

Abstracts of Theses Approved for the PhD/MMed/MSc at the School of Medical Sciences, Universiti Sains Malaysia, Kubang Kerian, Kelantan, Malaysia

PREVALENCE OF FALLS AND THEIR ASSOCIATED FACTORS AMONG HYPERTENSIVE OLDER ADULTS IN KUALA TERENGGANU, TERENGGANU

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Introduction: Falls are prominent health issues among older adults. Among hypertensive older adults, falls may have a detrimental effect on their health and wellbeing. The purpose of this study is to determine the prevalence of falls among hypertensive older adults and to identify the factors associated with their falls.

Objectives: To determine the prevalence of falls among hypertensive older adults in Kuala Terengganu and to identify factors associated with falls among hypertensive older adults in Kuala Terengganu, Terengganu.

Methods: This was a cross-sectional study conducted among 269 hypertensive older adults who were selected via systematic random sampling in two primary health clinics in Kuala Terengganu, Terengganu, Malaysia. Data on their socio-demographic details, their history of falls, medication history and clinical characteristics were collected. For the clinical characteristics, Modified Snellen Chart, Elderly Cognitive Assessment Questionnaire and Modified Barthel Index were used during the assessment. Balance and gait were assessed using the Performance Oriented Mobility Assessment (POMA). The analysis of the collected data was done using SPSS software. The simple logistic regression followed by multiple logistic regression analysis with backward and forward stepwise procedures were used.

Result: It was found that 32.2% of participants reported falls within a year. Polypharmacy (adjusted OR = 2.513; 95% CI: 1.339, 4.718) and diuretics (adjusted OR = 2.803; 95% CI: 1.418, 5.544) were associated with an increased risk of falls. Meanwhile, a higher POMA score (adjusted OR = 0.940; 95% CI: 0.886, 0.996) and the number of antihypertensives (adjusted OR = 0.473; 95% CI: 0.319, 0.700) were associated with a low incidence of falling among hypertensive older adults.

Conclusion: Falls are common among hypertensive older adults. Older adults who are taking diuretics and have a polypharmacy treatment plan have a higher incidence of falls. However, older adults taking a higher number of anti-

hypertensive medications were associated with a lower risk of falls.

Supervisor:
Professor Dr. Azidah Abdul Kadir

Co-supervisor:
Dr. Nur Suhaila Idris

THE EFFECT OF A BROWN-RICE DIET ON GLYCAEMIC CONTROL AND METABOLIC PARAMETERS IN PREDIABETES AND TYPE 2 DIABETES MELLITUS: A META-ANALYSIS OF RANDOMISED CONTROLLED TRIALS AND CONTROLLED CLINICAL TRIALS

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Background: Brown rice is a whole-grain food that is often assumed to have a lower glycaemic index compared to white rice. A few studies have objectively confirmed the effect of a brown- rice diet on glycaemic control and metabolic parameters compared to a white-rice diet. The purpose of this study is to determine the effect of brown rice on glycaemic control and metabolic parameters in prediabetes and type 2 diabetes. The researchers conducted a systematic review and meta-analysis of randomised controlled trials and controlled clinical trials.

Methods: PRISMA guidelines were used as the basis of this systematic review. Relevant studies were identified by searching the following databases: Cochrane Central Register of Controlled Trials, MEDLINE (PubMed), as well as Epistemonikos for randomised controlled trials and controlled clinical trials published not later than January 2021 involving adults with prediabetes and type 2 diabetes mellitus who were consuming brown rice compared with those consuming white rice. The primary outcomes measured were glycated haemoglobin and fasting blood glucose levels. The secondary outcomes were body weight, waist circumference, systolic and diastolic blood pressure levels, low-density lipoprotein cholesterol and high-density lipoprotein cholesterol levels. The mean differences with 95% confidence intervals between brown and white-rice-diet groups were calculated using a random-effects model.

Results: Seven trials involving 417 adults with prediabetes or type 2 diabetes were included in this study. Brown-rice diet did not improve the glycaemic control because it had no effect on the glycated haemoglobin level ($P = 0.150$) and the fasting blood glucose level ($P = 0.950$) compared to the white-rice diet. Brown-rice diet reduced body weight ($P < 0.001$; MD -2.2 kg; 95% CI: $-3.13, -1.26$; $I^2 = 0\%$). However, it had no effect on the waist circumference ($P = 0.090$), systolic blood pressure ($P = 0.600$) and diastolic blood pressure level ($P = 0.400$). HDL-cholesterol level is increased in brown-rice diet ($P = 0.010$; MD: 0.10 ; 95% CI: $0.02, 0.17$; $I^2 = 44\%$), but it had no effect on the LDL-cholesterol level ($P = 0.810$).

Conclusion: The available evidence indicated that consuming brown rice in substitute for white rice does not affect glycaemic control in pre-diabetes and type 2 diabetes patients. Brown rice, however, may be used as an alternative for white rice in such patients because it was found to reduce the body weight and increase HDL-cholesterol level. The benefits of a brown-rice diet on glycaemic control may not be detected in short-term studies. The obtained evidence in this meta-analysis ranged from low to moderate quality. Thus, more high-quality trials with a larger sample size and a longer follow-up duration are needed to further investigate the effects of a brown-rice diet on diabetes glycaemic control with stronger evidence.

Supervisor:
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QUALITY OF LIFE COMPARISON BETWEEN CONTROLLED VERSUS UNCONTROLLED ASTHMA IN HOSPITAL UNIVERSITI SAINS MALAYSIA, KELANTAN

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Introduction: Asthma is one of the most common chronic lung disease worldwide including in Malaysia. Asthma caused substantial physical, mental, and social impairment, limiting everyday activities. Asthma that is poorly controlled is linked to increased mortality and morbidity, as well as impairments in psychological, economic and quality of life. Therefore, it is very important to assess asthma control, as well as assessment of their quality of life, for better asthma care and management.

Objectives: This study was done to compare quality of life in people with controlled and uncontrolled asthma in Hospital Universiti Sains Malaysia using standardised Asthma Quality of Life Questionnaire, as well as to determine the correlation between asthma control and asthma quality of life.

Methods: From November 2021 to February 2022, a cross-sectional study was conducted at Hospital Universiti Sains Malaysia. All patients who came to Respiratory Clinic Hospital Universiti Sains Malaysia were screened for inclusion and exclusion criteria. For those who were selected, the demographic data was taken, and the Asthma Control Questionnaire and the Asthma Quality of Life Questionnaire were completed either by themselves or interviewed by investigator. All data were analysed with descriptive statistics (independent t -test and one-way ANOVA), and the association between asthma control and quality of life was analysed using Pearson correlation.

Results: For this study, 158 individual were screened, and 134 subjects were recruited. Participants in this study ranged in age from 18 years old to 80 years old, with a mean age of (48.75 ± 14.42). Females made up 76.7% of the participants ($n = 103$). Obesity was found in 53.7% of the patients ($n = 72$). The most commonly reported concomitant conditions are atopies (58%). Other comorbidities, such as GERD (23.1%), OSA (3.7%), anxiety (2.2%), diabetes and hypertension were also discovered. Overall, 47% of patients had uncontrolled asthma. Overall mean ACQ of (0.95 ± 0.95). There is no correlation between asthma control and the demographics of the patients, except GERD ($\chi^2 = 0.008$, $df = 1$, $P < 0.05$). When compared to other domains, the overall AQLQ mean score was (5.52 ± 0.80), with the environmental stimulation domain having the lowest mean score (4.17 ± 1.28). The asthma control status and quality of life had a strong negative correlation, ($r = -0.777$, $n = 134$, $P < 0.001$).

Conclusion: There is a substantial correlation between asthma control status and asthma quality of life status, according to this study. Patients with controlled asthma have a significantly higher quality of life compared to patients with uncontrolled asthma ($P < 0.05$).

Supervisor:
Dr. Nurashikin Mohammad

KNOWLEDGE, ATTITUDE AND STIGMA ON TUBERCULOSIS AND THE ASSOCIATED FACTORS FOR ATTITUDE AMONG TUBERCULOSIS CONTACTS IN ALOR SETAR, KEDAH

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Introduction: Tuberculosis (TB) is a worldwide public health crisis, and it has infected millions of people each year. Malaysia has been categorised as a country with an intermediate TB burden. Contact of TB patient (TB contacts) refers to any individual who was exposed to a person with TB disease previously. This group of people is at a higher risk of acquiring TB infection and they are candidates for active and latent TB infection screening and treatment. Thus, the World Health Organization considers screening of TB contacts as an

essential programme to control TB infection. Their attitude toward TB is important to know because it can determine their health seeking behaviour toward TB infection.

Objective: This study aims to explore the level of knowledge, attitude and stigma (KAS) on TB and the associated factors for attitude score among TB contacts in Kedah, Malaysia.

Methods: A cross-sectional study was performed among TB contacts using a validated KAS questionnaire on TB. A total of 338 respondents from five health clinics in Kedah, Malaysia was selected via convenience sampling. The data was analysed using simple and multiple linear regression.

Results: The mean KAS scores of participants are 73.5% (SD = 17.06), 83.0% (SD = 10.33) and 67.0% (SD = 16.72), respectively. Higher income ($P = 0.001$), better knowledge score ($P < 0.001$) and higher stigma score ($P = 0.003$) are the significant associated factors for the attitude score.

Conclusion: Our study revealed that our TB contacts generally have a satisfactory knowledge and positive attitude toward TB prevention and screening but their level of stigma on TB is high. The significant associated factors for a better attitude towards TB were higher income, higher knowledge score and higher stigma score. Implementation of TB intervention programmes among TB contacts particularly address health education on TB are required especially among low-income group.

Supervisor:
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Co-supervisor:
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ASYMPTOMATIC PERIPHERAL ARTERIAL DISEASES AND ITS ASSOCIATED RISK FACTORS AMONG TYPE 2 DIABETES MELLITUS PATIENTS IN HOSPITAL USM

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Introduction: Peripheral arterial disease [PAD] is a common manifestation of systemic atherosclerosis and is associated with an increased risk of death and ischemic events. PAD is a significant cause of morbidity and mortality among diabetic population. Detection of PAD among T2DM patients presents the opportunity to initiate secondary prevention by instituting atherosclerosis risk factor modification, thus reducing the risk of cardiovascular complications. Ankle brachial index [ABI] by ultrasound Doppler is the standard screening method for detecting atherosclerosis in PAD patients.

Objectives: This study is determined to evaluate the proportion of asymptomatic PAD and associated risk factors for patients under Diabetic Clinic HUSM.

Methods: This prospective and descriptive cross-sectional study included 159 diabetic patients who were regularly followed up in the Diabetic clinic HUSM between June 2021 and November 2021. An ABI test was performed in all subjects for detection of PAD who did not have symptoms of PAD. An ABI value < 0.90 indicates presence of PAD. A multiple logistic regression analysis was made between independent variables and the presence of an ABI < 0.90 .

Results: The final sample was 159 patients for whom ABI measurement was performed. The average age of 62.79 years old, comprising 105 (66.0%) males and 54 (34.0%) females from which 30 (18.9%) obtained an ABI < 0.90 . Multiple Logistic Regression was done for five independent variables which are age, IHD, HLP, CVA and LDL. Two variables were significant which were the IHD (OR = 4.56; 95% CI: 1.41, 13.77; $P = 0.007$) and HLP (OR = 6.71; 95% CI: 2.47, 18.25; $P = < 0.001$)

Conclusion: The prevalence of asymptomatic PAD among diabetes patients was 18.9%. (ABI < 0.90). The presence of ischaemic heart disease and hyperlipidaemia is significantly associated with PAD. The ABI test should be a regular routine in the diabetic clinic, especially on patients with ischemic heart disease and hyperlipidaemia.

Supervisor:
Associate Professor Dr. Wan Mohd Izani Wan Mohamed

QUALITY OF LIFE, ITS ASSOCIATED FACTORS AND ASSOCIATION WITH DEPRESSION AMONG PATIENTS WITH PSORIASIS AT DERMATOLOGY CLINIC HOSPITAL SULTANAH BAHYIAH, ALOR SETAR KEDAH

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Introduction: Psoriasis is an immune-mediated chronic relapsing inflammatory dermatological disorder with variable degree of severity and causes significant physical, psychosocial, economic impact and quality of life (QOL) to the patients. The psychological impact of psoriasis is substantial and may lead to substantial psychiatric conditions including depression, anxiety, and substance abuse.

Objectives: This study aims to determine the proportion of severe impaired quality of life, the associated factors to severe impaired quality of life and the correlation with depression among semi-urban populations in North East Coast of Peninsular Malaysia.

Methods: A cross-sectional study was conducted among 257 patients with psoriasis at the Dermatology Clinic of Hospital Sultanah Bahiyah, Alor Setar, Malaysia. Convenience sampling was applied. The data were collected by self-administered questionnaires. The questionnaires consist of sociodemographic profile, the validated Malay version of Dermatology Life Quality Index (DLQI), and Malay

version of Beck depression scale. The data was entered and analysed using the Statistical Package for the Social Sciences version 24.0 (SPSS v24). Descriptive analysis, simple/multiple logistic regression, and multiple linear regression analysis were applied.

Results: From 257 participants, 20.5% (95% CI: 5.14, 6.27) patients had severely impaired QOL quality of life, while 79.5% of patients had non-impaired QOL quality of life. Multiple logistic regression analysis showed that the severity of the disease (adjusted OR = 1.91; 95% CI: 1.76, 9.93; $P < 0.01$) and exposed area (adjusted OR = 2.93; 95% CI: 0.38, 2.29; $P = 0.05$) have a significant association with severe impaired QOL. While 18.7% (95% CI: 6.17, 7.26) patients had a positive screening for depression, which had a significant association between QOL and depression scores ($r = 0.47$; 95% CI: 0.35, 0.56; $P < 0.01$).

Conclusion: Our study showed that quality of life and psychological impact are significant in patients with psoriasis. The more impaired quality of life, the higher risk of depression among patients with psoriasis. Thus, regular screening is warranted for all patients with psoriasis to prevent any psychological impairment among patients with psoriasis.

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PATIENTS' PERSPECTIVES STIGMA AND DEPRESSION AMONG TUBERCULOSIS PATIENTS IN KEDAH, MALAYSIA

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Introduction: Tuberculosis (TB) related stigma is one of the significant barriers in global TB control and prevention programme. Stigma often cause psychological distress among TB patients which potentially impede their disease coping ability and treatment adherence. More importantly, stigma may lead to depression and these conditions frequently coexist, exerting negative impact on TB management.

Objective: This study aimed to determine the level of stigma among TB patients and the factors associated with it as well as to ascertain the correlation between level of stigma and depression in Kedah, Malaysia.

Methods: This was a cross sectional study using proportionate sampling method. Tb patients were recruited from chest clinic in three tertiary government hospital in Kedah. Case report form, a Malay version of 12 item TB stigma scale (TSS) and Beck Depression Inventory (BDI-Malay) were used for data collection. Data were then analysed using simple, multiple linear regression and correlation analysis.

Results: A total of 200 tuberculosis patient participated in the study and the mean score of tuberculosis stigma from patient perspective was 13.3 (SD 6.87). Younger age patient, currently married, higher education, unemployment and HIV co-infection were significantly associated with stigma experienced. In addition, there was a moderate, positive correlation between stigma and depression which was statistically significant ($r = 0.345$, $P < 0.001$).

Conclusion: Even though the patients' perspective stigma score among tuberculosis patient was not as high as we initially postulated, there was a moderate, positive correlation between stigma and depression level. Thus, intervention to reduce stigma among tuberculosis patients can be helpful as it may reduce the depression level.

Supervisor:
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COENZYME Q10 SUPPLEMENTATION FOR PROPHYLAXIS IN ADULT PATIENTS WITH MIGRAINE: A META ANALYSIS

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Introduction: Migraine is an episodic disorder, the centrepiece of which is a severe headache generally associated with nausea and/or light and sound sensitivity. Migraine is a common disorder that affects up to 12% of the general population. Migraine is a debilitating brain disorder with serious social and financial consequences for the individual and the society. Migraine medications usually aim to reduce the frequency and intensity of headache attacks and few of the medications acts as preventive medication.

Objective: To determine the effects of coenzyme Q10 (CoQ10) for reduction in the severity, frequency of migraine attacks and duration of headache in adult patients with migraine.

Design: Systematic review and meta-analysis.

Data sources: Cochrane Central Register of Controlled Trials, CENTRAL, MEDLINE, EMBASE, Cumulative Index to Nursing and Allied Health Literature (CINAHL) and Psychological Information Database (PsycINFO) from inception till December 2019.

Study selection: All randomised control trials comparing CoQ10 with placebo or used as an adjunct treatment included in this meta-analysis. Cross-over designs and controlled clinical trials were excluded.

Data synthesis: Heterogeneity at face value by comparing populations, settings, interventions and outcomes were measured and statistical heterogeneity was assessed by means of the I^2 statistic. The treatment effect for dichotomous outcomes were using risk ratios and risk

difference, and for continuous outcomes, mean differences (MDs) or standardised mean difference; both with 95% CIs were used. Subgroup analyses were carried out for dosage of CoQ10 and if CoQ10 combined with another supplementation. Sensitivity analysis was used to investigate the impact risk of bias for sequence generation and allocation concealment of included studies.

Result: Six studies with a total of 371 participants were included in the meta-analysis. There is no statistically significant reduction in severity of migraine headache with CoQ10 supplementation. CoQ10 supplementation reduced the duration of headache attacks compared with the control group (MD: -0.19; 95% CI: -0.27, -0.11; random effects; I^2 statistic = 0%; $P < 0.00001$). CoQ10 usage reduced the frequency of migraine headache compared with the control group (MD: -1.52; 95% CI: -2.40, -0.65; random effects; I^2 statistic = 0%; $P < 0.001$).

Conclusion: CoQ10 appears to have beneficial effects in reducing duration and frequency of migraine attack.

Supervisor:

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Co-supervisors:

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LEVEL OF KNOWLEDGE AND OTHER FACTORS ASSOCIATED WITH PRACTICE ON DIABETES MELLITUS MANAGEMENT DURING RAMADAN AMONG PRIMARY CARE DOCTORS IN KELANTAN

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Introduction: Fasting during Ramadan is one of the five pillars of Islam and majority of Muslims including those with diabetes will eagerly fast during Ramadan. Diabetic patients who fast should be risk-stratified and follow recommendations from their primary care doctors based on latest local and international guidelines on diabetes management in Ramadan. This study focuses on knowledge and other factors associated with management of diabetic patients during Ramadan among government primary care doctors in Kelantan.

Objectives: To determine knowledge, practice and associated factors for management of diabetes during Ramadan among government primary care doctors in Kelantan.

Methods: This was a cross sectional study conducted at in Kelantan involving 280 participants conveniently selected from government primary care clinics in Kelantan. A self-administered questionnaire was administered and consisted of two parts which are the knowledge and the practice of diabetes management during Ramadan. The multiple logistic regression was used to determine the associated factors.

Result: In Kelantan, 87.9% of the government primary care doctors showed good knowledge (score of $\geq 70\%$) with the mean correct score was 12.43 (95% CI: 12.23, 12.62; SD 1.68) and 56.4% had good practice (score of $\geq 75\%$) with the mean correct score was 10.98 (95% CI: 10.75, 11.21; SD 1.97). The good practice in managing diabetic patients during Ramadan was strongly associated with designated position as postgraduate training (OR = 2.75 [95% CI: 1.19, 6.36]; $P = 0.018$) and duration of service (OR = 1.01 [95% CI: 1.00, 1.02]; $P = 0.048$)

Conclusion: Majority of the government primary care doctors in our study had good level of knowledge and practice on the management of diabetes during fasting in Ramadan. Post-graduate training/trained doctors and duration of service were significantly associated with good practice on diabetes management during Ramadan. Primary care doctors should update their knowledge and follow the latest available local or international recommendations on the management of Ramadan during Ramadan.

Supervisor:

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Co-supervisor:

Associate Professor Dr. Nani Draman

SEXUALITY AND SEX EDUCATION FOR CHILDREN WITH INTELLECTUAL DISABILITIES: PERSPECTIVES AND EXPERIENCES OF THEIR MOTHERS (A QUALITATIVE STUDY)

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Introduction: Even though the sexuality of children with intellectual disabilities (IDs) is already a sensitive subject that is frowned upon by society, IDs add another degree of difficulty to acquire sexual knowledge. Previous literature indicates that parents of children with IDs are unwilling to view them as sexual beings, and some believe they are less in need of sex education (SE). Low knowledge of SE raises several health concerns, including vulnerability to sexual abuse and inappropriate sexual behaviour.

Objectives: To explore parents' views on sexuality and SE, their experiences in providing SE to their children with IDs, as well as the barriers and concerns associated with SE.

Methods: We employed a phenomenological approach and in-depth interviews with 20 Malay mothers of children with mild to moderate IDs or/and other neurodevelopmental disorders. The interviews were audio recorded, transcribed and coded using the Nvivo12 software. Thematic analysis was performed to extract relevant themes.

Results: Three themes emerged from the mother's views on sexuality: i) sexuality as erotic experience and life, which relies mainly on sexual intimacy and a part of person's life; ii) perceived the children's sexual maturity is

different, which reflects the mothers' attitudes toward their children's sexual development; iii) caution in providing SE, which summarises the mothers' ways of delivering SE, either following physicality or through socio-cultural ways. Among the hurdles that mothers encountered while imparting SE are personal factors such as a lack of knowledge, skills, and time; children's factors due to limited cognitive capacity to comprehend discussion; family dynamic factors such as family values, and sociocultural factors.

Conclusion: Almost all mothers realise the value of SE for their children's well-being, despite their lack of understanding about their children's developing sexuality. However, the interaction on the factors affecting mothers' attitudes about their children's sexuality and the dynamic interaction over the obstacles, hindered the provision of SE. This study emphasises the necessity for future interventions to overcome the factors and the hurdles at each level to implement the recommended strategies effectively.

Supervisor:
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EXPERIENCES OF FAMILY MEDICINE SPECIALIST (FMS) IN PROVIDING HEALTH CARE FOR LESBIAN, GAY, BISEXUAL AND TRANSGENDER PATIENTS: A QUALITATIVE STUDY IN EAST COAST PENINSULAR MALAYSIA

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Introduction: The recent years have witnessed a growing health concern over lesbian, gay, bisexual, and transgender (LGBT) community in Malaysia, particularly for human immunodeficiency virus infection/acquired immunodeficiency syndrome (HIV/AIDS) and sexually transmitted infection (STI). LGBT patients continue to report discrimination in healthcare setting despite the effort of our primary healthcare offering community friendly services.

Objectives: This qualitative study aimed to provide understanding of the current issue and to explore the challenges that family medicine specialist (FMS) face when dealing with LGBT patients.

Methods: Thirty FMSs working in East Coast Peninsular Malaysia were interviewed through a phenomenological framework using semi-structured in-depth interviews. The interviews were recorded, transcribed verbatim, and managed in an analytic computer software NVivo 12. The data were then analysed thematically.

Results: Three overlapping themes emerged from their experiences; i) understanding of LGBT as people who deviate from social norms and vulnerable members of society, ii) obstacles to providing culturally competent care, and

iii) barriers to incorporating spiritual needs for holistic care. FMSs have identified four main obstacles to providing health care for LGBT patients; lack of formal training, existence of stigma, challenging patients' personalities, and unfavourable clinic setting.

Conclusion: This study has shed light on the sensitive issue of LGBT in Malaysia and the current situation related to the challenges faced by FMS when dealing with LGBT patients. The findings on this study reflect the need for proper training of healthcare personnel to deliver a holistic, culturally competent care for LGBT patients. A collaborative effort with relevant authorities is also needed to successfully overcome those challenges.

Supervisor:
Associate Professor Dr. Rosediani Muhamad

Co-supervisor:
Dr. Maryam Mohd Zulkifli

THE EFFECTS OF EVENING PRIMROSE OIL ON MENOPAUSAL SYMPTOMS: A SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMISED CONTROLLED TRIALS

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Introduction: Evening primrose oil has been a treatment option for reducing menopausal symptoms but evidence for its use is inadequate.

Objectives: To determine the effectiveness of evening primrose oil in treating menopausal symptoms among peri and postmenopausal women.

Methods: The study design is a systematic review with meta-analyses of randomized controlled clinical trials. We sought for relevant randomised clinical trials in CENTRAL, MEDLINE, EMBASE and trial registries. The methodology and reporting were carried out grounded on references from the Cochrane collaboration and the preferred reporting items for systematic reviews and meta-analyses statement. All statistical analyses were carried out using Review Manager version 5.3.5.

Results: Five randomised clinical trials were identified, involving a total of 402 peri- and post-menopausal women. There was no difference between evening primrose oil and control for the frequency of daily vasomotor symptoms (MD 0.01 episodes; 95% CI: -0.54, 0.57; $P = 0.960$; two trials; $I^2 = 38\%$), frequency of daytime hot flash episodes (MD -0.51 episodes; 95% CI: -2.05, 1.03; $P = 0.510$; two trials, $I^2 = 87\%$), frequency of night sweat episodes per day (MD 0.33 episodes; 95% CI: -0.48, 1.13; $P = 0.430$; two trials, $I^2 = 74\%$) and severity of vasomotor symptoms (SMD -0.45; 95% CI: -1.56, 0.66; $P = 0.420$, four trials; $I^2 = 95\%$). EPO may reduce the severity of overall menopausal symptoms (SMD -1.18; 95% CI: -2.18, -0.18;

$P = 0.02$; two trials, $I^2 = 91\%$). There was no difference for the occurrence of nausea (RR 5.94; 95% CI: 0.74, 48.00; $P = 0.090$; $I^2 = 0\%$). There was insufficient data to analyse musculoskeletal symptoms, mood, sexuality, sleeping disorders and quality of life.

Conclusion: Evening primrose oil may reduce the severity of overall menopausal symptoms but is not effective to reduce the frequency and severity of vasomotor symptoms. The evidence quality ranged from very low to moderate. Further research is needed to enhance related evidence.

Supervisor:

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Co-supervisor:

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KNOWLEDGE, ATTITUDE AND ITS ASSOCIATED FACTORS FOR AUTISM SPECTRUM DISORDER AMONG CAREGIVERS WITH AUTISTIC CHILD IN KOTA BHARU, KELANTAN

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Introduction: Autism is a spectrum of disorder with different degree of intellectual and language impairment and emotional disturbances. Autism spectrum disorder persists into adolescent and adulthood as it has no cure. There are many interventions available to help these autism children such as speech therapy, occupational therapy and early intervention programme. Caregivers play a very important role in supporting their autism children. They need to know and understand the disorder very well. Thus, assessing their knowledge and their attitude is necessary in order to ensure their active role in the management of their autism children.

Objectives: To assess the proportion of good knowledge, attitude and its associated factors for autism spectrum disorder among caregivers with autism children in Kota Bharu.

Methods: A cross-sectional study was conducted among 128 caregivers of autism children in Kota Bharu, Kelantan from May to August 2020 using convenient sampling. Validated questionnaires were used to assess knowledge and attitude towards autism children. Data were entered and analysed using SPSS version 24.0. Descriptive statistics and simple and multiple logistic regression analyses were used.

Results: The response rate was 100%. The prevalence of good knowledge on autism and attitude towards autism children among caregivers was 85.1% and 88.3%, respectively. Factors which significantly associated with good knowledge were female [OR (95% CI): 2.79 (0.99, 7.90)], Chinese ethnicity [OR (95% CI): 0.08 (0.01, 0.92)] and not first-born autism child [OR (95% CI): 0.41 (0.15, 1.12)]. Whereby factors which significantly associated with good

attitude towards autism children were age above 30 years old [OR (95%CI): 0.13 (0.03, 0.62)] and caregivers who had other children with other type of learning disorders [OR (95% CI): 0.15 (0.04, 0.52)].

Conclusion: The proportion of good knowledge and good attitude towards autism children were high. Sociodemographic factors such as age, gender, ethnicity, the position of autism child among their siblings and the presence of other type of learning disorders in the family need to be determined when managing children with autism.

Supervisor:

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EFFECTIVENESS OF IRON POLYMALTOSE COMPLEX IN TREATMENT AND PREVENTION OF IRON DEFICIENCY ANEMIA IN CHILDREN: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Introduction: Iron deficiency anemia (IDA) is commonly treated with iron formulations. Despite the expanding acceptance of iron polymaltose complex (IPC) among clinicians, there is sparse and contradictory evidence regarding its efficacy in the management of IDA in children. This systematic review and meta-analysis aimed to assess the effectiveness of IPC in the treatment and prevention of IDA in children.

Objectives: To determine the efficacy and safety of oral iron IPC for the prevention and treatment of IDA in infants, children, and adolescents.

Methods: We searched the Cochrane Central Register of Controlled Trials, MEDLINE and Epistemonikos for all randomized control trials comparing oral IPC with standard oral iron supplementation for the treatment or prevention of IDA in children. We independently screened the titles and abstracts of identified trials before the full text of relevant trials were evaluated for eligibility. We then independently extracted data on the methods, interventions, outcomes, and risk of bias from the included trials. A random-effects model was used to estimate the risk ratios and mean differences with 95% confidence intervals.

Results: Eight trials comprising 493 randomised patients were included and analysed using three comparison groups. The comparison group of which was used to evaluate IPC and ferrous sulphate (FS) for treatment of IDA showed that IPC is less effective in increasing Hb (MD -0.81 ; 95% CI: $-1.08, -0.53$; $I^2 = 48\%$; $P < 0.001$; six studies, 368 participants; high certainty of evidence), ferritin (MD -21.24 ; 95% CI: $-39.26, -3.23$; $I^2 = 65\%$, $P = 0.020$; 3 studies, 183 participants; moderate certainty of evidence) and mean

corporeuscular volume levels (MD -3.20; 95% CI: -5.35, -1.05; $P = 0.003$; one study, 103 participants; low certainty of evidence). There was no difference in the occurrence of side effects between IPC and FS group (MD 0.78; 95% CI: 0.47, 1.31; $I^2 = 4\%$; $P = 0.350$; three studies, 274 participants; high certainty of evidence).

Conclusion: There was moderate to high certainty evidence that IPC is inferior to FS with a clinically meaningful difference in improving the Hb and ferritin levels in the treatment of IDA in children. There was no difference in the occurrence of gastrointestinal side effects with high certainty evidence between the IPC and FS groups. The body of evidence did not allow a clear conclusion regarding the effectiveness of IPC with iron gluconate and iron bisglycinate in the prevention and treatment of IDA. The certainty of evidence was low. Adequately powered and high-quality trials with large sample sizes that assess both hematological and clinical outcomes are required.

Supervisor:
Associate Professor Dr. Norhayati Mohd Noor

Co-supervisor:
Professor Dr. Shaiful Bahari Ismail

PROPORTION, RISK FACTORS AND CLINICAL OUTCOME OF MULTIDRUG-RESISTANT ORGANISMS AMONG CORONAVIRUS DISEASE 2019 PATIENTS IN CRITICAL CARE WARDS IN HOSPITAL RAJA PEREMPUAN ZAINAB II

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Introduction: Severe COVID-19 patients may require a prolonged stay in hospitals and are at higher risk of developing hospital-acquired infections with multidrug-resistant organisms (MDROs) especially in Critical Care Wards. MDRO patients are significantly associated with morbidity and mortality due to limited antimicrobial options and prolonged hospital stay. This study was aimed to evaluate the proportion, risk factors and clinical outcome of MDROs among severe COVID-19 patients in Critical Care Wards, Hospital Raja Perempuan Zainab (HRPZ) II.

Objectives: This study is determine to evaluate the proportion, risk factors and clinical outcome of MDROs among severe COVID-19 patients in critical care wards HRPZ II.

Methods: This is a retrospective cohort study involving a review of medical records of patients who were admitted in the critical care wards, diagnosed with severe COVID-19 in HRPZ II from January 1, 2021 through December 31, 2021. Statistical analysis was done using SPSS version 26.0.

Results: Three hundred and twenty-two patients were included in this study. Of 160 patients with MDRO acquisition, MDR *Acinetobacter baumannii* (46%) was the

most common, followed by CRE *Klebsiella pneumoniae* (23.6%), ESBL *Klebsiella pneumoniae* (13%) and MRSA (5%). MDROs were mostly isolated from tracheal aspirates (79.5%), blood (18%), sputum (1.9%) and urine (0.6%). Multivariate analysis showed COPD ($P = 0.037$) and exposure to multiple antibiotics ($P = 0.001$) were significant risk factors for MDRO isolation. All patients received steroids whilst 42.2% received concomitant immunomodulatory therapy either tocilizumab (30.1%) or baricitinib (12.1%). However, the use of immunomodulatory therapy was not associated with higher MDRO isolation. MDRO group patients had a higher risk of in-hospital mortality ($P < 0.001$).

Conclusion: COPD and exposure to multiple antibiotics therapy were significant risk factors for MDRO isolation among critically ill COVID-19 patients. MDRO patients are linked to a higher risk of mortality, and hence the stringent implementation of infection prevention measures and antimicrobial stewardship strategies are crucial for patients with risk factors.

Supervisor:
Dr. Alwi Muhd Besari @ Hashim

Co-supervisors:
Dr. Anilawati Mat Jelani,
Dr. Siti Azrin Ab Hamid

ASSESSING INFORMAL CAREGIVER BURDEN AS WELL AS KNOWLEDGE ON POSITIONING AND FEEDING OF STROKE PATIENTS IN HOSPITAL USM

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Introduction: Stroke contributes to high morbidity and mortality in both developed and developing countries. In a developing country like Malaysia, most stroke patients are taken care of by informal or family caregivers. Most of them did not receive adequate preparation and training. Hence may lead to an increase in caregiver burden. To date, there is a lack of information to correlate caregiving knowledge with the caregiver burden of stroke patients. This study examines the relationship between caregiver burden, caregiving knowledge, and demographic data of the informal caregiver of stroke patient in Hospital USM.

Objectives: This study is to determine the burden and knowledge of informal caregiver regarding positioning and feeding of stroke patients in Hospital USM. Risk factor associated with caregiver burden also be assessed in this study.

Methods: This cross-sectional study involves informal caregivers attending Rehabilitation Unit in Hospital USM. Caregiving knowledge and caregiver burden were measured using Caregiving Knowledge Questionnaire (CKQ-My on feeding and positioning) and Zarit Burden Interview (MZBI). Socio-demographic data of patients and caregivers also were

sampled and analysed. Descriptive and multivariate statistics were used for data analysis.

Results: Total of 76 participants were analysed, 87.8% of them had poor knowledge in positioning of stroke patient. Otherwise, all 46 participant whose been assessed for feeding knowledge showed to had good knowledge (mean score 15.59 ± 2.29). About half of informal caregiver experience burden (47.88%) in taking care of stroke patient and majority of them categorized in mild to moderate (42.1 %). Multiple logistic regression demonstrated that caregivers who taking care of stroke patient with MRS 4-5 has 4.9 higher odd compared to stroke patient with MRS 1-3 to experience caregiver burden (95% CI: 1.50, 15.96; $P = 0.008$). For non-primary caregiver has 94% lower odd to get burden compared to primary caregiver (95% CI: 0.02, 0.247; $P < 0.001$).

Conclusion: Informal caregivers of stroke patients at Hospital USM had poor knowledge on positioning, but good knowledge in feeding. Besides, they also experienced mild to moderate burden. Only Modified Rankin Scale (MRS) of stroke patient and type of caregiver (primary vs. non-primary) was found to be associated with the caregivers' burden.

Supervisor:

Associate Professor Dr. Nazri Mustaffa

Co-supervisor:

Associate Professor Dr Muhammad Hafiz Hanafi

AN AUDIT ON THE PRACTICE OF MANAGING HEART FAILURE PATIENTS WITH IRON DEFICIENCY ANAEMIA ATTENDING HEART FAILURE OUTPATIENT CLINIC HOSPITAL USM

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Introduction: Iron deficiency anaemia (IDA) is a common condition encountered in heart failure patients regardless of ejection fraction spectrum. There were many studies demonstrating IDA was associated with poorer functional status, higher risk of rehospitalization, and mortality among heart failure populations. In Hospital USM, there was a recent study published in January 2020 that demonstrated IDA was common among populations with heart failure with reduced ejection fraction (HFrEF) and associated with poorer NYHA functional class status.

Objectives: This audit was undertaken to determine whether the realisation from the published study in January 2020 had led to improvements in the management of IDA among heart failure patients in Hospital USM.

Methods: This is a retrospective audit in heart failure patients attending the Heart Failure Outpatient Clinic HUSM between the period of 1st January to 31st December 2021. The case notes from the patients' database were used to

obtain patients' demographics, comorbidities, haematological parameters, and echocardiographic findings. All heart failure patients attended Heart Failure Outpatient Clinic HUSM within the defined period included in this audit.

Results: A total of 205 patients' data were identified in heart failure clinic in the year of 2021. Of these 205 patients, only 150 (73%) patients had their haemoglobin levels assessed and anaemia was detected in 82 (53%) of them. In the anaemic cohort, 38 (47%), 4 (0.5%) and 44 (54%) patients had complete, incomplete and no IDA investigations ordered, respectively. Among those with full IDA investigations, 25 patients had IDA whereby, 14 (56%) patients had functional IDA and the remaining 11 (44%) patients had absolute IDA. However, none of the patients were treated with parenteral iron therapy during their clinic follow-up.

Conclusion: The result of our study demonstrated that anaemia and specifically iron deficiency is common comorbidity encountered among heart failure patients. In spite of this, the clinical audit found the condition was still poorly addressed and treated among heart failure patients in Hospital USM. Therefore, we advocate that all patients diagnosed with heart failure should be screened for anaemia and its cause and be treated properly. Finally, a comprehensive education plan for health care workers involved in managing heart failure patients is needed to instil the importance of addressing anaemia and IDA among heart failure patients.

Supervisor:

Dr. Abu Dzarr Abdullah

Co-supervisor:

Dr. W Yus Haniff W Isa

ASYMPTOMATIC PERIPHERAL ARTERIAL DISEASES AND ITS ASSOCIATED RISK FACTORS AMONG TYPE 2 DIABETES MELLITUS PATIENTS IN HOSPITAL USM

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Introduction: Peripheral arterial disease (PAD) is a common manifestation of systemic atherosclerosis and is associated with an increased risk of death and ischemic events. PAD is a significant cause of morbidity and mortality the among diabetic population. Detection of PAD among T2DM patients presents the opportunity to initiate secondary prevention by instituting atherosclerosis risk factor modification, thus reducing the risk of cardiovascular complications. Ankle brachial index (ABI) by ultrasound Doppler is the standard screening method for detecting atherosclerosis in PAD patients.

Objectives: This study is determined to evaluate the proportion of asymptomatic PAD and associated risk factors for patients under Diabetic Clinic HUSM.

Methods: This prospective and descriptive cross-sectional study included 159 diabetic patients who were regularly followed up in the Diabetic Clinic HUSM between June 2021 and November 2021. An ABI test was performed in all subjects for detection of PAD who did not have symptoms of PAD. An ABI value < 0.90 indicates presence of PAD. A multiple logistic regression analysis was made between independent variables and the presence of an ABI value < 0.90 .

Results: The final sample was 159 patients for whom ABI measurement was performed. The average age of 62.79 years old, comprising 105 (66.0%) males and 54 (34.0%) females from which 30 (18.9%) obtained an ABI value < 0.90 . Multiple Logistic Regression was done for five independent variables which are age, IHD, HLP, CVA and LDL. Two variables were significant which were the IHD (OR = 4.56; 95% CI: 1.41, 13.77; $P = 0.007$) and HLP (OR = 6.71; 95% CI: 2.47, 18.25; $P < 0.001$)

Conclusion: The prevalence of asymptomatic PAD among diabetes patients was 18.9%. (ABI value < 0.90). The presence of ischaemic heart disease and hyperlipidaemia is significantly associated with PAD. The ABI test should be a regular routine in the diabetic clinic, especially on patients with ischemic heart disease and hyperlipidaemia.

Supervisor:

Associate Professor Dr. Wan Mohd Izani Wan Mohamed

ACCURACY OF BASELINE SERUM CORTISOL IN DIAGNOSING SECONDARY ADRENAL INSUFFICIENCY

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Introduction: Adrenal insufficiency (AI) is defined as inability of adrenal cortex to secrete enough number of hormones like glucocorticoids and mineralocorticoids. To establish the diagnosis of AI, one need to undergo Short Synacthen Test (SST). However, baseline serum cortisol may be a useful tool for screening and diagnosis of AI. The objectives of the study are to compare baseline serum cortisol with positive and negative SST and to evaluate diagnostic accuracy of baseline serum cortisol at different cut off value.

Objectives: To determine the diagnostic accuracy of baseline serum cortisol and association both clinical and biochemical factors in diagnosing secondary adrenal insufficiency.

Methods: This 5-year retrospective study was performed in three tertiary centres. A total of 111 who undergone SST in the endocrine clinics were identified. Baseline serum cortisol was defined as a random serum cortisol sample drawn at first presentation. Positive SST refers to a patient who has confirm diagnosis of adrenal insufficiency based on short synacthen test (serum cortisol level < 550 nmol/L at 30 min or 60 min). The association between baseline serum cortisol and positive SST level

were demonstrated by independent sample *t*-test analysis. Diagnostic accuracy was evaluated by ROC analysis.

Results: Of the 111 patients who underwent SST, only 103 patients who fulfilled all the criteria. From 103 patients, 53 (51%) were confirmed to have secondary AI. Mean serum cortisol for positive SST was 143.86 ± 105.68 nmol/L. The ROC curve for the model assessing the diagnostic accuracy had an area under curve of 0.72 (95% CI: 0.62, 0.82). The cut off level of baseline serum cortisol for lower group were < 80 nmol/L and < 100 nmol/L with highest specificity of 98%, the optimal baseline serum cortisol of > 400 nmol/L had the highest sensitivity of 98.1%.

Conclusion: Baseline serum cortisol of < 100 nmol/L is highly specific and very strongly associated with secondary AI. There were no clinical and biochemical factors associated with positive SST in this study.

Supervisor:

Associate Professor Dr. Wan Mohd Izani Wan Mohamad

Co-supervisors:

Associate Professor Dr. Najib Majdi Yaacob,

Dr. Norhayati Yahya,

Dr. Masliza Hanuni Mohd Ali,

Dr. Tuan Salwani Tuan Ismail

STUDY OF EFFECTIVENESS OF USING RVI PLAX VIEW ON DETECTION ON SUPRADIAPHRAGMATIC CVC MALPOSITION IN COMPARISON TO CHEST X-RAY

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Background: Right ventricle inflow parasternal long axis view is one of the basic echocardiographic views that is easily performed bedside to visualize anterior cardiac structure such as tricuspid valve, right ventricle as well as right ventricle outflow tract. Likewise, we would like to explore the effectiveness of right ventricle inflow parasternal long axis view in determining the correct central venous catheter tip placement in comparison to conventional chest radiograph. As we know, that performing a bedside ultrasound is faster than X-ray, which involves confirming of placement.

Methods: This is a cross-sectional study specially designed to determine the effectiveness of right ventricle inflow parasternal long axis view in determine correct central venous catheters tip placement. This study was conducted from June 2021 until December 2021. Convenient and probable sampling were used, and subjects were screened in general medical ward, intensive care unit and medical high dependency unit, which involved a total of 105 patient that fulfilled the inclusion criteria. Socio-demographic, based on age, gender, ethnicity, comorbidities, central venous catheter indication and types were recorded. Patient vital signs and any inotropic or ventilatory support were recorded

as well. Bedside ultrasound performed by credential doctor/ investigator using apical four chambers view, right ventricle inflow parasternal long axis view as well as subcostal views (in certain difficult/poor echocardiography window patient) to visualize the tip of central venous catheter, each ultrasound clip was documented. Moreover, the contrast medium used in these studies was 5 cc–10 cc normal saline aided for better visualisation. Descriptive data reported as means and standard deviations for normally distributed data and as median for abnormally distributed data. Categorical data were reported in percentages and frequencies. Numerical data were presented as mean (SD) based on their normality distribution. The ratal agreement between first and second investigator was calculated based on Cohen's kappa coefficient for interrater reliability.

Results: Abnormal rapid arterial swirl sign in right ventricle inflow parasternal long axis view was not a sensitive sign (16.7%) but a very specific sign (91.9%) of central venous catheter malposition. There were no intraarterial central venous catheter malposition occurred. Right ventricle inflow parasternal long axis views successfully detected all intravenous central venous catheter tip position. Moreover, the '2 second rule' and the onset of rapid arterial swirl sign could not determine whether central venous catheter tip was correctly positioned. There was a moderate interrater disagreement between 1st and 2nd investigator with the kappa interrater reliability ratio of 0.456.

Conclusion: Contrast enhanced ultrasound with right ventricle inflow parasternal long axis view is an accurate and reproducible tool to rule out central venous catheter malposition in patient. However, prospective studies performed on larger study sample are required to confirm our study result.

Supervisor:

Dr. Mohd Jazman Che Rahim

THE PREVALENCE OF COVID-19 POSITIVITY AMONG HEALTHCARE WORKERS MANAGING COVID-19, ITS ASSOCIATED FACTORS AND ADHERENCE TO PERSONAL PROTECTIVE EQUIPMENT IN TERENGGANU

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Introduction: Coronavirus disease 2019 (COVID-19) is highly contagious and spread rapidly to affect almost the whole world. Though there are many studies focusing on healthcare workers in Malaysia, there are limited published studies on healthcare workers caring for COVID-19 positive patients or worked in COVID-19 related areas in Terengganu. Therefore, this study objectives is to determine both the prevalence and risk factors associated with COVID-19 positive and compliance to Personal Protective Equipment (PPE) among healthcare workers caring for COVID-19 patients or work in COVID-19 related areas in Terengganu.

Objectives: This study is determined to describe outcomes regarding prevalence and risk factors associated to COVID-19 positive and compliance to PPE among healthcare workers who provide care to COVID-19 patients and work in COVID-19 related areas in Terengganu.

Methods: This is a retrospective record review study. All healthcare worker who exposed or worked with COVID-19 patients will be screened for COVID-19. Among them, those who fulfill the criteria of working at Hospital Sultanah Nurzahirah (HSNZ) or Hospital Hulu Terengganu from June 2020 to December 2021 are included in the study. They were also given set of validated questionnaires as part of continuous improvement for assessment of compliance to PPE in managing COVID-19 cases. All data already collected, and they will be kept in Infectious Disease Unit HSNZ as hardcopy. Data will be reviewed and extracted into an excel sheet.

Results: A total of 300 healthcare workers caring for COVID-19 patients or work at COVID-19 related areas at Hospital Sultanah Nurzahirah and Hospital Hulu Terengganu were screened, 260 included in the study while another 40 were excluded due to incomplete form for PPE surveillance. None of the 260 healthcare workers were noted to be positive for COVID-19 PCR. Overall, 187 workers (71.9%) had a 100% self-reported compliance towards all five components of main personal protective equipment (PPE) while facemask recorded the highest rate of all time compliance with 250 workers (96.2%). PPK workers increased the risk of inadequate PPE by 16.68 compared to medical assistant workers (adjusted OR = 16.684; $P = 0.003$). Healthcare workers with a duration of exposure of 2 weeks–4 weeks increased the risk of inadequate PPE by 3.913 compared to healthcare workers with longer than six weeks (adjusted OR = 3.913; $P = 0.009$).

Conclusion: Our data showed that no significant risk of getting COVID-19 amongst healthcare worker who provide care to COVID-19 positive patients or work in COVID-19 related areas in Terengganu. This is because none of 260 participants tested to be positive. Personal protective equipment (PPE) compliance is vital in preventing transmission. Out of 260 participants, 187 workers (71.9%) had a 100% self-reported compliance towards all five components of personal protective equipment with highest compliance aspect reported towards facemask with 250 workers (96.2%); better compliance associated with designation and duration of exposure with P -value < 0.05.

Supervisor:

Dr. Alwi Besari

Co-supervisor:

Dato' Dr. Ahmad Kashfi Ab Rahman

DIAGNOSTIC ACCURACY OF CONTRAST-ENHANCED ULTRASOUND WITH DEXTROSE 50% IN DETECTING SUPRADIAPHRAGMATIC CENTRAL VENOUS CATHETER MALPOSITION

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Kelantan, Malaysia

Introduction: Central venous catheter (CVC) insertion is common in an in-patient medical setting. The usage varies from the administration of drugs, resuscitation, and haemodialysis. A standard practice to confirm CVC placement is by using a chest radiograph. Similarly, the usage of contrast-enhanced ultrasound (CEUS) can also detect catheter malposition, as shown by previous studies. Most studies used saline as a contrast, however it has been observed that using Dextrose 50% (D50%) as a contrast solution instead of saline results in better ultrasonic features. We explored the diagnostic accuracy of using D50% as a contrast solution to detect supradiaphragmatic central venous catheter malposition in Hospital Universiti Sains Malaysia (HUSM).

Objective: To determine the diagnostic accuracy of contrast-enhanced ultrasound (RVI PLAX, apical four-chamber, subcostal view) using D50% as a contrast medium in confirming supradiaphragmatic catheter placement.

Methods: This is a cross-sectional study involving patients who had CVC inserted according to standard indication and clinical practice. Convenient sampling was used, and subjects were screened from in-patient ward HUSM. We compared catheter malposition detection using Rapid Atrial Swirl Sign (RASS) features by CEUS with D50% and central venous catheter tip on chest radiograph. Additionally, we compared the agreement between first and second investigators regarding RASS features.

Results: In total, we included 99 patients. Seven catheter malpositions were detected by chest radiograph, and from this, only one was detected by CEUS. The sensitivity of detecting catheter malposition by CEUS D50% was 14.3%, and specificity was 95.5%. There was a moderate agreement between ultrasound and chest X-ray film with a Cohen's Kappa coefficient of 0.533.

Conclusion: In this study, CEUS using D50% cannot replace CXR to detect catheter malposition. However, it can determine the correct CVC position in the venous following insertion.

Supervisor:
Dr. Mohd Jazman Che Rahim

Co-supervisor:
Dr. Siti Azrin Ab Hamid

RETROSPECTIVE ANALYSIS OF THE EFFECTS OF A DEDICATED TRAUMA OPERATION THEATRE AND INTENSIVE CARE UNIT ON THE OUTCOMES OF PATIENTS WITH TRAUMATIC BRAIN INJURY AFTER EMERGENCY NEUROSURGERY: A SINGLE CENTRE STUDY

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Kelantan, Malaysia

Background: The set-up of trauma operation theatre (TOT) and trauma intensive care unit (TICU) within the same block with emergency department (ED) can facilitate immediate management and surgery for traumatic brain injury (TBI) patients. The aim of this study was to compare the effectiveness and the outcome of TBI management between the existence of TOT-TICU set-up and the previous setup of general OT (GOT) and Neuro-ICU (NICU).

Methods: This was a retrospective cohort study involving 120 TBI patients who were divided into GOT-NICU group (63 patients) and TOT-TICU group (57 patients). The data were obtained from admission records and patients' medical records. The demographic data, the duration during few phases of management and the outcome of patients were documented. Comparison of data between the 2 groups were recorded and statistically compared using Mann Whitney Test for the durations of transport, chi-square test for comparison of Glasgow Outcome Score (GOS) dan Spearman correlation to observe the correlations between the variables and the changes in GOS upon discharge and 3 months after discharge.

Results: Group TOT-TICU showed significantly shorter duration of transportation from ED to OT [15 (\pm 15) versus 45 (\pm 15) min; $P < 0.001$], duration of arrival in OT to incision [50 (\pm 30) versus 70 (\pm 23) min; $P = 0.005$] and duration of transportation from OT to ICU [40 (\pm 17) versus 48 (\pm 30); $P = 0.005$] than Group GOT-NICU. When we compare the transportation time from ED to OT, arrival to OT to time of incision and duration of transportation to Intensive Care Unit (ICU), TOT-TICU showed shorter durations in minutes compared to GOT-TICU group. There were significant correlations between Glasgow outcome scale (GOS) upon discharge with duration of ED management, duration of surgery, pre-intubation GCS, severity of TBI, duration of mechanical ventilation and ICU stay. There were also significant correlations between GOS at 3-month with ED management duration, pre-intubation GCS, severity of TBI, duration of mechanical ventilation and ICU stay. Generally, GOS are better when the duration of ED management, surgery, mechanical ventilation and treatment in ICU are shorter. Apart from that, severity of the brain injury according to pre-intubation GCS also influences GOS, where the more severe the brain injury, the lower the GOS recorded.

Conclusion: The set-up of TOT-TICU nearby to ED shortened duration of transportation from ED to OT, duration of arrival in OT to incision and duration of transportation from OT to ICU if compared to GOT-NICU setup. However, the outcomes in terms of GOS at discharge and 3 months after discharge were similar between the two groups.

Supervisor:

Dr. Wan Mohd Nazaruddin Wan Hassan

Co-supervisor:

Dr. Mohamad Hasyzan Hassan

A RANDOMISED CONTROLLED TRIAL COMPARING THE EFFICACY OF INTRACUFF ALKALINISED LIGNOCAINE PLUS INTRAVENOUS DEXAMETHASONE AND INTRAVENOUS DEXAMETHASONE IN PREVENTING POST-OPERATIVE SORE THROAT

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Introduction: Post-operative sore throat (POST) is a common complication of endotracheal intubation. Despite the established efficacy of intracuff alkalised lignocaine and intravenous dexamethasone in preventing POST, no study has compared the efficacy of alkalised lignocaine plus dexamethasone and dexamethasone alone.

Objectives: This study aimed to evaluate the efficacy of intracuff alkalised lignocaine plus intravenous dexamethasone (LD) and intravenous dexamethasone (D) alone in reducing POST.

Methods: This was a single-blinded, parallel, randomised controlled, single-centre trial in patients who underwent surgery under general anaesthesia that required endotracheal intubation in supine position. Patients were randomised into Group D who received intravenous dexamethasone 8 mg only ($n = 36$), and Group LD who received intracuff alkalised lignocaine 2% plus intravenous dexamethasone 8 mg ($n = 36$) using simple randomisation method with sealed-enveloped. POST and post-operative hoarseness (PH) were assessed at 1-h post-operation and 24-h post-operation by blinded assessor by interviewing the patients and scoring visual analogue score (VAS).

Results: Total 72 patients were randomised and analysed. The overall incidence of POST was 38.9% versus 44.4% in group D and LD, respectively ($P = 0.633$), which was same with the incidence of POST at 1-h after surgery. At 24-h after surgery, the incidence was 11.1% versus 8.3% ($P = 1.000$). At 1-h post-operatively, the VAS for group D and LD were 19.0 mm (Interquartile range (IQR): 14.0) and 21.5mm (IQR: 25.0)($P = 0.803$). At 24-h post-operatively, there was no significant difference of VAS between two groups. There was no significant difference in the overall

incidence of PH between group D and LD (61.1% versus 63.9%, $P = 0.808$). There were no adverse events reported.

Conclusion: Combination of intravenous dexamethasone and intracuff alkalised lignocaine did not significantly reduce in incidence of POST and PH compared to intravenous dexamethasone alone. It also didn't affect the pain score significantly in both groups.

Supervisor:

Associate Professor Dr. Saedah Ali

Co-supervisors:

Professor Dr. Shamsul Kamalrujan Hassan,
Dr. Chan See Yun

THE EFFECTIVENESS OF PREEMPTIVE NEBULISED DEXAMETHASONE IN REDUCING POST-OPERATIVE SORE THROAT FOLLOWING THE USE OF AMBU® AURAGAIN™ DEVICE: A DOUBLE BLIND, RANDOMISED CLINICAL TRIAL

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Introduction: Post-operative complications of sore throat, cough and hoarseness of voice are common minor complications following general anaesthesia. Although with a lower incidence with the use of supraglottic device, they may cause discomfort and delay recovery which may lead to added hospitalisation costs. To date, while there are proposed methods to prevent them, there is yet to be a proven method to effectively reduce their incidence and severity. This study evaluates the effectiveness of a single pre-operative dose of nebulised dexamethasone to reduce the incidence and severity of post-operative sore throat, cough and hoarseness of voice in the use of Ambu® AuraGain™ device.

Objectives: The general objective was to determine the effectiveness of pre-operatively nebulised dexamethasone in reducing the incidence of post-operative sore throat following Ambu® AuraGain™ SGA device use in patients undergoing elective procedures in Hospital Universiti Sains Malaysia, Kelantan. Specific objectives were to compare the incidence and severity of post-operative sore throat (POST), cough and hoarseness of voice with pre-operatively nebulised dexamethasone following insertion of Ambu® AuraGain™ SGA device at 30 min and 24 h post-operatively in patients undergoing elective procedures in Hospital Universiti Sains Malaysia, Kelantan.

Methods: Twenty-four patients between ages 18 years old–70 years old of ASA 1 and 2 groups undergoing elective surgical procedures using supraglottic airway device in Hospital Universiti Sains Malaysia, Kelantan were recruited and assigned randomly to two groups either C for routine anaesthetic care ($n = 12$) or D for receiving intervention ($n = 12$), which is a single dose of pre-operative nebulised dexamethasone 8 mg. Outcomes of incidence and severity

were measured using a 4-point scale for post-operative sore throat, cough and hoarseness of voice respectively at 1 h and 24 h.

Results: The incidence of sore throat was lower at 24 h in the control group compared to the intervention group (8.3% versus 50%, $P = 0.045$). Incidences of cough and hoarseness of voice were higher at 24 h in the intervention group, but this was not statistically significant.

Conclusion: Pre-operative nebulised dexamethasone 8 mg was not effective in reducing the incidence and severity of post-operative sore throat, cough and hoarseness of voice following the use of device.

Supervisor:

Associate Professor Dr. Rhendra Hardy Mohamad Zaini

Co-supervisor:

Associate Professor Dr. Wan Mohd Nazaruddin Wan Hassan

THE USAGE OF SUGAMMADEX IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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Introduction: Sugammadex is a selective reversal agent for neuromuscular agent such as rocuronium. It has significant advantages and safety profile compared to the traditionally used neostigmine. However, the use remains restricted due to its high cost. This study was designed to identify whether the indication of sugammadex usage adhered to Malaysian Society of Anaesthesiologists (MSA) protocol, the percentage of neuromuscular monitoring usage and intensive care unit (ICU) admission in patients given sugammadex.

Objectives: To explore whether the pattern of sugammadex usage in Hospital Universiti Sains Malaysia's (HUSM) anaesthetic practice adheres to the Malaysian Society of Anaesthesiologists (MSA) Sugammadex Clinical Use Protocol.

Methods: A five-year retrospective cross-sectional study from 2015 to 2019 was conducted in Hospital Universiti Sains Malaysia (HUSM) involving all government patients aged 18 years old who required elective or emergency surgery under general anaesthesia and received sugammadex as a neuromuscular blocking reversal agent. A total of 266 patients were identified from sugammadex usage recording book and relevant data from the medical and anaesthesia records were recorded into a data collection sheet which was created using Google Forms. The data were analysed using IBM Statistical Package for the Social Sciences (SPSS) for macOS 26.0.

Results: Out of 266 patients, 254 patients (95.5%) adhered to MSA protocol's indication and 12 patients (4.5%) did not adhere to MSA protocol. Only 18 patients' reversal (6.8%) was guided by intraoperative neuromuscular monitoring namely the train-of-four (TOF) count and the

remaining 248 patients (93.2%) reversal was not guided by neuromuscular monitoring. 241 patients (90.6%) did not require ICU admission and 25 patients (9.4%) required ICU admission of which 19 (7.1%) were anticipated and 6 (2.3%) were unanticipated.

Conclusion: Over the years, there was an increasing number of sugammadex usage in HUSM and majority of the patients selected adhered to MSA protocol. This study also revealed that the use of neuromuscular monitoring is still poorly practised although it is strongly recommended in MSA protocol. As this is the first audit on sugammadex in HUSM, future research is still needed to determine its benefits, safety profile and the cost-analysis when compared to neostigmine.

Supervisor:

Associate Professor Dr. Rhendra Hardy Mohamad Zaini

Co-supervisor:

Associate Professor Dr. Wan Mohd Nazaruddin Wan Hassan

COMPARISON OF TRAMADOL AND PETHIDINE AS TREATMENT FOR PERIOPERATIVE SHIVERING IN CAESAREAN SECTION UNDER SPINAL ANAESTHESIA: A RANDOMISED-CONTROLLED TRIAL

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Introduction: Perioperative shivering is a common and unpleasant complication. Current available modalities have variable efficacy and success. Currently pethidine is favoured but the search is on to look for agents with faster abolishment of shivering with fewer side effects. This study compared the efficacy of tramadol against pethidine in the treatment of perioperative shivering of parturients undergoing caesarean section under spinal anaesthesia.

Objectives: To compare the efficacy and safety of tramadol against pethidine in the treatment of perioperative shivering in patients that has undergone caesarean section surgery under spinal anaesthesia. To compare the number of patients that have stopped shivering and grade of severity of shivering respectively at 5 min, 10 min, 15 min, 20 min, 25 min, 30 min, 40 min, 50 min and 1 h after administration of the drugs between the tramadol and pethidine group. To compare the incidence of recurrence of shivering and of side effects after treatment between tramadol and pethidine group.

Methods: A total of 42 patients scheduled for caesarean section under spinal anaesthesia who had experienced shivering were randomised into two groups, group T ($n = 21$) received 1 mg/kg tramadol and group P ($n = 21$) received 0.5 mg/kg pethidine. The outcomes measured include the time taken until shivering stopped, reduction in shivering severity, recurrence of shivering and incidence of side effects.

Results: Median time taken from drug administration until cessation of shivering of the tramadol group was significantly faster than the pethidine group (7 min versus 13 min, $P = 0.049$). Shivering grade 0 was achieved by minute 15 in the pethidine group compared to minute 10 in the tramadol group. However, there were no significant difference in terms of the number of recurrences of shivering (1 in tramadol versus 3 in pethidine group, $P = 0.606$) and incidence of nausea (23.8% in tramadol versus 42.8% in pethidine group, $P = 0.19$) between the two groups.

Conclusion: Intravenous tramadol has faster alleviation of perioperative shivering than intravenous pethidine after spinal anaesthesia for caesarean section.

Supervisor:

Dr. Mohamad Hasyizan Hassan

Co-supervisor:

Dr. Sanisah Che Omar

EFFICACY AND SAFETY OF INTRATHECAL DEXMEDETOMIDINE VERSUS MORPHINE AS AN ADJUVANT TO SPINAL ANAESTHESIA IN OBESE PATIENT

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Background: Regional anaesthesia are still the mainstay for lower abdominal surgery. Usually by giving intrathecal morphine as an adjuvant, it may help to reduce the analgesic requirement up to 24 h post-operation. Unfortunately, it come with unpleasant side effects such as respiratory depression especially in obese patients. Due to delay respiratory depressant, we usually avoid to give intrathecal morphine to the patient with BMI > 40 kg/m². Intrathecal dexmedetomidine has showed some efficacy as an adjuvant and produce equipotent analgesic effect like morphine. Therefore, we would like to compare the efficacy of intrathecal morphine versus intrathecal dexmedetomidine as an adjuvant in spinal anaesthesia.

Methods: A total of 44 patients of BMI > 30 kg/m² undergoing lower abdominal surgery under spinal anaesthesia with expected duration of operation less than 2 h were randomised into two groups, group ITP ($n = 22$) receiving 5mcg dexmedetomidine and group ITM ($n = 22$) receiving 0.1 mg morphine. They were receiving 0.5% heavy bupivacaine depending in the height for the volume with addition of the adjuvant either morphine or dexmedetomidine. The outcomes measures were the onset and duration of the sensory and motor block, haemodynamic parameter, the incidence of side effects and pain score using visual analogue score at 24 h post-operation.

Results: Median time for the onset of sensory and motor block of intrathecal dexmedetomidine group were not significant to intrathecal morphine [1 (IQR = 1.2) min

versus 2 (IQR = 1.3) min, $P = 0.060$]. Mean duration block between ITP versus ITM [5.8 (1.6) versus 5.9 (1.1) h, $P = 0.885$]. Both groups exhibit haemodynamic stability during and post-operatively. There were no significant difference in terms of pain score at 24 h ($P = 1.000$) and incidence of nausea and vomiting ($P = 1.000$) between the two groups. However, it was noted that two patients in ITM group developed nausea and vomiting, which required rescue medication. Various type of surgery may represent different post operative pain scores, but data showed no significant pain score with ITM versus ITP patients ($P = 0.276$)

Conclusion: Intrathecal dexmedetomidine has similar efficacy and safety profile compared to intrathecal morphine.

Supervisor:

Dr. Laila Abd Mukmin

Co-supervisor:

Dr. Sanisah Che Omar

PREDICTORS AND OUTCOMES OF MEROPENEM TREATMENT FAILURE AMONG PATIENTS WITH SEPTIC SHOCK IN THE INTENSIVE CARE UNIT

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Introduction: Recently, the inappropriate used of meropenem in critically ill patient were increased. Thus, increased development of drug resistance bacteria towards meropenem. Therefore, this study evaluated the appropriate use of meropenem and determined the predictors of meropenem treatment failure as well as the patient outcomes.

Objectives: To study the predictors and outcomes of meropenem treatment failure among patients with septic shock in ICU.

Methods: This was a retrospective, cohort study, involving patients who were admitted to medical and surgical ICU HUSM since 1st January 2016 until 1st June 2019 and were diagnosed as septic shock, then started on IV meropenem. The cases were divided into two groups. Treatment success is defined as resolved fever, reduced total white cell (TWC), reduced c-reactive protein (CRP) and subsequent culture and sensitivity sampling negative.

Results: A total of 354 patients were recruited. Most patient were male. A 50 patient were not responded to treatment. The mean age was 54.7 (SD 17.87). Among all the studied factors, only APACHE mean 25.22 (SD 6.85) and SOFA 8.74 (SD 4.82) were found to be independently associated with treatment failure. The higher risk of mortality was observed among patients with higher APACHE, SOFA score and with antibiotics > 72 h (adjusted OR = 1.21; 95% CI: 1.12, 1.30; $P < 0.001$), (adjusted OR = 1.23; 95% CI: 1.08, 1.41; $P < 0.001$) and (adjusted OR = 6.38; 95% CI: 1.67, 24.50; $P = 0.007$).

Conclusion: A total of 50 (14.12%) patient had a treatment failure with meropenem. The predictors of meropenem failure were higher APACHE and SOFA score.

Supervisor:

Associate Professor Dr. Mohd Zulfakar Mazlan

Co-supervisor:

Dr. Mohamad Hasyizan Hassan

COMPARISON OF THE EFFICACY OF ACUPRESSURE P6 POINT, DEXAMETHASONE AND ONDANSETRON VERSUS PALONOSETRON MONOTHERAPY FOR PREVENTING POSTOPERATIVE NAUSEA AND VOMITING IN LAPAROSCOPIC SURGERY

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Background: Post-operative nausea and vomiting (PONV) generally affect 70%–80% patients with multiple risk factors. Our study compares the effectiveness of palonosetron as monotherapy versus combination of ondansetron with dexamethasone and acupressure P6 wristband in preventing PONV and requirement of rescue anti-emetics in laparoscopic surgery.

Objectives: This study is designed to compare the efficacy of dexamethasone and ondansetron adjunct with acupressure P6 point versus palonosetron monotherapy in preventing postoperative nausea and vomiting (PONV) and rescue anti-emetic requirement post-operatively.

Methods: Total 90 ASA I and II patients with APFEL score ≥ 2 who undergo laparoscopic surgery were recruited. They were randomly assigned into monotherapy and combination therapy group. Monotherapy group received IV palonosetron 0.075 mg after induction. Combination group received IV dexamethasone 8mg and acupressure P6 wristband after induction, subsequently IV ondansetron 4mg was given and wristband was removed prior to emergence. IV maxolon 10mg was used as rescue anti-emetics. The incidences of PONV and requirement for rescue anti-emetics were recorded at 0 h, 6 h, 12 h, 24 h and 48 h post-operative.

Results: 13.3% patients from combination therapy experienced PONV as compared with 33.3% patients from palonosetron group (95% CI: 0.107, 0.888, $P = 0.025$). The incidence of nausea was lower in combination group especially at 6 h (2.2% versus 24.4%; 95% CI: 0.009, 0.571; $P = 0.002$) and 12 h (0% versus 11.1%; 95% CI: 1.696, 2.662; $P = 0.021$). In addition, combination group had significantly lower incidence of vomiting at 6 h (2.2% versus 15.6%; 95% CI: 0.015, 1.048; $P = 0.026$). None of the patients in combination group required rescue anti-emetics while 17.8% of patients in palonosetron requested rescue anti-emetics post-operative (95% CI: 1.746, 2.814; $P = 0.003$).

Conclusion: Combination of ondansetron and dexamethasone with acupressure P6 wristband effectively preventing PONV and reducing requirement for rescue anti-emetics especially at 6 h and 12 h post-operative when compared with palonosetron group.

Supervisor:

Dr. Ariffin Marzuki Mokhtar

Co-supervisor:

Dr. Mohd Zulfakar Mazlan

FACTORS ASSOCIATED WITH INTENSIVE CARE ADMISSION AMONG LEPTOSPIROSIS PATIENTS IN HOSPITAL SULTANAH NUR ZAHIRAH, TERENGGANU

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Introduction: Leptospirosis is a worldwide zoonotic acute febrile disease caused by infection with pathogenic spirochetes of the genus *Leptospira*, commonly occurred in the tropics.

Objectives: To describe clinical characteristic and factors associated with intensive care unit admission among leptospirosis patient in Hospital Sultanah Nur Zahirah.

Methods: A total of 166 adult leptospirosis patients who were admitted to Hospital Sultanah Nur Zahirah were recruited and assigned to two groups based on admission to either general ward or intensive care unit (ICU). Data were collected based on demography, symptoms and sign, and blood parameter. Factors associated with severe leptospirosis and ICU were analysed.

Results: Among the 166 patients enrolled in the study, 41 patients required ICU admission which was 24.2% (95% CI: 17.6, 31.8). ICU mortality recorded 37.8% whereas non-ICU was 4.3%. An independent risks factor associated with ICU admission: lethargy (OR = 3.33 (1.11, 10.05)), dyspnoea (OR = 11.55 (2.91, 45.88)), tachycardia (OR = 1.03 (1.01, 1.05)), intubation (OR = 11.68 (2.33, 58.51)) and haemodialysis (OR = 11.01 (3.31, 36.68)).

Conclusion: Leptospirosis patient presented with dyspnoea, lethargy, tachycardia required intubation and haemodialysis associated with high ICU admission rate. These symptoms, signs and treatment modalities signify severe leptospirosis infection.

Supervisor:

Associate Professor Dr. Zulfakar Mazlan

Co-supervisor:

Associate Professor Saedah Ali

COMPARISON OF THE OUTCOME OF SEVERE TRAUMATIC BRAIN INJURY PATIENTS AFTER TWO DIFFERENT CEREBRAL STATE INDEX-GUIDED SEDATION LEVELS USING CEREBRAL STATE MONITOR IN INTENSIVE CARE UNIT

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Introduction: Sedation is an important acute cerebral protective management for severe traumatic brain injury (TBI) patients in the intensive care unit (ICU).

Objectives: This study aimed to compare the outcome of severe TBI patients between two different Cerebral State Index (CSI)-guided sedation levels (40–60 versus 60–70) using Cerebral State Monitor (CSM).

Methods: This was a randomised controlled trial of 63 adult patients with severe TBI who underwent cerebral protection with CSM guided sedation for at least 24 h either in Trauma ICU or Neuro ICU. Patients were randomised into two groups of CSI-guided sedation level: Group 1-hypnotic state (CSI value 40–60) and Group 2-deep sedative state (CSI value 60–70) using CSM. All patients received propofol infusion between 0.5 mg/kg/h and 4.0 mg/kg/h and fentanyl infusion 1 µg/kg/hour–2 µg/kg/hour that were titrated to the targeted CSI. We compared the Glasgow Outcome Score (GOS) upon ICU and hospital discharge and length of ICU stay between two groups CSI-guided sedation.

Results: The GOS upon discharge from ICU ($P = 0.276$) and upon hospital discharge ($P = 0.169$) were not significant between the two groups. There was also no significant difference in length of ICU stay ($P = 0.833$).

Conclusion: Both level of CSI-guided sedation, either hypnotic state or deep sedative state, were not significant in the outcome of severe TBI patients in terms of GOS upon ICU and hospital discharge, and length of ICU stay.

Supervisor:

Associate Professor Dr Wan Mohd Nazaruddin Wan Hassan

Co-supervisor:

Dr. Ariffin Marzuki Mokhtar

MASTER STUDENTS' PERCEPTION OF E-LEARNING DURING COVID-19 PANDEMIC IN DEPARTMENT OF ANAESTHESIOLOGY AND INTENSIVE CARE, HOSPITAL UNIVERSITI SAINS MALAYSIA

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Kelantan, Malaysia

Background: Synchronous e-learning Continuous Medical Education (CME) was adopted for the master students of Anaesthesiology, Hospital University Sains Malaysia (HUSM) when face-to-face teaching was suspended due to the COVID-19 pandemic. We aimed to investigate the students' perception of satisfaction, importance and confidence of e-learning readiness, their association with younger and older age group to help to guide educators to take necessary steps in incorporating this learning style for the benefit of the learners and educators.

Methods: Cross-sectional study was conducted in Anaesthesiology Department HUSM from May 2021 to June 2021. Eighty students included in the study were given a study code. Validated questionnaires were distributed in google forms via telecommunication messages with consent for participation in the study. Mean age was 34.55 (SD 2.047) years old among 69 samples collected. They were grouped into two groups, younger (35 respondents) and older group (34 respondents) according to their age below or above mean age.

Results: 86.3% students responded. Despite a slightly low mean score on satisfaction (29.51, SD 5.370 in all respondents; 28.89, SD 6.48 and 30.15, SD 3.91 in younger and old group), 59.4% respondents were satisfied on e-learning CME provided by institution during COVID-19 pandemic. 72.4%–91.3% respondents were satisfied when questions about CME content arrangement were asked, but 43.3% disagreed that e-learning was as effective as face-to-face learning. Majority perceived important of e-learning readiness (94.2%) and confident in e-learning readiness (84.1%). Perception of satisfaction, importance and confidence of e-learning readiness showed no difference in age group in this study. The main advantage of e-learning is the convenience to attend CME in any location, but network connection problems, lack of self-discipline, and poor learning environment may be the concern to the learners.

Conclusion: E-learning CME was beneficial to master students Anaesthesiology Department HUSM during the COVID-19 pandemic where face-to-face learning was relatively impossible. An upgrade on the network connection may increase the satisfaction among the learners. Further study is needed to assess the effectiveness of e-learning CME provided by the institution.

Supervisor:

Professor Dr. Shamsul Kamalrujan Hassan

Co-supervisor:

Dr. Sanisah Che Omar

A COMPARATIVE STUDY OF PCA MORPHINE AND PCA FENTANYL USAGE IN ELDERLY PATIENTS FOR ACUTE POSTOPERATIVE PAIN MANAGEMENT

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Kelantan, Malaysia

Background: Patient controlled analgesia (PCA) provides an excellent analgesia for post operation pain. PCA morphine is commonly used but associated with a lot of side effects such as respiratory depression, nausea and vomiting, especially in elderly patients. Therefore recent studies advocates the usage of fentanyl. This study aims to compare the efficacy of postoperative pain between PCA morphine and PCA fentanyl in elderly patients who underwent orthopaedic surgery. It also aims to evaluate the occurrence of side effects in these two groups.

Methods: A retrospective randomised study is conducted in Hospital Sains Malaysia (HUSM) in patients who received PCA as their post-operative pain management. A total of 53 patient of age 65 years old and above were included in this study. All these patients underwent elective or emergency orthopaedic operations.

Results: Out of 53 patients, 17 patients (32.1%) received PCA fentanyl and 36 patients (67.9%) received PCA morphine. Both analgesia treatments did elicit statistically significant change in pain score pain ($P < 0.001$) during the post-operative period. However, pain score level with morphine treatment is slightly better than fentanyl in 24 h post-operatively. For the comparison of side effects, there are no significant statistical difference in different analgesia and side effects. PCAM is associated with slightly higher incidence of arterial hypotension (8.3% versus 5.9%, $P = 0.616$), nausea and/or vomiting (16.7%, $P = 0.16$), respiratory depression ($n = 1$, $P = 0.679$) and discontinuation of the treatment due to the side effects (8.3%, $P = 0.543$). There is no incidence of pruritus and urinary retention side effects in both groups.

Conclusion: From this single-centered study, PCA morphine analgesic efficacy is equal to PCA fentanyl. However, it is associated with a slightly higher side effects in the elderly patients. In elderly patient, with higher body mass index (BMI), PCA fentanyl is more suitable.

Supervisor:
Dr. Ariffin Marzuki Mokhtar

Co-supervisor:
Dr. Kamaruddin Ibrahim

COMPARISON OF THE FIT OF UNCUFFED ENDOTRACHEAL TUBE BETWEEN TWO AGE-BASED FORMULAE IN PAEDIATRIC PATIENTS IN ELECTIVE SURGERY AND RADIOLOGICAL PROCEDURE

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Introduction: Cole's age-based formula is widely used in Malaysia to determine endotracheal tube (ETT) size in paediatric patient. Penlington's formula, in the other hand which gives bigger endotracheal tube size is an alternative to Cole's formula. This study is designed to compare Cole's to

Penlington's formula for the better fit of endotracheal tube in the trachea.

Objectives: The general objective of this study was to determine the better fit of the endotracheal tube in paediatric patient by comparing two different formulae. The specific objectives were to observe for any leak (presence of leak alarm), to determine the inspiratory pressure that need to be used to achieve tidal volume of 8 mL/kg, the need to change endotracheal tube due to leak and lastly the need to use throat pack to reduce leak.

Methods: A prospective randomised study is conducted in Hospital Universiti Sains Malaysia (HUSM) in paediatric patients between January 2021 and September 2021. A total of 57 patients were included in this study.

Results: Out of 57 patients, 29 patients (50.9%) recruited in control group (Cole's formula) and 28 patients (49.1%) in study group (Penlington's formula). Of all, 22.8% (13 patients) that presence leak alarm is from control group and there is no presence of leak alarm from study group (P -value < 0.0001). The mean inspiratory pressure to generate tidal volume of 8 mL/kg is higher in control group, which is 12.10 cm H₂O (SD 1.012) while study group is 9.57 cm H₂O (SD 0.836). There are significant differences in term of ETT change and throat pack insertion in which, of all, 12.3% need ETT change and 8.8% need for throat pack insertion from control group, while 0% for both outcomes in control group. The P -values are 0.006 and 0.021, respectively.

Conclusion: From this single-centered study, Penlington's formula for ETT size shows better fit of ETT in the trachea. Further and future study is needed to evaluate post extubation outcomes and cost-effectiveness between this two formulae.

Supervisor:
Dr. Ariffin Marzuki Mokhtar

Co-supervisors:
Dr. Laila Mukmin,
Dr. Nurhafizhoh Abd Hamid

COMPARISON OF THE EFFICACY AND SAFETY OF ROPIVACAINE 0.375% WITH MAGNESIUM SULPHATE ADDED AND ROPIVACAINE 0.375% ALONE IN PECTORALIS AND SERRATUS ANTERIOR (PEC II) NERVE BLOCK IN UNILATERAL BREAST SURGERY

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Kelantan, Malaysia

Introduction: PECS II nerve block is a multimodal analgesia approach for opioid sparing analgesia. Previous study had shown that addition of magnesium sulphate improved analgesic effect, reduced in opioid consumption with minimal side effect. This is the first study to evaluate

its efficacy and safety of magnesium sulphate added into ropivacaine 0.375% as an adjuvant in PEC II block.

Objective: To assess the efficacy analgesia and safety of magnesium sulphate added into ropivacaine 0.375% in PEC II nerve block in unilateral breast surgery.

Methods: This was a double blinded randomised controlled trial. A total of 50 ASA class 1 and 2 patients who underwent a unilateral breast surgery with or without axillary clearance were randomised into two groups, intervention (M) group ($n = 25$) who received ropivacaine 0.375% added with magnesium sulphate (5 mmol) and control (R) group ($n = 25$) who received ropivacaine 0.375% alone for PEC II nerve block. PEC II nerve block was performed under ultrasound guidance in sterile technique. Post-operative VAS pain score at 0 h, 4 h, 8 h, 12 h and 24 h were assessed. Intra and post-operative opioid rescue requirement usage were evaluated and documented. Post-operative side effect of magnesium sulphate such as nausea, vomiting, hypotension, cardiac arrhythmias and muscle weakness were assessed.

Results: There was no statistical significant in demographic profile between groups. There was statistical significance difference in post-operative VAS mean pain score at rest from time 8 hours and movement from time 4 h onwards (0.20 and 0.68, P -value of < 0.01). There was a significant difference in frequency of intra-operative opioid rescue requirement. (68% versus 7%, P -value < 0.05). There was no significant side effects or complications from the used of magnesium sulphate in this study.

Conclusion: Pectoralis and serratus anterior (PEC II) nerve block with ropivacaine 0.375% and magnesium sulphate significantly reduced post-operative pain score and intra-operative opioid consumption without any significant side effects.

Supervisor:
Dr. Laila Ab Mukmin

PSYCHOMETRIC EVALUATION OF SECOND VICTIM EXPERIENCE AND SUPPORT OPTIONS AMONG NURSES IN CRITICAL CARE IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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Introduction: Nurse are the forefront in the medical team and they work in a very complex environment making them more exposed to error and experience a second victim phenomenon. However, there is no single report about second victim in critical care unit in Malaysia. In this study, we aim to evaluate the psychometric properties of the second victim experience and support options among nurses in critical care unit in Hospital Universiti Sains Malaysia (Hospital USM), Kelantan, Malaysia.

Objective: To evaluate the psychometric properties of second victim experience and support options among nurses in critical care in Hospital USM.

Methods: A cross-sectional survey was conducted on 136 nurses who work in adult critical care units in Hospital USM. Participants were asked to answer a set of questionnaires based on the Second Victim Experience and Support Tool (SVEST) to assess their psychometric properties and support options.

Results: Our study showed about 69.1% of adult critical care nurses in Hospital USM experienced a second victim phenomenon that affects their psychological, physical, and professional self-efficacy. This leads to absenteeism which scored the most chosen negative outcome with 31% and the location of the critical care unit is not significant in contributing to the second victim phenomenon. Most of participants with 89.8% agreed that non-work-related support helped to overcome the stress and colleague support was the most undesirable support with only 2.1% reported this.

Conclusion: Second victim phenomenon was notably worrisome among our critical care nurse and a good framework of a support system must be established to help them psychologically, physically, and professionally.

Supervisor:
Dr. Arifin Marzuki Mokhtar

Co-supervisor:
Dr. Laila Ab Mukmin

DIAGNOSTIC ACCURACY OF ULTRASOUND MEASUREMENT OF TONGUE THICKNESS FOR PREDICTING DIFFICULT INTUBATION IN PATIENTS WITH SUSPECTED AND DIAGNOSED OBSTRUCTIVE SLEEPING APNEA

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Introduction: Ultrasonography of the airway can assist anaesthetists identifying and predicting difficult intubation in obstructive sleep apnea (OSA) patients by providing extra information about the airway.

Objectives: To determine the diagnostic accuracy of the ultrasonographic measurement of tongue thickness (TT) in comparison with the Cormack Lehane scoring in OSA patients.

Methods: A total of 165 adults who were diagnosed with or suspected to have OSA underwent elective or emergency surgical procedures in Hospital Universiti Sains Malaysia, Kelantan were recruited. They were scheduled for operations under general anaesthesia (GA) involving direct laryngoscopy and tracheal intubation. Preoperatively,

airway ultrasonography was performed, and measurements taken include tongue thickness (TT) and hyomental distance (HMD) and tongue thickness to hyomental distance ratio (TT:HMD ratio). The measurements were then compared with the Cormack Lehane (CL) score obtained during direct laryngoscopy under GA.

Results: Tongue thickness and TT:HMD ratio showed significant correlation with the CL grades, but not the hyomental distance. The correlation were about moderate with r -value between 0.4 and 0.5. Tongue thickness and TT:HMD ratio showed area under the curve (AUC) above 0.9 except for hyomental distances. Tongue thickness showed the highest AUC value; the diagnostic sensitivity and specificity were 100% and 97% based on the cut-off value (COV) of 7cm with P -value of < 0.001 . The TT:HMD ratio showed the second highest AUC value; the diagnostic sensitivity and specificity were 100% and 88.6% based on the COV of 1.195 with P -value of 0.000. Hyomental distances showed the lowest AUC; the diagnostic sensitivity and specificity were 45.5% and 39.4% based on the COV of 4.5cm with P -value of 0.033.

Conclusion: The ultrasound measurement of tongue thickness seems to have superior diagnostic accuracy to identify and predict difficult intubation during preoperative airway assessment for patients with suspected or diagnosed OSA. with the cut-off point of 7 cm.

Supervisor:
Dr. Sanihah Che Omar

Co-supervisors:
Professor Dr. Shamsul Kamaruljan Hassan,
Dr. Ahmad Tarmizi Musa

COMPARISON OF INTRAVENOUS ONDANSETRON VERSUS CHLORPHENIRAMINE FOR PREVENTION OF INTRATHECAL MORPHINE-INDUCED PRURITUS IN PATIENTS UNDERGOING ELECTIVE ORTHOPAEDIC SURGERY UNDER SPINAL ANAESTHESIA

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Introduction: Intrathecal morphine provides excellent post-operative analgesia and at low dosage it gives segmental analgesia, resulting in localised nociception without motor, sensory or autonomic side effects. Pruritus is an extremely common side effect with intrathecal opioid and can be much more irritating than the pain itself. Several different drugs have been used to prevent pruritus but the efficacy of these medications vary. IV ondansetron is an option for prophylaxis because it has no anti-analgesic effect, non-sedative and prevents nausea.

Objective: To evaluate the effect of IV ondansetron compared with IV chlorpheniramine for prevention of intrathecal morphine-induced pruritus in patients undergoing elective orthopaedic surgery under spinal anaesthesia.

Methods: Sixty-two patients with ASA I and II physical status who were scheduled for elective lower limb orthopaedic surgery were randomly assigned into two groups; IV ondansetron 4 mg or IV chlorpheniramine 10 mg. The study drug was given in the operating room before the administration of spinal anaesthesia using 2.8 mL–3.0 mL of bupivacaine 5 mg/mL and intrathecal morphine 0.1 mg. Patients were evaluated for pruritus score at 6 h, 12 h and 24 h post-operatively, requirement of IV naloxone as an antipruritic and side effects of the study drug. Chi-square test will be used to test the difference in proportion of pruritus between IV ondansetron and chlorpheniramine. A P -value < 0.050 is considered statistically significant.

Results: There were less patients experiencing pruritus in the ondansetron group compared to the chlorpheniramine group but statistically not significant (48.4% versus 61.3%, $P = 0.307$). During 24 h of follow-up, the proportion of pruritus was comparatively similar in both groups and no statistically significant difference was observed. None of the patients required naloxone as a treatment for severe pruritus. No side effects of ondansetron or chlorpheniramine were reported in 48 patients ($P = 0.002$).

Conclusion: Prophylactic administration of ondansetron is comparable with chlorpheniramine for prevention of intrathecal morphine-induced pruritus post spinal anaesthesia.

Supervisor:
Dr. Sanihah Che Omar

Co-supervisor:
Professor Dr. Nik Abdullah Nik Mohamad

COMPARISON OF INTUBATION CONDITION BETWEEN REMIFENTANIL LOADING DOSE INFUSION OF 1 μ G/KG VERSUS 2 μ G/KG DURING INDUCTION OF ANAESTHESIA FOR PAEDIATRIC ELECTIVE SURGERY

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Kelantan, Malaysia

Introduction: Remifentanil can be a useful drug for intubation without muscle relaxant when neuromuscular blockade is contraindicated. The study was designed to compare the intubation conditions and haemodynamic response following intravenous (IV) infusion of remifentanil loading dose either at 1 μ g/kg or 2 μ g/kg in combination with target-controlled infusion (TCI) propofol in paediatric elective surgery.

Objectives: To compare the intubation condition between remifentanyl loading dose infusion of 1 µg/kg versus 2 µg/kg during induction of anaesthesia for paediatric elective surgery.

Methods: Ninety-two patient at the age of 3 years old–12 years old and within ASA I–II classification, were randomised into two groups; Group R1 ($n = 46$) received IV loading dose of 1 µg/kg and Group R2 ($n = 46$) received 2 µg/kg of remifentanyl over 90 s and then both groups were maintained at 0.5 µg/kg/min until successful intubation. IV atropine 0.01 mg/kg was given prior to induction and patients were subsequently induced with TCI propofol at target-controlled plasma concentration of 6 µg/mL using the Paedfusor model. Intubation was performed after successful induction. Intubating condition was graded as excellent, good or poor using Copenhagen Consensus Conference Score. Haemodynamic parameters were recorded at pre-induction, post induction, and post successful intubation at 1 min, 3 min and 5 min.

Results: Group R2 showed higher percentage of excellent intubation than Group R1 but the intubation condition was not significantly difference between the two groups [36 (78.3%) versus 28 (60.9%); $P = 0.149$]. Only one patient in Group R1 required rescue muscle relaxant and there was no significant difference between the two groups ($P = 0.315$). There were no significant differences in overall haemodynamic parameters between the two groups and no treatment for hypotension and bradycardia required. There was also no muscle rigidity reported.

Conclusion: Both 1 µg/kg and 2 µg/kg loading dose of remifentanyl in combination with TCI propofol at 6 µg/mL provides satisfactory endotracheal intubation without muscle relaxant and comparable haemodynamic changes in unpremedicated children.

Supervisor:
Associate Professor Dr. W. Mohd Nazaruddin W. Hassan

Co-supervisor:
Associate Professor Dr. Rhendra Hardy Mohamad Zaini

COMPARISON OF ANALGESIC EFFICACY BETWEEN ADDITION OF KETAMINE TO BUPIVACAINE VERSUS BUPIVACAINE ALONE IN RECTUS SHEATH BLOCK FOR MIDLINE LAPARATOMY

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Introduction: Multimodal analgesia strategies are crucial to improve post-operative pain management in major abdominal and gynaecological surgeries with midline incision and to reduce opioid usage. The ultrasound-guided rectus sheath block (RSB) is an effective regional analgesia technique that provides pain relief over the midline of the anterior abdominal wall. Ketamine affects pain modulation

through multiple mechanisms and may enhance the analgesic effects of local anaesthetics. This study aims to evaluate the analgesic efficacy and safety of ketamine as an adjuvant to bupivacaine in RSB for patients undergoing midline laparotomy.

Objectives: To evaluate the analgesic efficacy and safety of 1 mg/kg ketamine as an adjuvant to bupivacaine 0.25% in ultrasound-guided rectus sheath block (RSB) following major abdominal and gynaecological surgery with midline incision.

Methods: Fifty-six patients of American Society of Anaesthesiologists (ASA) class I–II aged 18 years old–65 years old were enrolled and randomly allocated to two groups: Ultrasound-guided RSB was performed in control group ($n = 28$) with 40 mL of 0.25% bupivacaine only, while in ketamine group ($n = 28$) with 40 mL of 0.25% bupivacaine plus ketamine 1 mg/kg. Post-operatively both groups received patient-controlled analgesia (PCA) morphine. The combined VAS/NRS pain scores at rest and movement were assessed at 0 h, 1 h, 12 h and 24 h post-operatively. Total 24 h morphine consumption and psychomimetic side effects were recorded.

Results: The mean VAS/NRS values on movement was significantly lower in the ketamine group at most time points compared to the control group ($P < 0.05$). The ketamine group had significantly reduced total morphine consumption (14.3 ± 6.55) compared to the control group (21.86 ± 15.46) ($P < 0.05$). No psychomimetic adverse effects were reported in both groups.

Conclusion: The addition of ketamine to bupivacaine in RSB resulted in effective postoperative analgesia by reducing postoperative pain scores on movement. Such combination also reduced postoperative morphine requirement in patients who underwent midline laparotomy without serious side effects.

Supervisor:
Professor Dr. Shamsul Kamalrujan Hassan

Co-supervisor:
Associate Professor Dr. Saedah Ali

COMPARISON OF PROPHYLAXIS PHENYLEPHRINE INFUSION AND RESCUE BOLUS ADMINISTRATION FOR MAINTAINING BLOOD PRESSURE DURING SPINAL ANAESTHESIA FOR CAESAREAN DELIVERY IN OBESE WOMEN

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Background: Obesity and Caesarean section (CS) have been identified as independent risk factors for maternal morbidity and mortality. Regional anesthesia should ideally be used for all Caesarean delivery unless contraindicated. However, maternal hypotension, a recognized complication

of post-spinal anesthesia, found more severe among obese mothers. Phenylephrine (PE) is a preferred choice of vasopressor in this setting as it results in better neonatal outcomes. This study investigates the effect of prophylactic PE infusion on the hemodynamics of obese parturients undergoing elective CS under spinal anesthesia (SA).

Objectives: To compare haemodynamic in obese parturients undergoing LSCS receiving prophylactic phenylephrine infusion with those who are receiving rescue boluses during spinal anesthesia.

Methods: This was stratified balanced randomisation, double blinded, parallel group study conducted in Hospital Universiti Sains Malaysia. A total of 74 parturients scheduled for elective CS under SA were randomised into two arms, Group A ($n = 37$) received prophylactic PE infusion starting at 50 $\mu\text{g}/\text{min}$ and adjusted according to the given algorithm or Group B ($n = 37$) who received 100 μg phenylephrine bolus to treat post-spinal hypotension. The primary outcome measured included systolic blood pressure (SBP), diastolic blood pressure (DBP) and mean artery pressure (MAP). The secondary outcomes were the total requirement of PE and neonatal APGAR score.

Results: Six patients were excluded from the analysis due to missing data. The result showed that SBP, DBP and MAP were statistically significantly higher in the prophylactic infusion group compared with the therapeutic bolus group ($P < 0.05$). The mean difference of SBP, DBP and MAP between the two groups were significant. The mean requirement of PE was higher in the infusion group compared with the bolus group. Both groups have no difference in terms of neonatal APGAR score.

Conclusion: Prophylactic PE infusion provides more excellent haemodynamic stability control than therapeutic PE boluses among obese parturients with BMI between 30 kg/m^2 –40 kg/m^2 undergoing CS under SA.

Supervisor:

Professor Dr. Shamsul Kamalrujan Hassan

Co-supervisor:

Dr. Sanisah Che Omar

KNOWLEDGE, ATTITUDE AND PRACTICE ON EVIDENCE-BASED MEDICINE AMONG EMERGENCY DOCTORS IN KELANTAN, MALAYSIA

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Introduction: In Malaysia, the prevalence of knowledge, attitude and practice on evidence-based medicine (EBM) are not widely reported. Internationally, studies have shown various outcomes of the prevalence of good knowledge, positive attitude and good practice of EBM, including identifying barriers in practicing EBM. This study aimed to determine the proportions of knowledge, attitude

and practice of EBM and identify the factors associated with its practice among emergency doctors in Kelantan, Malaysia.

Objective: To determine the prevalence of high level of knowledge, positive attitude and good practice on evidence-based medicine (EBM) and identify the associated factors for practice score on EBM among emergency medicine doctors in Kelantan, Malaysia.

Methods: This cross-sectional study was conducted from February 2020–May 2020 in randomly selected hospitals in Kelantan. The data were collected from emergency doctors using self-administered questionnaires covering six areas, including sociodemographic data, knowledge, practice, and attitudes regarding EBM, among others.

Results: A total of 183 participants responded and making a response rate of 91.5%. Of them, 49.7% had high level of knowledge, 39.9% had a positive attitude and 2.1% had good practice. Sex, race, the average number of patients seen per day, internet access in workplace, having online quick reference application, and attitude towards EBM were significantly associated with EBM practice scores.

Conclusion: Although most emergency doctors have good knowledge and a positive attitude towards EBM, they have a low EBM practice. Factors associated with the poor practice of EBM were higher patient volume, ethnicity, poor access to subscribed databases, unavailability of access to the online application, and a neutral attitude towards EBM.

Supervisor:

Associate Professor Dr. Tuan Hairulnizam Tuan Kamauzaman

Co-supervisor:

Associate Professor Dr Norhayati Mohd Noor

A REVIEW OF MORTALITY IN THE EMERGENCY DEPARTMENT OF A TEACHING HOSPITAL IN NORTHEAST MALAYSIA

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Introduction: Mortality in emergency department (ED) is frequently encountered. In Malaysia, data related to mortality patterns in ED is however still limited. Patient's related factors such as sociodemographic and clinical condition may contribute to preventable death in ED.

Objectives: The aim of this study was to determine the associated factors related death in emergency department (DID).

Methods: This comparative cross-sectional study involved patients admitted to Red Zone ED Hospital Universiti Sains Malaysia (USM) from January 2019 until December 2019. Data collected from medical records included patients' demography, chief complaints, diagnosis and initial vital signs. Factors associated with DID were determined.

Result: A total of 235 cases were included in this study. There were 61 DID and 174 non-DID cases. Among mortality cases, elderly patient, male gender and Malay are the most predominant. Chief complaints related to DID were non-trauma related and most frequent diagnosis related to DID were infection. Result from multiple logistic regression showed that elderly patient (OR = 1.04, 95% CI), low systolic blood pressure (OR = 5.8, 95% CI), Glasgow Coma Scale of 9–12 (OR = 11.46, 95% CI), and oxygen saturation (SpO₂) more than 90% (OR = 3.00 95% CI) were significantly associated with DID.

Conclusion: In this study, increasing of age is associated with higher odds of death. Low systolic blood pressure and Glasgow Coma Scale of 9–12 are significantly associated with mortality. Intervention to identify patients with higher risk of mortality is at utmost importance to lead to a better patient care in emergency department.

Supervisor:
Dr. Abu Yazid Md Noh

KNOWLEDGE AND ATTITUDES ABOUT GERIATRICS AMONG EMERGENCY DEPARTMENT DOCTORS IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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Introduction: The number of elderly patients presenting to emergency departments (EDs) is rising in line with the growing geriatric population. There are valid concerns whether the existing emergency care system is prepared to deal with a larger geriatric population presenting with acute medical problems. The objective of this study is to assess baseline knowledge and attitudes of doctors working in the ED toward the elderly patients and to determine the factors that influence emergency doctors' knowledge and attitudes toward elderly.

Objective: To assess the geriatric knowledge and attitudes toward elderly patients among ED doctors in Hospital Universiti Sains Malaysia.

Methods: A cross-sectional study was conducted among emergency doctors in ED of Hospital Universiti Sains Malaysia (Hospital USM) from February to July 2020 using a validated questionnaire. The questionnaire consists of three sections, namely questions on sociodemographic background of the respondents, their knowledge and core attitudes toward elderly. The responses were analysed using descriptive analysis, simple and multiple logistic regression analysis.

Results: A total of 198 ED doctors in Hospital USM participated in the study. Most respondents held positive attitudes toward elderly (53.5%). However, the majority of respondents had poor geriatric knowledge level (76.3%). The age of the doctor (AOR = 0.08; 95% CI: 0.01, 0.89; $P = 0.042$) was a factor that influenced attitudes toward geriatric patients. Nevertheless, no single factor was found

to influence good geriatric knowledge. A significant weak positive correlation ($r = 0.154$, $P = 0.031$) was found between geriatric knowledge and attitudes toward elderly.

Conclusion: In conclusion, majority of ED doctors in Hospital USM exhibited positive attitudes toward the elderly but had an unfavourable geriatric knowledge level. Senior doctors were less likely to have positive attitude toward elderly patients. Good geriatric knowledge was associated with positive attitudes of emergency doctors toward the elderly. A more innovative and structured geriatric continuing medical education should be implemented to enhance the knowledge and dispel negative attitudes, so emergency doctors able to manage elderly patients more confidently.

Supervisor:
Dr. Mohammad Zikri Ahmad

Co-supervisors:
Dr. Afifah Sjamun Sjahid,
Dr. Mohd Faiz Mohd Shukri

MAGNESIUM SULFATE IN ACUTE EXACERBATION OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Introduction: Magnesium sulfate has been used in exacerbation of chronic obstructive pulmonary disease (COPD) with mixed results, but its application was not mentioned in Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2019.

Objective: The aim of our review is to assess the effectiveness of magnesium sulfate in acute exacerbation of chronic obstructive pulmonary disease.

Methods: We searched via CENTRAL, MEDLINE, EMBASE and trial registries for relevant randomised controlled trials. Screening of full texts, evaluation for eligibility and data extraction were done by two independent reviewers. Risk ratios and mean differences were estimated using the random-effects model with 95% confidence intervals.

Results: We included six trials involving 395 patients. Three modes of administration of magnesium sulfate reported were nebulised, intravenous and a combination of both modes. While some individual studies stated improvement in lung function indices favouring the intervention group, none of the pooled results demonstrate a remarkable clinical benefit as measured by FEV₁ predicted percentage, FEV₁ volume and peak expiratory flow rate. Subgroup analysis based on the timing of measurement and method of magnesium sulphate administration failed to show any significant difference. Evaluation of secondary outcomes concluded that addition of magnesium sulfate to standard therapy does not produce significant clinical effect in term of

length of hospital stay, hospital admission, intensive care unit admission, ventilation requirement, mortality rate, oxygen saturation and adverse effects.

Conclusion: The findings of six studies conducted in this review did not provide clear evidence of benefits to endorse magnesium sulfate use during COPD exacerbation and consequently, the evidence available to date is insufficient to guide the change in clinical practice. The current meta-analysis summarized data from a small number of studies involving relatively few patients. Further larger and well-designed randomised controlled trials are required to determine the effectiveness of magnesium sulfate in exacerbation of COPD.

Supervisor:

Dr. Abu Yazid Md. Noh

Co-supervisors:

Associate Professor Dr. Norhayati Mohd Noor,

Dr. Mohd Boniami Yazid

A STUDY ON PSYCHOLOGICAL DISTRESS AMONG MALAYSIAN UNITED NATIONS PEACEKEEPER IN LEBANON

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Introduction: The Malaysian Armed Forces (MAF) have been contributing to United Nations (UN) peacekeeping operations (PKO) since 1957. Peacekeepers have their own specific roles and tasks pertaining to their expertise and are different from those of a real combat mission.

Objectives: This study aims to i) determine the level of depression, anxiety, stress, burnout and post-traumatic stress disorder (PTSD) among Malaysian military peacekeepers in Lebanon and ii) the associated contributing factors.

Methods: We conducted a cross-sectional study to investigate the prevalence and factors contributing to psychological distress among 491 Malaysian UN peacekeepers using a self-administered, online questionnaire which contained the Depression Anxiety Stress Scale (DASS 21), the Maslach Burnout Inventory-General Service (MBI-GS), and the Post-traumatic Stress Disorder Checklist for Civilians (PCL-C) to measure depression, anxiety, stress, burnout and PTSD. The data was analysed using the R language (version 4.0.2) and RStudio (version 1.3.959).

Results: A total of 491 people responded well to the questionnaire. Most of our respondents were male (94.7%), Malay (91.4%), married (74.1%), had a secondary education level (83.3%), had more than 10 years of work experience (64.1%) and were junior non-commissioned officers (64.2%). There was a 1% prevalence of extreme depression, 2.2% of extremely severe anxiety, 0.2% of extremely severe stress and 4.3% of severe PTSD. In terms of burnout, 6.7% reported extreme exhaustion and 12.6% reported extreme cynicism. Regarding the contributing factors: Lack of direction from

the organisation for performing any tasks was significantly associated with depression, anxiety, stress, PTSD and burnout ($P < 0.001$). Having a different job scope from the original designation was significantly associated with depression, anxiety, stress and burnout ($P < 0.005$). Poor co-worker relationships were also significantly associated with depression, stress, burnout and PTSD ($P < 0.005$). Feeling hostility towards different affiliations shows a significant association with depression, anxiety, and stress ($P < 0.005$). Single peacekeepers showed a higher tendency towards burnout ($P < 0.005$).

Conclusion: Despite the difficult nature of being a UN peacekeeper, this study found that Malaysian UN troops in Lebanon experienced very low psychological distress. This could be owing to their extensive military training, which has equipped them to deal with any stressor.

Supervisor:

Associate Professor Dr. Tuan Hairulnizam Tuan Kamauzaman

Co-supervisor:

Associate Professor Dr. Mohd Azhar Mohd Yasin

DEVELOPMENT AND VALIDATION OF QUESTIONNAIRE TO EVALUATE KNOWLEDGE, ATTITUDE AND PRACTICE OF POINT OF CARE ULTRASOUND (POCUS-Q) AMONG MEDICAL OFFICERS IN EMERGENCY DEPARTMENT

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Background: Point of Care Ultrasound (POCUS) is a focused bed-side examination that enable the emergency physician to interpret and use the information to address clinical presentation, to assist procedures, to address specific diagnosis, and to guide an on-going management of a patient. However, there is no standardised, validated methodology to assess medical officers' knowledge, attitude and practice of POCUS in Malaysia's emergency department. The goal is to create and verify a new evaluation tool, POCUS-Q questionnaire to assess medical officers' knowledge, attitude and practice in the emergency department.

Methods: There were two steps to this study: questionnaire creation and psychometric testing. The newly generated items were subjected to content validation by five panel of experts and face validation by 30 participants. Psychometric analysis involved medical officers from two different centres, Emergency Department Hospital Universiti Sains Malaysia and Emergency Department Hospital Pulau Pinang. Item Response Theory (IRT) 2-parameter logistic model was used to analyse knowledge, while attitude and practice were examined via Exploratory Factor Analysis (EFA) and internal consistency.

Results: Fifty-seven items representing the knowledge, attitude and practice section were generated from guidelines and literature review and 52 items were retained after content and face validation. All the items in the knowledge section obtained good standardised loading value of > 0.3 and adequate root mean square error of approximation of 0.081. Two items were removed from attitude section in view of factor loading < 0.5, however all the items in practise component were kept. Both attitude and practice demonstrated good internal consistency of 0.822 and 0.897, accordingly.

Conclusion: The result of this study indicate that the POCUS-Q questionnaire is a valid and accurate assessment tool.

Supervisor:

Associate Professor Dr. Mohd Hashairi Fauzi

Co-supervisor:

Dr. Mohamad Najib Mat Pa

KNOWLEDGE FOR AWARENESS ON EARLY RECOGNITION OF STROKE AMONG PUBLIC (SKTQ-BM): VALIDATION OF QUESTIONNAIRE

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Introduction: Stroke is a significant public health problem in Malaysia. The public needs to be educated and advocated for an early visit to the Emergency Department (ED) for treatment and rehabilitation to minimise the risk of disability and death. One way to increase the public's awareness is by strengthening their knowledge on the recognition of stroke.

Objectives: To validate the content, face, and construct of the Stroke Knowledge Test Questionnaire (SKTQ-BM), a newly revised and improved stroke knowledge questionnaire in the Malay language aimed at the public in Malaysia.

Method: This study has two phases. Item adaptation and modification, content validity testing with expert panels, and face validity testing with ten respondents comprised the first phase. The second phase, which included 201 responders, consisted of a psychometric test based on Item Response Theory (IRT).

Results: IRT revealed that the knowledge section consisted of four domains, with a total of 29 items being unidimensional, after removing items with high difficulty coefficients (outside the range of -3 to +3) and items with shallow discrimination values (0.35).

Conclusion: The SKTQ-BM is a well-validated and dependable tool for evaluating the knowledge of early stroke recognition, which can be used to build future population stroke intervention programs that enhance effective knowledge conversion.

Supervisor:

Dr. Ariff Arithra Abdullah

A STUDY OF PREVALENCE, ASSOCIATED FACTORS AND COPING STRATEGY OF DEPRESSION, ANXIETY AND STRESS AMONG EMERGENCY DEPARTMENT PERSONNEL IN HOSPITAL TENGGU AMPUAN RAHIMAH KLANG AND HOSPITAL UNIVERSITI SAINS MALAYSIA KUBANG KERIAN

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Introduction: The prevalence of depression, anxiety and stress is high among emergency department personnel and this may adversely affect their personal and professional life. While many coping strategies can be used, some may implicate psychological health positively and some are not. Hence, the prevalence of psychological distress should be assessed frequently and the associated factors and its coping strategies should be addressed to ensure a good performance of emergency medical service.

Objectives: The objectives of this study is to describe the prevalence, to determine the associated factors and to study the association between coping strategy with depression, anxiety and stress among emergency department personnel in Hospital Tengku Ampuan Rahimah, Klang and Hospital Universiti Sains Malaysia, Kubang Kerian.

Methods: A cross-sectional study was conducted from June until December 2020 on emergency department personnel in Hospital Tengku Ampuan Rahimah(HTAR), Klang and Hospital Universiti Sains Malaysia(HUSM), Kubang Kerian to study the level of depression, anxiety and stress. Participants completed a set of questionnaires which contain a research proforma form, Depression, Anxiety and Stress Scale21 (DASS21), and Brief Coping Orientation to Problems Experienced Scale (BriefCOPE). The data collected were analysed using SPSS version 24.0 software using descriptive and inferential statistics.

Results: A total of 311 participants were included in this study shows that the prevalence of depression, anxiety and stress among emergency department personnel were 29% (mild 11.3%, moderate 11.9% and severe 5.8%), 35.7% (mild 7.1%, moderate 16.1% and severe 12.5%) and 23.8% (mild 10.9%, moderate 8.7% and severe 4.2%), respectively. Married participants have lower odds to have depression (OR = 0.46; 95% CI: 0.25, 0.82) and anxiety (OR = 0.50; 95% CI: 0.29, 0.86). Other sociodemographic factors have

no significant correlation. Problem-focused strategy has lower odds to experience depression, anxiety and stress with OR = 0.82 (95% CI: 0.75, 0.89), OR = 0.81 (95% CI: 0.72, 0.91) and OR = 0.9 (95% CI: 0.84, 0.97), respectively. Conversely, dysfunctional coping strategy has higher odds to experience depression, anxiety and stress OR = 1.36 (95% CI: 1.26, 1.47), OR = 1.26 (95% CI: 1.18, 1.36) and OR = 1.28 (95% CI: 1.19, 1.37) respectively, while emotion-focused coping strategy has higher odds to experience anxiety (OR = 1.10; 95% CI: 1.02, 1.19).

Conclusion: The prevalence of depression, anxiety, and stress among emergency department personnel are high. Married healthcare personnel has lower depression and anxiety. Problem-focused coping strategies may protect against, while dysfunctional and emotion-focused coping strategies may cause depression, anxiety and stress.

Supervisor:

Professor Dato' Dr. Nik Hisamuddin bin Nik Ab. Rahman

EMERGENCY DEPARTMENT PATIENTS' COMPREHENSION DIFFICULTY OF THEIR DIAGNOSIS AND CARE UPON DISCHARGE AND DESCRIPTION OF FACTORS CONTRIBUTING TO THEIR KNOWLEDGE DEFICIT

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Introduction: Emergency Department (ED) patients must be aware of their diagnosis, treatment options, and implications of their diagnosis and its outcome in order to engage effectively in treatment options.

Objectives: To identify the proportion of discharged ED patients who have comprehension difficulty of their diagnosis and treatment received and to describe the factors contributing to patient comprehension difficulty.

Methods: A cross-sectional survey of 332 discharged green zone patients of ED Hospital Universiti Sains Malaysia chosen by simple random sampling was conducted from May 2020 to December 2020. A newly developed questionnaire adapted from previously established study at Chicago was content and face validated and translated. Pilot study involving 50 patients was done. Cronbach alpha value of 0.9 was obtained. Patients rated their subjective understanding on degree of agreement of three domains: diagnosis, ED care (tests and treatment) and factors contributing to comprehension deficit. Descriptive statistics was used to summarise sociodemographic characteristics, proportion of perceived comprehension difficulty of diagnosis and ED care. Statistical significance for association between variables were calculated using Pearson's chi-square test.

Results: More than 80% patients had good comprehension of their diagnosis and ED care. All the factors described except long waiting time were statistically

significant for patient comprehension. Noisy environment and lack of privacy was statistically significant as contributing to poor comprehension of ED care.

Conclusion: There is great improvement on patient comprehension of their diagnosis and treatment over the years. A conducive environment in addition to effective communication is vital further improvement of patient understanding of diagnosis and treatment received.

Supervisor:

Associate Professor Dr. Shaik Farid Abdull Wahab

NOREPINEPHRINE IN SEPTIC SHOCK: A SYSTEMATIC REVIEW AND META-ANALYSIS

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School of Medical Sciences, Universiti Sains Malaysia, Kelantan, Malaysia

Introduction: Most experts recommend norepinephrine as the first-line agent in septic shock.

Objective: To determine the effectiveness and safety of norepinephrine in patients with septic shock.

Methods: We searched the Cochrane Central Register of Controlled Trials and Epistemonikos as well as MEDLINE from 1966 till August 2019. Screening of full texts, evaluation for eligibility and data extraction were done by four independent reviewers. We estimated risk ratios (RR) and mean differences (MD) using random-effects model with 95% confidence intervals (CI). The primary outcomes included the number of participants who achieved the target mean arterial pressure (MAP), time to achieve the target MAP and number of participants with all-cause 28-day mortality. The secondary outcomes included the length of stay in the intensive care unit, length of hospital stay, incidence of arrhythmia and myocardial infarction, vasopressor-free days and number of participants with all-cause 90-day mortality.

Results: We identified 11 randomised controlled trials with a total of 4,803 participants. There was no difference in the number of participants who achieved the target MAP between those patients receiving norepinephrine and other vasopressors (RR = 1.44; 95% CI: 0.32, 6.54; $P = 0.640$; $I^2 = 94\%$; two trials, 116 participants). There was no significant difference in time to achieve the target MAP (MD = -0.05; 95% CI: -0.32, 0.21; $P = 0.690$; $I^2 = 26\%$; two trials, 1,763 participants) and all-cause 28-day mortality (RR = 0.95; 95% CI: 0.89, 1.02; $P = 0.160$; $I^2 = 0\%$; seven trials, 4,139 participants). Regarding the secondary outcome, norepinephrine may significantly reduce the incidence of arrhythmia as compared to other vasopressors (RR = 0.64; 95% CI: 0.42, 0.97; $P = 0.030$; $I^2 = 64\%$; six trials, 3,974 participants). There was no significant difference in the incidence of myocardial infarction (RR = 1.28; 95% CI: 0.79, 2.09), vasopressor-free day (RR = 0.46; 95% CI: -1.82, 2.74) and all-cause 90-day mortality (RR = 1.08; 95% CI: 0.96, 1.2) between norepinephrine and vasopressors.

Conclusion: In minimising the occurrence of arrhythmia, norepinephrine is superior to other vasopressors, making it safe to be used in septic shock. However, there was insufficient evidence concerning mortality and achievement of the target MAP outcomes.

Supervisor:

Associate Professor Dr. Kamarul Aryffin Baharuddin

Co-supervisors:

Associate Professor Dr. Norhayati Mohd Noor,

Dr. Mohd Boniami Yazid

AN ANALYSIS OF UNDERTRIAGE AMONG RED ZONE CASES AT HOSPITAL SULTAN ABDUL HALIM , SUNGAI PETANI KEDAH

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Introduction: Undertriage may leads to serious outcomes such as mortality, morbidity, and lawsuit particularly in emergency department.

Objectives: This study aimed to identify the rate, outcomes, and predictive factors of undertriage among red zone patients at Emergency Department, Hospital Sultan Abdul Halim (HSAH), Malaysia.

Methods: This retrospective study was conducted from 1 January 2018 until 30 December 2019 involving a total of 393 patients where 131 were categorised as undertriaged patients and 262 (control group) as appropriately triaged patients. Undertriage patients were identified as patients who fulfilled the red zone category based on the Malaysian Triage Category but were mistriaged to green. The numerator was red zone patients that were mistriaged to green, and the denominator consisted of all red zone patients. Data of patients' characteristics (demography, comorbid, chief complaints, vital signs, and GCS), environmental factors (working shift, weekend and public holiday) and staff factor (triage officer working experience) were obtained from the electronic medical records. Logistic regression was employed to analyse the data.

Results: Study found that the rate of undertriage was 1.2% (131/10,867) which is slightly higher than 0.5% as set by the Ministry of Health Malaysia. Comparison of outcomes (ward or ICU admission, mortality and length of stay) between undertriaged and appropriately triaged patients were not statistically significant. The predictors of undertriage identified were comorbidity of asthma (AOR = 3.791; $P = 0.008$), GCS (AOR = 2.110; $P = 0.002$) and patients with specific chief complaints of cardiovascular (AOR = 0.189; $P < 0.001$), respiratory (AOR = 0.262; $P < 0.0001$), neurological (AOR = 0.081; $P < 0.0001$) and trauma (AOR = 0.129; $P < 0.0001$). Asthmatics patients and higher GCS were more likely to be undertriaged, while patients with specific chief complaints were less likely to be undertriaged.

Conclusion: The identification of predictive factors of undertriage provides a framework for better training of ED staff and future prevention of undertriage. Multicentre prospective studies are needed to explore other predictive factors of undertriage.

Supervisor:

Dr. Normalinda Yaacob

FACTORS ASSOCIATED WITH SEVERITY IN PATIENTS WITH CONFIRMED LEPTOSPIROSIS AT A TEACHING HOSPITAL IN NORTHEASTERN MALAYSIA

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Introduction: Leptospirosis is known as zoonosis and possibly emerging infectious disease. This study aims to determine the factors associated with the severity of confirmed leptospirosis.

Objectives: To determine the factors associated with severity in confirmed leptospirosis patients.

Methods: This is a retrospective study identified 66 patients as laboratory confirmed leptospirosis from January 2014 to December 2019 in a tertiary hospital. We analysed the clinical, epidemiological, and laboratory factors associated with disease severity in these cases.

Results: A total of 66 samples were recruited in this study. Among 25 patients with severe leptospirosis, 19 had acute kidney injury (AKI), 16 had shock requiring vasopressors and eight had haemorrhage. Clinical feature commonly associated with severity are tachycardia and lethargy, abdominal pain and myalgia, shock and vomiting and fever. Patients with severe leptospirosis had leucocytosis, thrombocytopenia, high urea and creatinine compared to non-severe groups. There were significant association between shock ($P < 0.001$) and chronic kidney disease (CKD) ($P = 0.018$) with severe of leptospirosis. For CKD, there were 28.82 times higher odds to experience severe leptospirosis compared to non-CKD group (OR = 28.82 (95% CI: 1.76, 471.33)). For shock, there were 109.20 times higher odds to experience severe leptospirosis compared to non-shock cases (OR = 109.20 (95% CI: 12.53, 951.43)).

Conclusion: Our study has shown that factors associated with severity of leptospirosis are tachycardia, abdominal pain, fever and acute kidney injury. Leucocytosis, thrombocytopenia, high urea and creatinine are laboratory salient features that suggest severe leptospirosis. Patients with CKD show higher association with experiencing severe form of disease as compared with non-CKD patients.

Supervisor:

Dr. Mimi Azliha Abu Bakar

Co-supervisor:

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FACTORS PREDICTING HOSPITAL LENGTH OF STAY FOR ACUTE HEART FAILURE PATIENTS IN HOSPITAL UNIVERSITI SAINS MALAYSIA: INCORPORATION OF POINT OF CARE ULTRASONOGRAPHY (POCUS)

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Introduction: Despite advancement in heart failure (HF) management, it remained a progressive disease with significant morbidity and mortality rates linked to prolonged hospital length of stay (LOS). The length of hospital stay is a crucial factor in determining health care costs. We collected all baseline clinical, laboratory characteristics and point of care ultrasonography (POCUS) findings specific to the acute heart failure (AHF) patient population in a tertiary hospital in Malaysia to assess their LOS and identify the factors associated with longer LOS.

Objective: To study hospital length of stay and its predictive factors during the initial presentation of AHF patients to Emergency Department.

Methods: A prospective cross-sectional study was conducted in Hospital Universiti Sains Malaysia (Hospital USM) to all AHF patients presented to the emergency department (ED). Baseline clinical, laboratory characteristics and POCUS findings were collected. The primary outcome was hospital LOS. Multiple logistic regression analysis was used to identify the independent predictors of longer hospital LOS.

Results: Ninety-seven AHF patients were included in this study. The median length of stay in hospital was 4 days with 48 patients (49.5%) with hospital LOS of > 4 days. From univariate analysis, prolonged hospitalisation was found to be associated with non-invasive ventilation treatment, pleural effusion and length of stay in ED. In the multivariate analysis, the final model consisted of NIV treatment (adjusted OR = 3.73; 95% CI: 1.51, 9.20; $P = 0.004$), pleural effusion (adjusted OR = 3.59; 95% CI: 1.24, 10.39; $P = 0.019$) and length of stay in ED (adjusted OR = 1.07; 95% CI: 1.10, 1.13; $P = 0.016$) as the independent predictors of longer hospital LOS.

Conclusion: AHF patients who presented to a tertiary hospital in Malaysia were generally elderly and frail with multiple comorbidities. Sonographic findings of pleural effusion, patients receiving noninvasive ventilation treatment and length of stay in ED were independent factors of longer hospital LOS in AHF patients.

Supervisor:
Dr. Mohammad Zikri Ahmad

A 3-YEAR REVIEW OF GROUP B STREPTOCOCCUS COLONISATION IN PREGNANCY AND ITS PERINATAL OUTCOME IN HOSPITAL SELAYANG

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Introduction: There is an increase in the prevalence of GBS infection in pregnancy, which causes significant morbidity and mortality to both mother and baby. This retrospective study will evaluate the impact and outcome of pregnancy associated with GBS in Selayang Hospital from year 2017 till 2019.

Objectives: To evaluate Group-B Streptococcus infection in pregnancy and its perinatal outcome in Hospital Selayang over 3 years.

Methods: This retrospective study was performed at Hospital Selayang over a three-year period between 1st January 2017 and 31st December 2019. Patients with GBS colonisation were identified from their case note and laboratory investigation result. Those patients who had their high vaginal swab culture growing GBS bacteria were considered as patient with GBS colonization. Patient's demographic, obstetric and neonatal data were documented in Performa. Data analysis was carried out with SPSS version 26.0.

Results: A total of 31,762 patients delivered at Hospital Selayang. From this a total of 344 patients were noted to have GBS colonisation, making its prevalence of 1.09%. Out of 344 deliveries, 114 of babies were admitted to NICU for various reason. Majority (56.3%) of them were admitted in view of presumed sepsis as the infants showed early sign of infection. From our study noted, that Chinese mothers has a significant association and 1.92 likelihood of baby admitted to NICU compared to other ethnicity (adj 95% CI: 1.11, 3.30; $P = 0.02$) when antibiotic variable was controlled. Meanwhile patients who were given antibiotics has 0.62 reduce likelihood of baby admitted to NICU compared to patients who did not receive intrapartum antibiotic prophylaxis ($P = 0.004$).

Conclusion: The prevalence (1.09%) shown much lower than other literature review, as the sample size not as universal screening in general population of pregnant patients. Only those patients who came with excessive vaginal discharge, PROM, PPRM and preterm labour were screened. There is significant association between Chinese ethnicity and NICU admission. It shown that babies born to Chinese mothers with GBS infection more prone to get admitted to NICU compare to other race and foreigners.

Supervisor:
Associate Professor Dr. Adibah Ibrahim

Co-supervisor:
Dr. Valyakalayil Daniel Phillip

A 10-YEAR REVIEW OF METHOTREXATE TREATMENT FOR ECTOPIC PREGNANCY IN HOSPITAL RAJA PERMAISURI BAINUN, IPOH

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Introduction: Ectopic pregnancy is known as the fourth principal cause of death for maternal in Malaysia year 2019. An earlier diagnosis and use of methotrexate treatment proved to be safe and effective alternatives to surgical treatment.

Objective: To determine the methotrexate usage and its treatment outcome among ectopic pregnancy in Hospital Raja Permaisuri Bainun, Ipoh.

Methods: This retrospective study of 10 years from January 2009 until November 2019 reviewed 73 patients with ectopic pregnancies who received methotrexate according to a single-dose protocol. The diagnosis of ectopic pregnancy was confirmed using a combination of transvaginal scan and serial serum β -hCG levels. The selection criteria were patients who had a stable haemodynamic status and willingness to follow up. Patients were not excluded from methotrexate treatment either by pre-treatment serum β -hCG levels or by the presence of foetal cardiac activity on ultrasound. A proforma was used to record all relevant clinical and demographic data in all cases. Serum β -hCG levels were measured at pre-treatment and monitored subsequently to determine the rate of successful resolution.

Results: The overall success rate was 87.7% (64/73 patients) with methotrexate treatment. Fifty-six patients (87.5%) were treated successfully with a single dose of methotrexate, and only eight patients (12.5%) required a second dose of methotrexate. There was no relation between socio-demographic, pre-treatment β -hCG levels, ectopic mass size, and treatment efficacy. The presence of a yolk sac and combination with any other ultrasound findings such as positive foetal cardiac activity or free fluid at Pouch of Douglas were the significant predictors of required second dose MTX or treatment failure.

Conclusion: Early diagnosis of ectopic pregnancy is crucial to reduce morbidity and mortality. In carefully selected cases, methotrexate treatment proved cost-effective, avoided risks associated with surgery and anaesthesia, and showed a similar success rate.

Supervisor:
Dr. Ahmad Akram Omar

Co-supervisor:
Dato' Dr. Aruku Naidu a/p Apana

DEVELOPMENT AND VALIDATION OF MENSTRUAL DISORDER OF ADOLESCENT (MENDA) QUESTIONNAIRE IN MALAY LANGUAGE

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Introduction: The onset of menstruation or menarche represents a hallmark event in the pubertal development of the adolescent girl. It signifies the maturation of reproductive potential and physiological growth. The current study was designed to develop and validate the questionnaire regarding menstrual disorder among adolescents based on their knowledge, attitude, and practice in the Malay language. A knowledge, attitude, and practice survey are helpful to assess a target groups' current knowledge, attitude and practice on a specific health topic to identify their needs, problems and possible barriers before developing and implementing an intervention. Should it be validated and successfully reliable, it can be used in our community.

Objectives: To develop and validate the Menstrual Disorder of Adolescent (MenDA) Questionnaire to assess knowledge, attitude, and practise (KAP) of adolescents towards menstrual disorder.

Methods: The questionnaire was developed following a standardised protocol that consisted of literature review, focused group discussions, and expert opinion. It was subjected to content validity by six experts and face validity by 46 adolescents before a revised final version was drafted. Then, a cross-sectional survey on 485 adolescents was carried out to validate the tool. The MenDA questionnaire was administered using Google form and consist of three domains: Knowledge (35 items), attitude (23 items), and practice (23 items). Exploratory factor analysis (EFA) was performed using a principal component with varimax rotation to establish the construct validity of the questionnaire. The internal consistency of the questionnaire was tested using Cronbach's alpha coefficient.

Results: MenDA questionnaire with 62 items categorised under three domains knowledge, attitude, and practices was developed. The KAP sections have 23, 18 and 21 items, respectively. Independent Cronbach's alpha for KAP domains were 0.739, 0.711 and 0.793, respectively, indicating good internal consistency.

Conclusion: Evidence of validity and reliability of the MenDA questionnaire has been obtained and can be used to assess KAP on menstrual disorders among Malaysian adolescents.

Supervisor:
Dr. Nik Rafiza binti Nik Muhamad Afendi

Co-supervisors:
Dr. Erinna binti Mohamad Zon,
Dr. Najib Mat Pa

EVALUATION OF THE DRY EYE DISEASE PARAMETERS WITH EXPOSURE TO DRY ERASE INK AMONG SCHOOL TEACHERS

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Introduction: Previously, school teachers write on blackboards using chalk. Chalk produces a lot of dust which accumulates on surfaces and causing irritating respiratory tract symptoms when inhaled. Therefore, almost all schools nowadays substitute the chalkboards with whiteboards. Dry-erase ink is a type of ink used in most whiteboard marker pen which contain volatile solvent vehicle that easily vaporizes allowing the mark to dry on the surface. Most whiteboard markers use dry-erase ink which easily vaporizes allowing the mark to dry on the surface of the whiteboard. The solvents used in dry erase ink can cause irritation to the eyes, especially to school teachers using whiteboard.

Objectives: To evaluate the effect of dry-erase ink marker usage among school teachers towards the dry eye disease parameters including tear film breakup time (TBUT), Schirmer test and ocular surface disease index(OSDI) score.

Methods: A cross-sectional study was conducted from June 2020 to December 2021 involving 116 school teachers and 145 control subjects. Assessment include demographic data, average of hours of teaching in a day and a week for school teachers, TBUT test, Schirmer test and OSDI score among school teachers and control subjects. Dry eye disease was defined as OSDI score more than 12 and either TBUT less than 10 s or Schirmer test less than 6 mm in 5 min or both. Statistical analysis was done using SPSS version 26.0.

Results: There were 116 school teachers with mean age of 48.0 year-old and 145 control subjects with mean age of 42.0 year-old involved in this study. There was statistically significant difference of OSDI score and TBUT results among school teachers compared with control subjects ($P < 0.01$). However, there was no significant difference in Schirmer test results. There was no statistically significant relationship between hours of teaching with the TBUT test ($P = 0.450$) and Schirmer test ($P = 0.327$). There was no significant relationship of OSDI score with the TBUT test ($P = 0.629$) and Schirmer test ($P = 0.230$) among school teachers or control group ($P = 0.225$, $P = 0.840$).

Conclusion: Ocular surface integrity and tear film are not affected by usage of dry-erase ink marker among school teachers. However dry eye among school teachers can affect the quality of work and classroom learning.

Supervisor:
Professor Dr. Mohtar Ibrahim

Co-supervisor:
Dr. Rohana Abdul Rashid

EVALUATION OF VASCULAR ENDOTHELIAL GROWTH FACTOR LEVEL IN TEARS AND AQUEOUS AMONG PATIENT WITH NON-PROLIFERATIVE DIABETIC RETINOPATHY

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Introduction: Diabetic retinopathy is a reversible cause of blindness with early detection and treatment. Vascular endothelial growth factor (VEGF) plays an essential role in the pathogenesis of blindness-related diseases, such as diabetic retinopathy (DR). VEGF is largely produced intraocularly such as in vitreous and aqueous. As tears sampling is less invasive, evaluating the VEGF level in tears may provide an association of the disease process with ocular surface fluid.

Objectives: This study aims to evaluate the VEGF level in tears and aqueous among diabetes mellitus (DM) patients with non-proliferative diabetic retinopathy (NPDR) and their correlation.

Methods: A cross-sectional study was conducted in Hospital Universiti Sains Malaysia and Hospital Raja Perempuan Zainab II from July 2019 until November 2021. Fifty-one diabetic patients with no DR, 45 patients with NPDR, and 54 non-DM patients were enrolled in this study. Type 2 DM patients and non-DM patients that were planned for cataract surgery and fulfilled the selection criteria were included in the study. Tears were collected using a Schirmer strip before the operation and aqueous were collected via cornea paracentesis during cataract surgery. The concentration of VEGF was determined using an ELISA kit test.

Results: The mean VEGF concentration in tears was 46.9 ± 18.7 pg/mL in DM patients with NPDR, 46.7 ± 23.3 pg/ml in patients with no DR, and 40.1 ± 20.6 pg/mL in non-DM. There was no significant difference in mean VEGF level in tears between the three groups before and after adjusting for covariates ($P = 0.180$ and $P = 0.155$, respectively). VEGF concentration in aqueous was 217.5 ± 89.2 pg/mL in patients with NPDR, 174.3 ± 75.1 pg/mL in DM patients with no DR group, and 140.7 ± 41.9 pg/mL in the non-DM group. There was a significant difference in mean VEGF level in aqueous between the three groups before and after adjusting for age, duration of DM, level of HbA1c, hypertension, dyslipidemia and status of smoking ($P < 0.001$ and $P = 0.004$, respectively). Post hoc analysis showed VEGF level in NPDR was significantly higher than in no DR ($P = 0.012$) and non-DM ($P = 0.033$). There was a significant weak correlation of VEGF levels between tears and aqueous among diabetic patients ($r = 0.201$, $P = 0.049$).

Conclusion: This study demonstrated that aqueous levels of VEGF were significantly higher in DM patients with NPDR than in no DR and non-DM. The level of tears VEGF

has little or no relationship to the level of aqueous VEGF. These findings suggest that aqueous VEGF may reflect the DR status.

Supervisor:

Professor Datin Dr. Zunaina Embong

Co-supervisors:

Associate Professor Dr. Mahaneem Mohamed,

Dr. Tengku Norina Tuan Jaffar

EVALUATION ON KNOWLEDGE AND PRACTICE OF TARGET INTRAOCULAR PRESSURE IN THE MANAGEMENT OF GLAUCOMA PATIENTS AMONG OPHTHALMOLOGISTS AND MEDICAL OFFICERS

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Introduction: Intraocular pressure (IOP) is the only modifiable risk factor for the development and progression of glaucoma.

Objectives: To evaluate the knowledge and practice of target intraocular IOP among ophthalmologists and trainees in Malaysia based on Clinical Practice Guideline for management of glaucoma by Ministry of Health, Malaysia.

Methods: A cross-sectional study was conducted between 1 January 2020 and 31 December 2021 involving 279 subjects (139 ophthalmologists and 140 trainees) working in ophthalmology fraternity in various institutions in Malaysia. This study was divided into two phases. Phase I involved the development and validation of questionnaire on knowledge and practice in setting target IOP. This questionnaire was later used in the phase II. Phase II involved an online survey of the validated questionnaire. Mean score of knowledge and adherence to setting target IOP in clinical practice was compared between ophthalmologists and trainees using independent *t*-test.

Results: A total of 323 ophthalmologists and trainees were invited to participate, but only 279 (139 ophthalmologists and 140 trainees) responded (86.4%). Mean years of experience in ophthalmology practice was 7.4 (5.5) years. A total of 225 respondents (80.6%) adhered to setting target IOP. There was significant difference in the incidence of adherence between ophthalmologists (125, 89.9%) and trainees (100, 71.4%) ($P < 0.001$). Mean total score of knowledge among ophthalmologists (21.03 [95% CI: 20.52, 21.54]) was significantly higher than trainees (20.24 [95% CI: 19.78, 20.69]) ($P = 0.022$). There was significant association of mean total score of knowledge and adherence in setting target IOP in clinical practice ($P = 0.002$). There was no association between number of patients with glaucoma seen in their practice with their knowledge ($P = 0.376$) and adherence (0.083) in setting target IOP. Poor understanding (27.8%) and confusion in

selecting the method of setting target IOP (35.2%) were the commonest reason among the non-adherences. The most popular method was the percentage of IOP reduction from baseline.

Conclusion: There is the discrepancy of knowledge and adherence to setting target IOP between ophthalmologists and trainees in Malaysia. An intervention program should be planned to address the discrepancy of standard clinical practice and prevention of glaucoma progression in Malaysia.

Supervisor:

Professor Dr. Liza Sharmini Ahmad Tajudin

Co-supervisors:

Dr. Suhaily Mohd Hairon,

Associate Professor Dr. Azhany Yaakub

EVALUATION OF THE CHANGES OF ANTERIOR SEGMENT BIOMETRY AND INTRAOCULAR PRESSURE IN PATIENTS TREATED WITH INTRAVITREAL INJECTION OF ANTIVASCULAR ENDOTHELIAL GROWTH FACTOR

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Introduction: Anti-vascular endothelial growth factors (anti-VEGF) intravitreal injection is one of the popular procedures for medical retina diseases. However, this common procedure does associate with ocular side effects of which raised intraocular pressure (IOP) is the commonest.

Objectives: This study aimed to evaluate the changes of anterior segment biometry with IOP post intravitreal injection.

Methods: From May 2020 till May 2021, this prospective cohort study recruited 72 eyes of 66 patients who received intravitreal injection of either Aflibercept or Ranibizumab. Recruited candidates were examined for IOP and anterior segment biometry using Visante 'anterior segment-optical coherence tomography' (AS-OCT) before and after injection. The anterior segment biometry measured in this study includes central anterior chamber depth, angle opening distance at nasal and temporal (AOD500 nasal, AOD500 temporal), and trabeculo-iris angle at nasal and temporal (TIA500 nasal and TIA500 temporal).

Results: Mean (SD) increment of IOP following injection within 30 min and 1 h were 6.16 (0.68) mmHg ($P < 0.001$) and 1.26 (0.35) mmHg ($P = 0.002$) respectively. Mean (SD) differences of TIA500 temporal between pre with within 30 min and 1-h post-injection were 1.66 (0.66) degrees ($P = 0.04$) and 1.45 (0.57) degrees ($P = 0.04$), respectively. The changes of other anterior segment biometry parameters were not significant. Also, no significant relationship between IOP changes and anterior segment biometry was found.

Conclusion: A single dose of intravitreal anti-VEGF injection is associated with short-term raised in IOP. There are no significant changes in anterior segment biometry parameter except for TIA500 temporal and it has no statistically significant relationship with IOP changes post intravitreal anti-VEGF.

Supervisor:
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Co-supervisors:
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Dr. Kursiah Mohd Razali,
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EFFECT OF VISUAL REHABILITATION ON QUALITY OF LIFE AND DEPRESSION AMONG PRIMARY GLAUCOMA PATIENTS

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Introduction: Glaucoma is an irreversible optic neuropathy characterised by corresponding visual field defects. Increasing visual field damage from glaucoma affects patient's daily living. Allocating time to physical, social, and cognitive activities has been widely attributed to a state of happiness in the elderly. The goal of visual rehabilitation is to maximize an individual's functional vision. It may help individuals to gain greater control of their environment, which leads to greater self-confidence, lowered risk of depression and anxiety, and improved quality of life.

Objectives: To evaluate effect of visual rehabilitation on IOP, quality of life and depression among patients with primary glaucoma.

Methods: A randomised single-blinded control trial was conducted involving primary glaucoma patients, mainly POAG and PACG patients between Dec 2020 and Dec 2021 at Hospital Universiti Sains Malaysia, Malaysia. Patients who fulfilled inclusion and exclusion criteria were randomised into group A and group B using sequentially numbered, opaque sealed envelopes (SNOSE). Patients in group A were assigned to attend rehabilitation sessions for 6 months. The patients in group B were advised to carry out their normal routine activities. At baseline and 6 months post recruitment, both groups were given GlauQol-36 and mGDS-14 questionnaire to read and answer. Descriptive analysis and repeated measures ANOVA were performed using SPSS.

Results: A total of 72 patients were recruited and randomized into two groups ($n = 36$). However, only 67 patients completed the study (five dropouts). The mean age of the recruited patients with primary glaucoma was 64.0 ± 6.7 years old. There was no significant difference in all demographic data between groups A and B. There was a significantly higher mean IOP in Group A compared to Group B ($P = 0.003$). For GlauQoL36, the total score for 6 months post intervention for group A was lower than group B but

without statistically significant ($P = 0.309$) based on RM ANOVA. Group A showed improvement in 6 months post-intervention score in four domains (daily living, anxiety, treatment burden and confidence healthcare) but without significant difference based on paired t -test. Group B showed improvement in 6 months post-intervention score in three domains (daily living, anxiety and confidence health care) but without significant difference. For mGDS-14, only one patient from group A scored more than eight points (depressed) at baseline. The score remain the same at 6 month post-intervention. The remaining patient's mGDS14 questionnaire scoring was below 7 points. The mean mGDS-14 score at baseline was slightly higher in group B than in group A. There is no statistically significant difference ($P = 0.371$) based on RM ANOVA.

Conclusion: In conclusion, visual rehabilitation based on the rehabilitation for patients with stroke may not be suitable for patients with glaucoma. However, there is potential benefit of visual rehabilitation to the QoL and reduction of depression among patients with glaucoma.

EVALUATION OF ASSOCIATED FACTORS OF OPTICAL COHERENCE TOMOGRAPHY FEATURES AND THEIR ASSOCIATION WITH VISUAL ACUITY AMONG DIABETIC PATIENTS WITH CLINICALLY SIGNIFICANT MACULAR OEDEMA

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Introduction: Clinically significant macular oedema (CSMO) is a specific category of diabetic retinopathy (DR) which is a microvascular complication of diabetes mellitus (DM) that lead to structural changes at the macular. Optical coherence tomography (OCT) offers a structural and quantitative analysis of CSMO. DM status and severity of DR can affect the OCT morphological features and OCT quantitative parameters of CSMO. Visual acuity is directly affected by the changes of these OCT features. By identifying its associated factors, we can address to CSMO patients regarding the choice of treatment, visual prognosis and also the treatment outcome.

Objectives: Our objective was to identify the associated factors (demographic, systemic and ocular factors) affecting OCT features (OCT morphology and OCT quantitative parameters) among CSMO patients and also to determine association of these OCT features with visual acuity.

Methods: A cross-sectional study was conducted in the Ophthalmology Clinic, Hospital Universiti Sains Malaysia (USM), from January 2020 till November 2021 among Type 2 DM patients with CSMO. OCT was performed to identify the OCT morphological features [sponge-like diffuse retina thickness (SLDRT), cystoid macular oedema (CMO), and subretinal fluid (SRF)] and to measure OCT quantitative features [central macula thickness (CMT) and retina volume].

Results: A total of 140 Type 2 DM patients with CSMO were recruited and analysed in this study. The mean duration of Type 2 DM was 12.0 ± 6.0 years and the mean HbA_{1c} were $10 \pm 2.5\%$. Majority of the patients had mild form of visual impairment (better than 6/18; 45%), followed by moderate visual impairment (6/18–6/60; 32.9%) and severe visual impairment (6/60–3/60; 9.3%). There was 12.9% of patients presented with blindness (worse than 3/60). The most common OCT morphological features were SLDRT (39.3%), followed by mixed type (30.0%), CMO (25.0%) and SRF (5.7%). Small number of patients had epiretinal membrane (ERM; 19.3%) and vitreomacular traction (VMT; 1.4%). The associated factors affecting OCT morphological features among diabetic patients with CSMO were DM duration (for SLDRT and Mixed type), PDR status (for SLDRT), CMT (for SLDRT and CMO) and retina volume (for CMO, SRF and mixed type). For OCT quantitative features, the associated factors were CMO type (for CMT); age, SRF type, SLDRT type, and CMT (for retina volume) and mixed type (for CMT and retina volume). Among the OCT morphological features, SRF type had significant association with visual acuity. Among the OCT quantitative features, CMT and retina volume had significant association with visual acuity.

Conclusion: The most common OCT morphological type among CSMO was SLDRT and the best mean visual acuity was observed in SLDRT group. Duration of DM, PDR status, CMT and retinal volume are the factors affecting OCT morphological features. Whereas age and OCT morphological features are the factors affecting the OCT quantitative parameters. SRF, CMT and retina volume had significant association with the visual acuity. By stabilizing the severity of DR status, it will reduce the structural damage of macular and provide good outcome of visual acuity.

Supervisor:
Professor Dr. Zunaina Embong

EVALUATION OF OCULAR BIOMETRY IN PATIENTS WITH EVAPORATIVE DRY EYES

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Introduction: Accurate ocular biometry measurements is essential in ensuring good post-operative outcome. Laser interferometry is a commonly applied, non-invasive method of ocular biometry measurements which relies on stable tear film and smooth corneal surface for accurate readings. These are factors which are affected in patients with evaporated dry eye disease.

Objectives: To evaluate ocular biometry parameters, which includes axial length, keratometry reading and anterior chamber depths among patients with evaporative dry eyes.

Methods: A cross-sectional study was conducted in ophthalmology clinic of Hospital Melaka and Hospital University Sains Malaysia from August 2019 till June 2021. The samples were selected with the convenience purposive

sampling method. The participants who fulfilled the inclusion criteria were recruited. Participants were subjected to evaporative dry eye assessment, whereby they were divided into dry eye group and no dry eye group. The participants in both groups then undergo axial length, keratometry and anterior chamber depth measurements using IOLMaster 700.

Results: A total of 115 participants with mean age of 64.58 years old were recruited (64 had evaporative dry eye and 51 had no dry eye). Mean keratometry reading in the evaporative dry eye group was higher ($-1.45D$) than the no dry eye group ($-0.59D$) and the difference was statistically significant ($P < 0.01$). Mean axial length and anterior chamber depth were shorter in the evaporative dry eye group. However, this was not statistically different. When assessing the correlation between individual dry eye parameters with ocular biometry of subjects with evaporative dry eye, there was a statistical significant positive correlation between anterior chamber depth with TBUT ($P = 0.021$) and a statistically significant negative correlation between axial length with cornea fluorescein staining ($P = 0.042$). There were no correlations between keratometry reading with OSDI, TBUT and cornea fluorescein staining grading.

Conclusion: There was a statistically significant difference in the mean keratometry reading between evaporative dry eye group and no dry eye group. However, there were no correlations between the individual dry eye parameter with keratometry reading among subjects with evaporative dry eye. Though differences in the mean axial length and anterior chamber depth were not statistically significant, correlations with the individual dry eye parameters were present. Therefore, assessment for evaporative dry eye during cataract operation pre-clerking is warranted to improve the accuracy of ocular biometry measurements and IOL power selection.

Supervisor:
Dr. Julieana Muhammed

Co-Supervisor:
Dr. Fadzillah Ab Jalil

EVALUATION OF ANXIETY AND DEPRESSION AND ITS ASSOCIATED FACTORS USING HADS QUESTIONNAIRE IN NASOLACRIMAL DUCT OBSTRUCTION PATIENTS

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Introduction: Nasolacrimal duct obstruction (NLDO) also known as dacryostenosis, is an anatomic obstruction that may occur along the lacrimal drainage pathway and may be congenital or acquired. Acquired NLDO may be primary acquired NLDO (PANLDO) or secondary acquired NLDO with the primary appearing as the most common type. Most NLDO patients complain of occasional conjunctival

hyperemia and epiphora. Psychological sequelae of NLDO is often not addressed by the treating physician. Thus, identification of such sequelae may be helpful to these patients and brings attention to the need of referral to the appropriate channels for further evaluation.

Objective: The aim of our study was to evaluate the levels of anxiety and depression in NLDO patients and to determine the potential predictors associated with it.

Methods: A cross-sectional study was conducted between March 2021 and March 2022 involving NLDO patients attending eye clinics in Hospital Universiti Sains Malaysia. Patients were given the validated Hospital Anxiety and Depression Scale (HADS) and an evaluation of Munk score. After completion, the questionnaires were calculated and scored, and statistical analysis was done using Statistical Package for the Social Science (SPSS Inc. version 26.0).

Results: A total of 109 patients diagnosed with NLDO participated in this study. The demographic and clinical variables assessed were age, gender, race, marital status, highest education, duration of NLDO in years and severity of epiphora. The mean HADS-Depression score was 4.61 (SD 3.4) with a range of scores from (0 to 12). There were 25.7% ($n = 28$) of the total number of patients had depression. Seventy-four and three tenths percent of the patients had normal depression scores, while 22.0% and 3.7% of the participants had mild and moderate depression respectively. The mean HADS-Anxiety score was 5.98 (SD 4.34) with a range of scores from (0–14). A total of 35.8% ($n = 39$) of patients had anxiety. Sixty-four and two tenths percent of the patients are normal, while 19.3% and 16.5% of the patients had mild anxiety and moderate levels of anxiety, respectively. A score of more than 8 represents mild depression or anxiety. There were significant associations between age, NLDO duration, epiphora and dabbling with depression levels based on the multiple linear regression ($P < 0.05$ for all variables tested). Similarly, there were significant associations between epiphora and dabbling 2–4/day and 5–10/day with increased anxiety levels among the patients where $P < 0.05$ for the variables. In addition, depression scores decreased by 0.048 with age among the patients. Similarly, NLDO duration of 1 year–5 years and > 5 years have 4.054 and 4.683 chances of having depression when compared to single patients respectively. For anxiety, for patients with NLDO duration of > 5 years have 2.642 chance of experiencing the condition that those with the duration of < 5 years.

Conclusion: This study showed a low prevalence of depression and anxiety among NLDO patients. Younger age group, NLDO duration and epiphora requiring dabbling were associated with depression among the patients; Whereas NLDO duration and epiphora requiring dabbling were associated with increased level of anxiety.

Supervisors:

Associate Professor Dr. Adil Hussein,
Dr. Evelyn Tai Li Min

EVALUATION OF PREVALENCE AND ASSOCIATED FACTORS OF DRY EYE SYNDROME AMONG MEDICAL STUDENTS EXPOSED TO VISUAL DISPLAY TERMINAL IN HEALTH CAMPUS, UNIVERSITI SAINS MALAYSIA

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Introduction: Dry eye syndrome (DES) has become a public health concern, especially during the COVID-19 pandemic. Medical students are at risk due to an increase in visual display terminal (VDT) exposure given the transition to full-time online lectures. Presence of reduced blink rate and tear film instability in VDT users causes an increase in tear evaporation leading to symptoms of DES. This study helps us to learn about the associated factors of VDT use and DES among the young generation.

Objectives: This study aims to determine the prevalence and associated factors of DES among medical students exposed to VDT in health campus, Universiti Sains Malaysia (USM).

Methods: A cross-sectional study involving 140 undergraduate medical students aged 22 years old–29 years old who were VDT users. Factors analysed are age, gender, race and duration of VDT usage. Data collection included both subjective assessment (OSDI questionnaire) and objective assessment (TBUT and Schirmer's test). Statistical analysis was done using Statistical Package for the Social Science (SPSS Inc. version 24.0). Results were analysed using descriptive analysis and multivariate logistic regression.

Results: Most of the medical student cohort was female and Malay. Most of the students use VDT for less than 8 h. A high incidence of DES was noted among medical students (92.1%). None of the factors showed significant association with positive findings DES by subjective and objective assessment and duration of VDT usage.

Conclusion: DES is common among VDT users. This study showed a high prevalence of DES among the medical students in USM. The factors analysed did not show a significant association between DES and duration of VDT usage. This study may help to recognize the problem and will raise awareness of their daily practice and implement preventive measures to avoid VDT related DES.

Supervisor:

Dr. Khairy Shamel Sonny Teo

Co-supervisor:

Dr. Adil Hussein

KELULUT HONEY AS AN ALTERNATE SOURCE OF CARBOLOADING IN DIAGNOSTIC VALUE OF SERUM AND TISSUE EOSINOPHIL IN DIAGNOSIS OF ASTHMA AMONG PATIENTS WITH CHRONIC RHINOSINUSITIS

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Introduction: Chronic rhinosinusitis (CRS) is one of the most common chronic inflammatory diseases of sinonasal mucosa. Asthma among CRS patients is often underdiagnosed and causes management of CRS more challenging. Therefore, using serum and tissue eosinophil as an indicator and prediction of asthma in CRS patients are valuable for further preventing recurrent and increase the effectiveness of treatment for CRS.

Objective: To determine the association and diagnostic ability of serum and tissue eosinophils in the diagnosis of asthma among CRS patients.

Methods: A cross-sectional study was conducted involving 24 CRS patients with and without asthma respectively from the Otorhinolaryngology clinic of two tertiary hospitals located in the East Coast of Peninsular Malaysia. Serum and tissue eosinophils (obtained from nasal polyp) between both groups were compared. Association between serum and tissue eosinophils with asthma evaluated using logistic regression analysis, adjusting for important sociodemographic characteristics. The diagnostic ability of serum and tissue eosinophil was then evaluated by assessing the receiver operating characteristic (ROC) curve.

Results: A total of 48 CRS patients with a mean [SD] age of 47.50 [14.99] years old were included. Patients with asthma had significantly higher serum [0.48 versus $0.35 \times 109/L$] and tissue eosinophil [100 versus 8.5 per HPF]. Tissue eosinophils were found to be an independent predictor of asthma with adjusted OR = 1.05, $P < 0.001$, after adjusting for age and serum eosinophils. The area under the ROC curve for serum eosinophil was 69.0%. At optimal cut-off value ($0.375 \times 109/L$), the sensitivity and specificity for serum eosinophil was 75.0% and 70.8%. The area under the ROC curve for tissue eosinophil was 93.4%. At optimal cut-off value (58.0 per HPF), the sensitivity and specificity for tissue eosinophil were 79.2% and 91.7% respectively.

Conclusion: A significantly higher level of serum and tissue eosinophil are seen in CRS with asthma. However, there was no correlation between serum and tissue eosinophil in both groups. The CRS patient needs to be screened

for asthma if the level of serum eosinophil is more than $0.375 \times 109/L$ and tissue eosinophil more than 58 per HPF.

Supervisor:
Dr. Norasnieda Md Shukri

Co-supervisors:
Dr. Sakinah Mohamad,
Professor Sharifah Emilia Tuan Sharif,
Dr. Rosdi Ramli,
Dr. Murni Hartini Jais,
Dr. Mat Zuki Mat Jaeb,
Dr. Najib Majdi Yaacob,
Dr. Mohd Yusran Yusoff,
Professor Baharudin Abdullah

THE PREVALENCE OF COMPLEMENTARY AND ALTERNATIVE MEDICINES USAGE AMONG ALLERGIC RHINITIS PATIENTS IN MALAYSIA

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Introduction: Allergic rhinitis (AR) is a common disease in Malaysia with many patients using complementary and alternative medicines (CAM) to alleviate their symptoms. However, there was no prevalence study done for CAM users among the allergic rhinitis patients in Malaysia. Because of the rising interest in CAM in the treatment of allergic rhinitis, we conducted this study to estimate the prevalence of CAM usage among allergic rhinitis patients in Malaysia and understand the practice of CAM usage among them.

Objectives: i) To determine the prevalence of CAM usage among allergic rhinitis patients in Malaysian population, ii) to describe the pattern of CAM usage among allergic rhinitis patients in Malaysian population, iii) to identify types of CAM used by allergic rhinitis patients in Malaysia, iv) to explore the perceived effectiveness of CAM in treating allergic rhinitis based on users' subjective experience and v) to determine the reasons of CAM usage by allergic rhinitis patients in Malaysia.

Methods: A cross-sectional study which included a questionnaire-based study and a survey that used secondary data, which was information of allergic rhinitis from patient's clinic records. Patients with allergic rhinitis who attended the ORL-HNS department in Hospital Universiti Sains Malaysia and Hospital Sultanah Aminah, Malaysia were enrolled after consented, on a first come first serve basis as convenience sampling from July 2020 until February 2021. A pre-tested self-administered, 16-item questionnaire in Bahasa Malaysia was distributed to the participants. The questionnaire consists of a set of 16 questions with subsets to enquire about the sociodemographic data and pattern of usage of CAM and its effectiveness.

Results: 372 patients were enrolled in this study consisting of 217 (58.3%) female and 155 (41.7%) male patients. 231 (62.1%) participants had used CAM for AR in the past 10 years. A higher proportion of females ($P = 0.015$) and those with higher income ($P = 0.004$) had used CAM. Among the users, 87.9% found CAM to be effective. No differences were found in terms of age ($P = 0.888$) and education level ($P = 0.057$) for CAM usage.

Conclusion: CAM is widely used in Malaysia to alleviate allergic rhinitis symptoms, with a large proportion of users think it is effective. Therefore, more randomised controlled trials and laboratory researches should be done in the future to provide evidence and guidance to integrate CAM into allergic rhinitis management.

Supervisor:

Dr. Norasnieda Md Shukri

Co-supervisors:

Associate Professor Dr. Ramiza Ramza Ramli,

Associate Professor Dr. Najib Majdi Yaacob

RADIOANATOMICAL ANALYSIS OF VIDIAN CANAL AND ITS RELATIONSHIP TO SURROUNDING STRUCTURES: A COMPARISON BETWEEN THREE RACES

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Introduction: Accurate understanding of the vidian canal (VC) and knowing its relationship with the surrounding structures is crucial for developing surgical plans, and minimize the complication rate. The different variation of the VC course and its relationship to the sphenoid and internal carotid artery have been described over the years to improve the outcome of endoscopic approach.

Objectives: To compare the different patterns of VC position in relation to the body of sphenoid sinus with the variation in the VC course, the different position of VC with relation to the anterior genu of the petrous portion of internal carotid artery (pICA) and the relationship of VC termination and pICA for use in endoscopic endonasal skull base approaches among the three major ethnic groups in Malaysia.

Methods: A retrospective cross sectional study designed on 240 subjects who underwent computed tomography (CT) of skull base in the period from 2015 to 2019 was conducted at the Department of Radiology.

Results: Three major ethnic groups in Malaysia: Malay, Chinese and Indian were evenly distributed, 80 subjects for each group. There were significant differences in the measurement of VC length as Chinese revealed the shortest VC length among the three races. In terms of the distance between VC and foramen rotundum, no statistically

significant difference among the three races. The most common VC types were Type 2 and the least common were Type 1. There were significant difference in the VC types among the race was observed. The variation of rostral-caudal course (RCC) of VC revealed to be predominantly medial to lateral. All subjects revealed superior-medial pICA types for both side of the sections exclusively. There were no significant difference between VC types and RCC of VC types.

Conclusion: This study is essential to provide a better and precise knowledge regarding the VC landmarks, assist in endoscopic sinuses and skull base surgery planning and provide contributions to the literature.

Supervisor:

Professor Dr. Md Khairi Md Daud

Co-supervisors:

Professor Dr. Baharudin Abdullah,

Dr. Avatar Singh a/l Mohan Singh,

Associate Professor Dr. Mohd Ezanee Aziz,

Dr. Nurul Akhmar Omar

CROSS-REACTIVITY OF COCKROACHES TO HOUSE DUST MITES AND SEAFOOD IN ALLERGIC RHINITIS PATIENTS IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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Introduction: Allergic rhinitis (AR) is a common disease globally, mediated by immunoglobulin E (IgE) or type 1 immediate hypersensitivity in response to inhaled allergens, with implication on quality of life and economic burden. Cockroach is an important aeroallergen that shows specific IgE (sIgE) cross-reactivity with other inhalant and food allergens and contributes to the severity of AR.

Objectives: This study is aimed to determine the prevalence of cockroach sensitisation in AR patients, its sIgE cross-reactivity with house dust mite (HDM) and seafood, and its contribution to severity of AR.

Methods: This is a cross sectional study which include a total of 110 adult AR subjects. Skin prick test (SPT) was performed, and all patients were positive to at least one out of eight allergens: *Periplaneta americana* (PA), *Blattella germanica* (BG), *Dermatophagoides pteronyssinus* (DP), *Dermatophagoides farinae* (DF), *Blomia tropicalis* (BT), shrimp (*Litopenaeus/Farfantepenaeus*), crab (*Callinectes* spp.) and squid (*Loligo* spp.) tested. Subsequently specific immunoglobulin E (sIgE) test was performed using direct enzyme-linked immunosorbent assay (ELISA) method and sIgE cross-reactivity profile was obtained using indirect inhibition ELISA method. The results of the direct ELISA were also compared with ImmunoCAP sIgE tests.

Results: Majority of patients were Malay (95.5%), female (60.9%) with median age of 36.8 years old. HDM [led by BT (90%) followed by DP (50.9%) and DF (49.1%)] was the highest prevalence on SPT, followed by cockroach (PA and BG presented the same prevalence, 39.1%) and seafood [shrimp (30.9%), crab (25.5%) and squid (24.5%)]. sIgE test showed lower percentage but shared almost similar pattern of distribution (55.5%, 49.1%, 45.5%, 28.2%, 31.8%, 12.7%, 9.1% and 8.2%, respectively). There was strong concordance between the sIgE measured by our direct ELISA method and the ImmunoCAP sIgE test results. The most common sIgE cross-reactivity was between cockroach and HDM (predominantly DP), followed by between different species of cockroach and the least was between cockroach and seafood. Sensitization to cockroach demonstrated significant association to increase severity of AR ($P < 0.05$).

Conclusion: Cockroach is an important aeroallergen with major contribution to severity of AR and has high sIgE cross-reactivity with HDM but lower sIgE cross-reactivity with food allergen (seafood) in our cross-sectional population.

Supervisor:
Professor Dr. Baharudin Abdullah

Co-supervisors:
Associate Professor Dr. Nurul Asma Abdullah,
Dr. Sakinah Mohamad

TRANSLATION AND VALIDATION STUDY OF EUSTACHIAN TUBE DYSFUNCTION QUESTIONNAIRE (ETDQ-7) INTO BAHASA MALAYSIA

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Introduction: Chronic eustachian tube dysfunction (ETD) is the pathophysiologic basis of many middle ear diseases. Unfortunately there is a lack of diagnostic tool for this condition. The ETDQ-7 is a 7-item questionnaire which has been consistently studied and proven reliable and valid for the evaluation of eustachian tube dysfunction.

Objectives: We translated ETDQ-7 into Bahasa Malaysia by forward and backward translation done by School of Languages, Literacy and Translation University Sains Malaysia. The BM-ETDQ-7 were further validated using face validity, internal consistency, test-retest reliability and discriminant validity

Methods: This cross-sectional study was carried out in the Otorhinolaryngology, Head and Neck Surgery Department of University Sains Malaysia from March 2020 until January 2021. The BM-ETDQ-7 undergo Face Validity (FV) testing in 10 patients. Following satisfactory (0.83) FV index, 126 participants, including 60 participants with

ETD and 66 healthy control participants were recruited to complete the BM-ETDQ-7. Participants grouped in ETD were those who have positive ETD complains and abnormal tympanogram. A subset of participants from both group repeated the BM-ETDQ-7 in time frame of 2 weeks.

Results: Internal consistency testing of translated ETDQ-7 yielded a Cronbach α -value of 0.878. Test-retest reliability showed good ICC coefficient (> 0.9) and good correlation ($r > 0.8$). The BM-ETDQ-7 showed good discrimination between both groups with a significantly higher individual and total mean score. A score of 17.5 were found to be the optimal value to differentiate both groups.

Conclusion: The present study showed good reliability and validity of BM-ETDQ-7 when applied to both ETD and healthy participants. We recommend the use of BM-ETDQ-7 in clinical practice among Bahasa Malaysia-speaking population.

Supervisor:
Associate Professor Dr. Ramiza Ramza Ramli

Co-supervisor:
Dr. Nik Adilah Nik Othman

THE STUDY OF OSTEITIS CHANGES IN CT PARANASAL SINUS OF ATOPIC AND NON-ATOPIC CHRONIC RHINOSINUSITIS

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Introduction: The role of atopy on osteitis changes in patients with chronic rhinosinusitis (CRS) is not well established and its influence on the treatment outcome is not clearly understood.

Objectives: The objectives of this study was to determine the effect of atopy on osteitis changes in patients with chronic rhinosinusitis.

Methods: A cross sectional study involving 75 CRS patients and 66 control patients who underwent computed tomography of paranasal sinuses (CTPNS) was conducted. Skin prick test was used to determine the atopy among the CRS patients. The evaluation was performed by using a symptom score, Lund-Kennedy endoscopic score and Lund Mackay (LM) staging system and Global Osteitis Scoring scale (GOSS) of CTPNS.

Results: Among CRS patients, 54.7% had atopy ($n = 41$) and 57.3% ($n = 43$) had osteitis changes while control group had 0.03% osteitis ($n = 2$). No significant difference ($P > 0.05$) was found for symptom and endoscopic scores in both CRS groups. There was no difference in the LM and GOSS scores between atopy and non-atopy CRS. Significant correlation was found between LM and GOSS scores in atopy CRS ($r = 0.81$). Similarly, both scores were found to be significantly correlated in non-atopy CRS ($r = 0.74$).

Conclusion: There is no difference in the severity of osteitis between atopic and non-atopic patients with CRS. The present study suggests that osteitis occurs independently from the atopic pathway. The available treatment regime for osteitis may be applicable for all patients irrespective of their atopy status.

Supervisor:
Professor Dr. Baharudin Abdullah

Co-supervisors:
Dr. Sakinah Mohamad,
Associate Professor Dr. Mohd Ezane Aziz

OUTCOME OF DIFFERENT TREATMENT MODALITIES IN SEVERE LEGG-CALVÉ-PERTHES DISEASE: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Introduction: Legg-Calvé-Perthes disease (LCPD) is an idiopathic aseptic necrosis of the femoral head in children. Management of LCPD centres around containment of the femoral head within the acetabulum during the active phase of the disease. Multiple modalities are currently used to achieve said containment with varying results. We conducted a comprehensive systematic review and meta-analysis to estimate the overall pooled prevalence of Stulberg outcome in severe LCPD classified as Catterall III/IV and/or Herring lateral pillar classification B, B/C, C in children 6 years old and older without hinge abduction after different treatment modalities.

Objectives: To study the outcome of severe LCPD classified as Catterall III, IV and Herring B, B/C, C without hinge abduction in children equal to or older than 6 years old using systematic review and meta-analysis methodology.

Methods: PubMed, Scopus, and Google Scholar databases were searched to identify studies published before 30th June 2021. We used random-effects model to estimate the pooled prevalence with 95% confidence intervals (CIs) of Stulberg outcome. Stulberg class I, II were defined as good outcome, Stulberg class III as fair outcome and Stulberg class IV, V were defined as poor outcome. Pooled odds ratio (OR) with 95% confidence intervals (CIs) was calculated from studies comparing two different treatment modalities. As subgroups, pooled prevalence and 95% confidence intervals (CIs) of Stulberg outcome classifications in patients with severe LCPD after different treatment modalities was analysed. Heterogeneity was assessed using the I^2 statistic and Cochran's Q test. This study is registered with PROSPERO (CRD42021224676).

Results: We identified 1,585 studies, of which 41 studies (1,517 hips) were included in the meta-analysis. Overall, the pooled prevalence of good (Stulberg I, II), fair (Stulberg III) and bad (Stulberg IV, V) outcome in children

6 years or older with severe LCPD regardless of the treatment modality was 43.4% (95% CI: 38.3, 48.4; $I^2 = 73\%$), 36.6% (95% CI: 32.5, 40.7; $I^2 = 60\%$) and 15.9% (95% CI: 12.8, 18.9; $I^2 = 60\%$), respectively. In terms of outcome after specific treatment modality, prevalence of good outcome was highest after Salter Innominate Osteotomy (SIO) at 54.4% (95% CI: 43.8, 65.1; $I^2 = 68\%$). Prevalence of bad outcome was highest after Arthrodiastasis 22.0% [95% CI: 12.4, 31.5; $I^2 = 23\%$] and non-operative 20.8% [95% CI: 12.5, 29.2; $I^2 = 80\%$]. Studies comparing outcomes of femoral varus osteotomy (FVO) versus non-operative showed a pooled odds ratio (OR) for good outcome favouring FVO at 0.53 [95% CI: 0.35, 0.81; $P = 0.003$; $I^2 = 0\%$] and pooled OR for bad outcome was higher in non-operative at 3.05 [95% CI: 1.71, 5.42; $P = 0.0002$; $I^2 = 0\%$].

Conclusion: In children 6 years old and older diagnosed with severe LCPD without hinge abduction, all operative treatment modalities except for arthrodiastasis had better outcome compared to non-operative treatment. Salter Innominate Osteotomy (SIO) had the highest prevalence of good outcome results in severe LCPD hips as well as in the subgroup of Herring C and Catterall IV hips.

Supervisor:
Professor Dr. Abdul Razak Sulaiman

Co-supervisor:
Dr. Md Asiful Islam

FUNCTIONAL AND RADIOLOGICAL OUTCOME FOR ANTERIOR STABILISATION OF SACROILIAC JOINT IN UNSTABLE PELVIC FRACTURE

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Introduction: Unstable pelvic injuries which result from high energy trauma, can cause life-threatening conditions and morbidity if patients are not treated properly. Many techniques can be used to stabilise pelvic ring injuries, each with their own advantages and disadvantages. We studied the functional and radiological outcome following open reduction and anterior fixation of the sacroiliac joint and agreement between both outcomes, which we believe is the best approach to achieve anatomical reduction via direct vision.

Objectives: To evaluate the functional and radiological outcome for anterior stabilisation of SIJ in unstable pelvic ring injuries. Specifically, to describe functional outcome of patients post-operatively, to describe radiological outcome of the patients post-operatively and to evaluate the agreement between functional and radiological outcome of the patients post-operatively.

Methods: This retrospective study involved 15 patients who had unstable pelvic injuries requiring surgical intervention from January 2015 to December 2020. All

patients have undergone anterior stabilisation of the sacroiliac joint. Radiological outcome assessments were done post-operatively. The complete functional outcome was assessed at least 6 months post-operatively when the patients were able to fully weight bear. The functional outcome of patients was evaluated based on the Majeed system, and the radiological outcome assessment was based on the Lindahl criteria. Descriptive statistical analysis was performed using IBM SPSS Statistics version 27.0.

Results: The participants consist of 73.3 % male and 26.7% female patients, where 66.7% of patients had a Tile type B pelvic ring injury and the remaining 33.3% had a Tile type C pelvic ring injury. Based on the Majeed system, 73.3% of patients had excellent functional outcomes, and based on Lindahl criteria; there were 60% of patients who had excellent radiological outcome. However, there was no significant agreement between functional and radiological outcomes.

Conclusion: Anterior stabilisation of the sacroiliac joint is one of the surgical techniques that can be used as a definitive fixation. An excellent functional and radiological outcome can be obtained from this fixation as it can anatomically reduce the sacroiliac joint. However, further study may be needed to evaluate the correlation between functional and radiological outcomes and compare the various method of fixation with a larger sample size.

Supervisor:
Dr. Mohd Hadizie Din

Co-supervisor:
Dr. Ahmad Tarmizi Musa

THE EFFICACY OF DISINFECTING CONTAMINATED SCREWS WITH CHLORHEXIDINE 0.5%, POVIDONE-IODINE 10% AND ALCOHOL 70%

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Introduction: The inevitability of dropping an implant, graft or other surgical instruments during a surgery onto the surgical floor is unavoidable. Most of the times there will always be a replacement available. However there are times in which a surgeon needs to reuse a graft or implant that has been on the floor, and reuse it for the patient after decontamination has been done. In the past decontamination was done with the use of povidone iodine. The current recommendation method for decontamination currently is chlorhexidine. Decontamination can be achieved by the use of 10% povidone iodine, chlorhexidine 0.5% and alcohol 70%.

Objectives: To determine the efficiency of chlorhexidine 0.5%, alcohol 70% and povidone-iodine 10% in the disinfection on contaminated screws.

Methods: This was a prospective study performed at Hospital Raja Perempuan Zainab 2. A total of 134 sterilised

screws were used and autoclaved before being distributed into four groups: control positive, 0.5% chlorhexidine, 10% povidone-iodine and 70% alcohol. Each screw was dropped 1 h into surgery. The screws were dropped from a 1 m height. Screws that were at a 1 m diameter around the operation table were allowed to rest on the floor for 30 s before being picked up with sterile forceps. The screws were then placed in their respective solutions for 10 min before being cleaned with a sterile gauze. Each screw were then placed into its own nutrient broth media and sent to the lab to see if they yield any growth.

Results: There were a total of 134 screws dropped and were divided into groups of 34 screws each. The results that were obtained from the lab revealed, control positive 31 (91.1%) growth; 10% povidone iodine 24 (70.5%) growth, $P = 0.040$; Chlorhexidine 0.5%, 3 (8.8%) growth, $P < 0.001$; Alcohol 70% , 30 (88.2%) growth, $P = 0.691$.

Conclusion: From this study, it was found that chlorhexidine ($P < 0.001$) was the most superior solution that can be used for decontamination. This finding is consistent with most of the studies that have been done in the past revealing that chlorhexidine was superior. Povidone iodine ($P = 0.040$) was once a solution of choice but it is evident that it's not superior to chlorhexidine from this study. Therefore we suggest the use of chlorhexidine as a solution for decontamination should the need ever arise.

Supervisor:
Dr. Mohammad Paiman

A COMPARATIVE STUDY BETWEEN THE STANDARD AO METHOD AND FIBULA LENGTH MEASUREMENT IN ESTIMATING MAXIMUM FEMORAL NAIL LENGTH

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Introduction: Diaphyseal femur fractures are a common presentation in orthopaedics and are routinely managed with intramedullary fixation. Appropriate nail length and size is required to be measured pre-operatively. Maximum nail length can be estimated by measuring either clinically or radiographically the contralateral femur or by using forearm referencing. However, these methods are inadequate when patients present with bilateral femoral bone fractures with concurrent forearm fractures. The aim of this study is to identify another reliable clinical method in estimating the maximum femoral nail length.

Objectives: To study the association of clinical measurement of the estimated maximum femoral nail length (EFNL) using the standard AO method with fibula length in estimating the maximum femoral nail length and the inter observer reliability of each method.

Methods: A total of 140 patients who attended the Orthopaedic clinics and wards at Hospital Universiti Sains Malaysia (HUSM) that met the inclusion and exclusion

criteria were chosen using a convenience sampling method and participated in this cross-sectional study. Their EFNL and fibula length were measured using a tailor measuring tape on the ipsilateral limb. The EFNL was measured according to the standard AO method while the fibula was measured from the tip of the fibula head to the tip of the lateral malleolus. These data were collected and analysed using SPSS version 26.0. Descriptive statistics was used to summarize the socio-demographic characteristics of the subjects. Numerical data were presented as mean (SD) or median (IQR) based on their normality distribution, while categorical data were presented as frequency (percentage).

Results: Of the 140 patients measured, the overall mean EFNL was 37.98 cm (\pm 2.72 cm) while the fibula length was 37.72 cm (\pm 2.61 cm). The Pearson's correlation analysis showed that the fibula length was highly correlated with the EFNL, and this correlation was not influenced by age, BMI or gender. Interclass correlation analysis (ICC) showed high degree of inter-observer reliability in the both the femur (ICC 0.938 with a 95% confidence interval) and fibula (ICC 0.972 with a 95% confidence interval) measurements. A formula for estimating maximum femoral nail length was derived from the correlation graph. Estimated maximum femoral nail length = $1 + (0.98 \times \text{fibula length})$

Conclusion: The fibula length is shown to correlate well with the clinical measurement of EFNL in this study and can be used as a reliable alternative clinical method to estimate the maximum femoral nail length.

Supervisor:

Dr. Shaiфуzain Ab Rahman

Co-supervisor:

Dr. Ahmad Filza Ismail

NORMAL MORPHOLOGICAL STUDY OF ACETABULAR QUADRILATERAL PLATE BASED ON THREE-DIMENSIONAL COMPUTED TOMOGRAPHY IMAGING

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Introduction: An acetabular fracture involving a quadrilateral plate (QLP) is complicated as the manoeuvre to reduce the fracture is challenging. However, there is no suitable fixation implant to stabilize the fracture adequately. Improper reduction of acetabular QLP fracture causing significant morbidity to the patient. Besides, there is no study to measure the standard parameter of QLP among the Malaysian population. Thus, this study was conducted to determine the length, angle and thickness of normal QLP between males and females among the Malaysian population.

Objectives: The objective of this study is to determine the length, angle and thickness of normal quadrilateral plate between males and females among Malaysian population.

Methods: This is a retrospective study using data from patient's record in Hospital Universiti Sains Malaysia (HUSM). The inclusion criteria involved patient age; 18 years old–60 years old at the abdominopelvic computed tomography (CT) scan regardless of gender. Those positive findings of having acetabular region fracture or congenital abnormalities of iliac bones or pathology at the iliac bone prior to instrumentation to the pelvis were excluded from the study. Materialise's Interactive Medical Image Control System (MIMICS) version 17.0 software converted the Digital Imaging and Communication in Medicine (DICOM) data to three dimension (3D). Subsequently, 3MATIC 9.0 software was used to measure the length, angle and thickness of QLP. Statistical Package for the Social Sciences (SPSS) version 21.0 was used for analysis. A continuous variable was summarised as mean and standard deviation (SD). Intraclass correlation coefficients were calculated to assess the level of agreement between the data collected by two independent investigators. An independent *t*-test was run to compare the mean difference between lengths, angle and thickness of QLP with gender.

Results: The total number of patients gathered was 65. The mean age of the patient was 39 years old, with the minimum age captured being 18 years old and the maximum age is 60 years old, 52.3% was male, and 47.7% was female patient. The majority of the patient was Malay (89%). The interclass correlation agreement was good and excellent for the measurements made by the two investigators. All QLP lengths were recorded to be longer among males compared to females. The measurement of the QLP angle was slightly more comprehensive among male patients, and the measurement of the thickness of QLP was thicker for male patients compared to females. There was a significant mean difference in length of QLP and bone thickness of QLP between gender except for length A to B and thickness 3a.

Conclusion: These study findings had added knowledge and understanding to the surgeon on the typical anatomical pattern of QLP. Thus, suitable and successful internal fixation can be designed to aid in the proper reduction of QLP fracture to achieve excellent stability and prevent further complications.

Supervisor:

Dr. Sahran Yahaya

Co-supervisors:

Associate Professor Dr. Mohd Ezane Aziz,

Dr. Johari Teh

TREATING INTERTROCHANTERIC FRACTURE BY SHORT AND LONG CEPHALOMEDULLARY NAIL: A SYSTEMATIC REVIEW AND META ANALYSIS

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Introduction: Pertrochanteric femur fracture is common injury and usually result from high energy injury such as a motor vehicle accident or fall from a height. It can also occurs due to low energy injury in elderly. The cephalomedullary nailing has become a popular surgical technique for treatment of these type of fracture patterns. There is different type of nail implant design exist, including short and long implant.

Objective: To compare the effects between short and long cephalomedullary nails for surgical treatment of pertrochanteric hip fracture.

Methods: A Systematic review meta-analysis that include 20 studies with total 3,470 patients, these studies identified by electronic searches. Last statistical analyses, assessment of heterogeneity and measurement of treatment effect done using Review Manger 5.4 software (RevMan 2020).

Result: Our study showed the usage of long nail was associated with increases in blood loss, hospital stay, operative time and blood transfusion in this group however in term of functional outcome, the group with long nail showed better scores. The occurrence of hip pain and peri-implant fracture with short nail was 12% and 2% reduced, respectively. No difference was found in terms of union, malunion, nonunion, delay union and ambulation status, implant failure and re-operation rate. However, in terms of functional outcome scores, the use of long nail showed better scores.

Conclusion: We found no difference between two nails in term of complication or ambulation or union. Conclusion does not provide any medical advantage over short nail in treatment of intertrochanteric, but that do not include subtrochanteric fracture or pathologic fracture or intertrochanteric fracture combined with midshaft fracture.

Supervisor:

Associate Professor Dr. Tengku Muzaffar Tengku Md. Shihabudin

Co-supervisor:

Professor Dr. Mohd Noor Norhayati

THE OUTCOME OF COMPLEX ACETABULAR FRACTURE FIXATION USING A PRE-CONTOURED PLATE BASED ON PATIENT SPECIFIC 3D PRINTED PELVIC BONE MODEL

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Introduction: Acetabular fracture surgery with plate fixation is a challenge for orthopaedic surgeons due to variations in the fracture patterns. Among its complications are prolonged surgery and massive blood loss, thus increasing morbidity. Three-dimensional (3D) printing is a rapidly emerging technology that can enhance surgeons'

understanding of patho-anatomy and aid in precise pre-operative planning. This study used 3D printing to improve pre-operative planning, allowing for precise pre-contouring of the plate by comparing the quality of fracture reduction, total operative time and volume of blood loss.

Objectives: To ascertain if by treating acetabular fractures, using a pre-contoured plate, guided by a patient-specific 3D-printed pelvic bone model gives similar quality of fracture reduction but significantly reduces operative time and blood loss.

Methods: A case-matched control study was conducted involving 29 patients who sustained acetabular fractures. A total of 15 patients were treated with the conventional method, and 14 patients were treated using pre-contoured plates based on a patient-specific 3D-printed pelvic bone model. The fractures were classified using the Letournal-Judet classification. Comparisons were made between the treatment groups regarding the quality of fracture reduction, duration of surgery and blood loss volume.

Results: Patients who were treated with a pre-contoured plate in the patient-specific 3D-printed pelvic bone model had no statistical significant difference in terms of post-operative radiological assessment using the MATTA scoring system (P -value = 0.164). A significantly shorter operative time (219.3 min; P -value = 0.037) and a significantly lesser volume of blood loss (872.9 mL; $P < 0.001$) was achieved.

Conclusion: When treating acetabular fractures, using a pre-contoured plate guided by a patient-specific 3D-printed pelvic bone model gives similar quality of fracture reduction but significantly reduces operative time and blood loss.

Supervisor:

Dr. Nor Azman Mat Zin

Co-supervisors:

*Dr. Mohd Hadizie Din,
Professor Dr. Wan Faisham Nu'man Wan Ismail,
Dr. Sahran Yahaya*

CLINICAL OUTCOMES OF SINGLE STAGE POSTERIOR-ONLY DEBRIDEMENT AND INSTRUMENTATION IN THE MANAGEMENT OF SPINAL TUBERCULOSIS

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Introduction: Spinal tuberculosis (TB) is the most common form of extra-pulmonary tuberculosis. Anti-tuberculous chemotherapy has been the standard treatment for spinal TB. However, surgical management is recommended to control the progression of kyphosis and improve the neurological impairment associated with this disease. Various surgical methods have been advocated. But the posterior approach surgery has gained popularity due to its reported low complication rate.

Objectives: This study aimed to evaluate the clinical and radiological outcomes of posterior-only approach for debridement, decompression and instrumentation in the treatment of spinal tuberculosis.

Methods: In this retrospective study, we analysed 27 patients with thoraco-lumbar TB treated in our centre from 2003 to 2019 with singlestage posterior only debridement and instrumentation. Pre-operative and post-operative kyphosis angle, ASIA neurological grading, C-reactive protein (CRP), erythrocyte sedimentation rate (ESR) and visual analogue scale (VAS) score were compared. Correction in kyphosis including loss of kyphosis angle, neurological recovery, resolution of infection and pain relief at one year followup was assessed. The data was analysed using SPSS version 24.0. Numerical variables were presented as mean and standard deviation while categorical variables were presented as frequency and percentage. The numerical variables were assessed using skewness and kurtosis.

Results: Patients (15 male and 12 female) with mean age of 51 years old were treated. All patients had two contiguous vertebral segment involvement. The preoperative average rise in ESR was $74.78 \pm \text{SD } 23.68$ mm/h which dropped down to $25.46 \pm \text{SD } 19.49$ mm/h at 1 year follow-up. The average preoperative rise in CRP was 80.89 ± 50.26 mg/L which returned to 16.55 ± 10.01 at 1 year followup. There was improvement of VAS from 6.96 ± 1.29 pre-operatively to 1.37 ± 0.57 at 1 year follow-up. Pre-operatively, the mean kyphosis angle was $17.75^\circ \pm 10.49^\circ$ and corrected postoperatively to $9.87^\circ \pm 7.47^\circ$ with an average correction of $7.88^\circ \pm 6.99^\circ$ (45.37%). At 1 year follow-up, the mean loss of correction was of $2.22^\circ \pm 2.15^\circ$ (32.38%). No patients recorded any neurological deterioration with 100% neurological recovery observed at one year follow-up.

Conclusion: The results of this study show improvements in kyphotic correction, neurological recovery, VAS score as well as resolution of infection.

Supervisor:
Dr. Joehaimy Johari

THE INCIDENCE OF BLOOD TRANSFUSION AND FACTORS INFLUENCING BLOOD LOSS FOLLOWING PRIMARY TOTAL KNEE REPLACEMENT SURGERY

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Introduction: Total knee replacement (TKR) is a very successful surgical procedure for knee osteoarthritis and has been proven to have excellent results in relieving pain as well as improving the mobility of the patient. Although becoming more increasingly performed, significant peri-operative blood loss requiring allogenic blood transfusion is still a common occurrence. Allogenic blood transfusion (ABT) can be lifesaving in a certain clinical situation but also comes with its

own risks and side effects. The reported incidence of ABT and blood loss following TKR surgery vary widely in the literature. The objectives of this study were to look at the prevalence of ABT, factors leading to transfusion as well as an increase in blood loss.

Objectives: i) To determine the incidence of blood transfusion following primary total knee replacement surgery, ii) to identify risk factors associated with blood transfusion following total knee replacement surgery and iii) to identify risk factors associated with an increase in blood loss following total knee replacement surgery.

Methods: A cross-sectional retrospective study was conducted involving 296 adult patients who underwent elective primary unilateral TKR surgery from January 2015 until December 2019 at Hospital Melaka. Medical records of these patients were reviewed, and data were extracted for final analysis. Incidence of ABT, demographic data, use of antiplatelet/anticoagulant, tourniquet time, types of general anaesthesia, and pre- and post-operative haemoglobin count were recorded. These factors were analysed to look at the association with ABT as well as increase in blood loss.

Results: Prevalence of ABT following primary unilateral TKR surgery were found to be 4.39% (95% CI: 2.04, 6.74). Pre-operative haemoglobin value was found to be the only significant variable associated with blood transfusion ($P < 0.001$; Odds ratio (OR) = 0.35; 95% CI: 0.22, 0.54). Meanwhile, prolonged tourniquet time of > 120 min was the only significant variable towards an increase in blood loss. Participants with tourniquet time > 120 min have 2.67 times the odds to have blood loss > 2 g/dl compared to participants with tourniquet time of less or equal to 120 min (95% CI: 1.54, 4.64).

Conclusion: The prevalence of ABT following primary unilateral TKR was lower in our centre compared to other reported literature. Pre-operative optimisation of anaemic patients with medications will help the surgeon to reduce the requirement for ABT. Prolonged tourniquet time of > 120 min contributed to a higher amount of blood loss.

Supervisor:
Professor Dr. Abdul Nawfar Sadagatullah

Co-supervisors:
Dr. Mohd Karim Md Isa,
Dr. Mohamad Fauzlie Yusof

SURGICAL OUTCOMES OF THE EXTENSOR CARPI ULNARIS SLING PROCEDURE

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Introduction: Extensor carpi ulnaris subluxation is rare pathology of the wrist. It presents with ulna sided wrist pain, especially during wrist flexion, ulna deviation and forearm supination. This results in significant functional impairment to the patient. Non-operative methods are the

usual treatment, however some recalcitrant cases require surgical intervention. The sling procedure is commonly performed for such cases. This study was conducted to assess and analyse the outcomes after the sling procedure

Methods: This is a retrospective cohort study to evaluate the outcome the ECU sling procedure or ECU sub-sheath reconstruction from in patients operated by a single experienced surgeon between 2016 to 2020 at Hospital Universiti Sains Malaysia and Hospital Queen Elizabeth II. All patients were seen in the clinics to assess their pre-and post-operative pain scores and functional status, as well as contralateral wrist and post-operative wrist range of motion and grip strength. Points for each parameter were accumulated and tabulated according to the Modified Mayo Wrist Score to obtain the outcome. Paired *t*-test and chi-square test was used to analyse the difference between pre- and post-operative pain scores and functional status respectively, while independent *t*-test was used for the difference between contralateral wrist and post-operative wrist range of motion and grip strength. McNemar's test was used to determine the difference between pre and post-operative points from the Modified Mayo Wrist Score. Statistical analysis was performed using IBM SPSS Statistics version 25.0 (IBM Corp. Released 2017. IBM SPSS Statistics for Windows, version 25.0. Armonk, NY: IBM Corp).

Results: There were 13 females (86.7%) and 2 male (13.3%) patients included in our study. There was a significant improvement in mean pain scores and grip strength, but no statistically significant improvement in terms of functional status and wrist range of motion. The accumulated points from the Modified Mayo Wrist Score showed eight patients with a good outcome (53.3%), four patients with a fair outcome (26.7%) and three patients had an excellent outcome (20%).

Conclusion: The overall scores from the Modified Mayo Wrist score indicate a favourable surgical outcome for the extensor carpi ulnaris sling procedure. Hence, we recommend this procedure for refractory cases of extensor carpi ulnaris subluxation in our population

Supervisor:

Associate Professor Dr. Abdul Nawfar Sadagatullah

A COMPARISON STUDY OF CLINICAL OUTCOME OF SUPERCUTANEOUS PLATING VERSUS CONVERSION NAILING IN OPEN META-DIAPHYSEAL TIBIA FRACTURE GUSTILO I, II AND IIIA

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Introduction: Open meta-diaphyseal tibia fractures are one of the most challenging orthopaedic injuries. When compared with standard established two-staged protocol in managing open fracture tibia, usage of externalised locking plate remains controversial. Not much literature compared

these two methods available. Therefore, this study examined the clinical outcomes in duration to union, infection rate and re-surgery rate between supercutaneous plate and conversion nailing.

Objectives: To compare clinical outcome by duration for union, infection rate and re-surgery rate between supercutaneous plating and conversion nailing in open meta-diaphyseal tibia fracture grade I, II and IIIa (Gustilo-Anderson).

Methods: This was a retrospective comparative study of a single-centre using the patient registry. For the past three years, we evaluated all open meta-diaphyseal (extra-articular fracture either proximal, shaft, distal or segmental) tibia Gustilo Grade I, II and IIIA. Only trauma patients were included in the study. The conversion nailing group was defined as patients who underwent debridement surgery and external fixator before conversion to intramedullary nailing, while the supercutaneous group was defined as patients who underwent externalised locking plate during primary debridement surgery. The result was then compared between these two groups regarding duration to union from the time of injury, infection rate and re-surgery rate. All patients were followed up for a minimum of 1 year to analyse possible post-operative complications.

Results: A total of 182 patients were recruited which 83 patients in conversion nailing group and 99 patients in supercutaneous group. Among all the patients, 42 patients were classified as gustilo grade I, 76 grade II and 64 grade IIIa. A significant difference ($P < 0.001$) was seen between these two groups, with supercutaneous group showing a shorter duration to union (mean 33.99 weeks \pm 23.62) compared to the conversion nailing group (mean 47.83 weeks \pm 49.99). Gustilo II and IIIa groups have a significant difference in the union duration ($P < 0.05$) in grade comparison. Chi-square analysis showed that supercutaneous groups have a significant difference in having union less than six months in grades I and II and a lesser infection rate in grade IIIa ($P = 0.047$). Meanwhile, the re-surgery rate in Grade I ($P = 0.005$) and II ($P = 0.013$) was also significantly lower in the supercutaneous group. Multiple regression analysis revealed supercutaneous group (95% CI: 0.088, 0.478; $P < 0.001$) 79% reduce odds of having union > 6 months, 67% reduce odds (95% CI: 0.17, 0.69; $P = 0.002$) to develop superficial/deep infection, have 68% reduce odds (95% CI: 0.168, 0.605; $P < 0.001$) to have re-surgery compare to conversion group.

Conclusion: Supercutaneous plating in the treatment of open meta-diaphyseal tibia fracture have an acceptable and good clinical outcome in term of duration to union, infection rate and re-surgery rate.

Supervisor:

Professor Dr. Tengku Muzaffar Tengku Md. Shihabudin

Co-supervisor:

Dr. Azlan Mohd Sofian

THE PREVALENCE OF INFECTION FOLLOWING CONVERSION OF EXTERNAL FIXATION TO INTERNAL FIXATION IN OPEN TIBIA FRACTURE

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Introduction: In managing severe open tibia fractures, most of orthopedic surgeons have been obliged to use an external fixator to gain initial bony and soft tissue stability after wound debridement. Unfortunately, the conversion of external fixation to internal fixation has been associated with deep infection. Our aim in designing this retrospective study is to investigate the risk factors for development of deep infection.

Objectives: To study the prevalence of infection in patient with open tibia fracture (grades 2 and 3) that underwent conversion of external fixation to internal fixation and its associated factors among patients in Hospital Universiti Sains Malaysia, Hospital Raja Perempuan Zainab 2 and Hospital Sultan Haji Ahmad Shah.

Methods: All patients that fulfil the criteria of our study are reviewed retrospectively. The information are obtained from medical files that has been traced through record office. The result was analysed using Fisher's exact test for gender and age, chi-square test for grade and site of fracture, duration of external fixation, period of free fixator and types of internal fixation. All the statistic values are calculated using SPSS version 26.0.

Results: There are total 61 patients that underwent conversion of external fixation to internal fixation in open tibia fracture with prevalence of infection is 16.39%. All the factors that might affect the infection rate such as gender, ages, grade and sites of fracture, types and duration of external fixation, period of free fixators and types of internal fixation showed insignificant value.

Conclusion: The prevalence of infection post conversion external fixation to internal fixation in our study was 16.39% and comparable to other literatures. Several important factors in preventing or reducing risk of infection were prophylactic antibiotic, adequate wound debridement and to avoid pin site infection.

Supervisor:
Professor Dr. Wan Faisham Nu'man Wan Ismail

FACTORS INFLUENCING MAGNITUDE OF CURVE CORRECTION IN PATIENTS WITH ADOLESCENT IDIOPATHIC SCOLIOSIS UNDERGOING POSTERIOR SPINAL CORRECTION AND FUSION

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Introduction: Curve correction magnitude is an important primary radiological outcome that is measured in patients with Adolescent Idiopathic Scoliosis (AIS) who have undergone posterior spinal correction and fusion (PSCF). However, factors that influence this outcome have not been extensively studied. We attempted to identify pre-operative factors that have significant influence on this outcome with the aim of better understanding the relationship between these variables and possibly improve the surgical outcomes and patient satisfaction.

Objective: To identify factors that influences the amount of curve correction in AIS patients undergoing posterior spinal fusion (PSF).

Methods: All patients with the diagnosis of AIS who underwent PSCF from the year 2004 to 2020 were recruited for this study. Patients with non-idiopathic causes of scoliosis or who had undergone anterior spinal release prior to surgical correction were excluded. Their pre-operative factors namely age, gender, pre-operative Cobb angle, curve flexibility, Lenke classification, Risser sign and experience of the surgeon performing the surgeries along with the percentage of curve correction were analysed. All parameters were measured and statistical analysis (IBM SPSS Statistics version 27.0) using *t*-test and Pearson's correlation coefficient was performed to look for correlation significance. A step-wise multiple linear regression model was then run to determine the independent factors that were highly correlated and predictive of the curve correction magnitude. Descriptive analysis of the numerical variable was presented as mean (standard deviation).

Results: A total of 41 patients was available for this study. The mean age of the cohort was 15.1 years old \pm 2.1 with the mean age for males 15.5 \pm 1 years old and 15.2 \pm 2.2 for females. The mean pre-operative Cobb angle, post-operative Cobb angle, curve flexibility and magnitude of curve correction (MCC) was 63.05 \pm 23.3°, 29.45 \pm 20.5°, 32.3 \pm 13.7% and 56.26 \pm 14.4%, respectively. Pearson's correlation coefficient showed no significant correlation between Lenke classification and Risser signs with the magnitude of curve correction. A step-wise multiple linear regression showed pre-operative Cobb angle and curve flexibility to be the most important predictor of magnitude of curve correction, with R² value of 0.328 (*P* < 0.001). Age, gender and surgeon experience had no influence on the amount of curve correction achieved. MCC can be predicted using the formula: 46.06 + (-0.182 X Pre-op Cobb angle) + (0.672 X Curve flexibility).

Conclusion: Pre-operative Cobb angle and curve flexibility were the most important predictors of magnitude of curve correction in patients with AIS undergoing single stage PSCF.

Supervisor:

Professor Dr. Mohd Imran Yusof

CLINICAL PROFILE AND OUTCOME OF CHILDREN WHO UNDERWENT MICTURATING CYSTOURETHROGRAM: A TERTIARY HOSPITAL EXPERIENCE

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Introduction: Urinary tract infection (UTI) is one of the most common infections in children under the age of 2 years old. Due to the common association between UTI and vesicoureteric reflux (VUR), it is important to diagnose and treat VUR as its presence may have a negative impact on children's health. Micturating cystourethrogram (MCUG) is the gold standard test for the diagnosis of VUR, thus the use of it as part of UTI evaluation is vital.

Objectives: The study aims to describe the proportion of the paediatric patients who have had MCUG and to establish the association between the presence of VUR and renal outcomes.

Methods: A cross-sectional retrospective study was conducted in children who were referred for MCUG at a tertiary centre over a 10-year period. Baseline characteristic data and the results of renal ultrasound, MCUG, with renal function were compiled and analysed. Fisher Exact tests were used to compare between grade of VUR and renal outcomes. Simple and multiple logistic regressions were used to examine the risk factors that may contribute to the development of VUR.

Results: There were 136 children recruited in total of which forty-five were having VUR, (31 [68%] high-grade, 14 [32%] low-grade, respectively). One third (33.3%) were surgically treated, 29 (64.4%) developed chronic kidney disease (CKD), and 18 (40%) developed renal scarring. Children with UTI and hydroureter have 4.19 and 3.40 times the odds of developing VUR, respectively.

Conclusion: The presence of hydroureter from ultrasound is a strong indicator of underlying VUR and justifies the rationale of requesting for MCUG, especially for those with recurrent UTI. The study failed to demonstrate significant association between the presence of VUR and complication of renal scarring and CKD.

Supervisor:

Dr. Mohamad Ikram Ilias

Co-supervisors:

Dr. Fahisham Taib,

Dr. Ahmad Hadif Zaidin Samsudin

PSYCHOLOGICAL FUNCTIONING IN PARENTS OF CHILDREN BEING ADMITTED FOR FEBRILE SEIZURES IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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Introduction: Febrile seizures in children are an alarming experience for parents.

Objectives: This study aimed to assess the psychological functioning of parents of children when they were being admitted for treatment of febrile seizures in hospital, the importance of which is clear since parents are the primary custodian of their children.

Methods: This is a cross-sectional study conducted on 110 participants whose child had been admitted for a febrile seizures to Hospital Universiti Sains Malaysia from September 2020 until June 2021. The depression, anxiety, and stress levels were determined based on a validated Bahasa Melayu questionnaire of the Depression Anxiety Stress Scale (DASS-21). In addition, multiple logistic regression was used to determine the associated factors related to the participants' psychological functioning.

Results: The mean age of children with febrile seizures was 21 months old, and most children showed features of simple febrile seizures (71.8%). The prevalence of anxiety, stress, and depression was 58.2%, 29% and 23.6%, respectively. Using multiple logistic regression, child age ($P < 0.050$), family history of febrile seizures ($P = 0.027$), family history of epilepsy ($P = 0.045$), and length of stay in the ward ($P = 0.041$) were found to be significantly associated with anxiety when adjusted for other variables. Otherwise, for depression and stress, no significant associated variables were found when adjusted for other variables.

Conclusion: Anxiety was highly reported by participants when their children were admitted for febrile seizures. Several factors impacted their anxiety, including the lower the child's age, participants with no family history of febrile seizures before, and the longer duration of hospital stay. Therefore, further study and intervention on reducing the parent's anxiety could be emphasised in the future.

Supervisor:

Associate Professor Dr. Salmi Abdul Razak

Co-supervisors:

Associate Professor Dr. Azizah Othman,

Associate Professor Dr. Ariffin Nasir

PAEDIATRIC MORTALITY REVIEW: A SINGLE INSTITUTION EXPERIENCE

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Introduction: Auditing of paediatric deaths has rarely been evaluated in low/middle-income countries hospitals.

Objectives: The aim of the study is to describe the characteristics of paediatric death among the hospitalised children in Hospital Universiti Sains Malaysia (HUSM) and explore the factors associated with location of death.

Methods: Paediatric mortality cases for children aged between 29 days old and 18 years old at the time of death and met the inclusion criteria were included. These cases were those from the year 2013 until 2020 which had occurred at Hospital USM. Case notes were reviewed and data were captured retrospectively. For descriptive statistics, the categorical variables were expressed as proportions. Multiple Logistic Regression was used to assess predictors of the location of death.

Results: Out of 841 paediatric deaths identified during the period of the study, 544 cases were enrolled. Male gender has higher proportion (1.4:1). The median (IQR) age was 56 months old with infancy being the predominant age group. The median (IQR) length of hospital stay was 10.5 days. More than half of the cases (58.3%) had underlying life-limiting illnesses. Majority of the patients had DNR order (general ward/HDU 70.5%, ICU 81.6%, other wards 79.1%). Being on ventilator (POR 3.421; 95% CI: 1.947, 6.012) was the significant predictor for the ward death among the cases.

Conclusion: It is vital to understand the characteristics of child death and the factors associated with death location in order to enhance paediatric care and management.

Supervisor:

Dr. Fahisham Taib

Co-supervisors:

Dr. Nor Rosidah Ibrahim, Associate Professor Dr. Najib Majidi Yaacob

THE PATTERN OF NON-COVID PAEDIATRIC ADMISSION IN TWO UNIVERSITY HOSPITALS IN MALAYSIA: BEFORE AND DURING COVID-19 PANDEMIC WITH MOVEMENT CONTROL ORDER

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Introduction: A novel coronavirus called SARS-CoV-2 was discovered in December 2019, in Wuhan, Hubei Province, China which led to coronavirus disease 2019 (COVID-19). The outbreak of this disease has caused major impact to the society worldwide. In Malaysia, government had implemented the Perintah Kawalan Pergerakan 2020 (Movement Control Order 2020, MCO) from March 18 until April 14 2020 then subsequently had been extended to August 1 2021 in few phases. The aim of this measure was to reduce new infections and thus flattening the epidemiological curve into a more manageable scenario. The indirect effect of this directive also lead to children not attending school and intermingling with their peers and thus theoretically also leading to reduction of non-COVID infective illnesses and hospital admission

Objectives: The goal of the study was to describe the demographic characteristics of patients admitted to non-COVID hospitals which were Hospital USM and Sultan Ahmad Shah Medical Centre (SASMEC@IIUM). Study also aimed to compare the rate of hospital admissions between pre and during MCO periods and to differentiate the characteristics of cases admitted between these two periods.

Methods: This was a retrospective study involving Hospital USM and SASMEC@IIUM that was conducted in two phases. Phase I was the period between February 19, 2020 until March 17, 2020 which was the 4 weeks period prior to MCO lockdown. Phase II was the 4 weeks during MCO lockdown (March 18, 2020 until April 14, 2020). It involves all children under 18 years old of age who were hospitalised in the general paediatric wards including paediatric surgical ward and intensive care unit (ICU). Descriptive statistics were used to summarise the socio-demographic variables. Independent *t*-test analysis was applied to compare the rate of admission per day between pre and during MCO to Hospital USM and SASMEC@IIUM. Chi-square test and Mann-Whitney U test were applied to compare the characteristics of cases admitted during these two periods.

Results: There is a total 496 and 191 admissions to Hospital USM and SASMEC@IIUM respectively during both pre- MCO and MCO period. There were significant reduction in hospital admissions to both centres after implementation MCO. For Hospital USM, the daily hospital admissions has significantly decreased after the implementation of MCO with mean of 10 admissions per day (pre MCO) to seven admissions per day (during MCO) (95% CI: 1.54, 7.54; $P = 0.001$). Similarly, daily hospital admissions rate to SASMEC@IIUM also has shown a significant reduction of admission number whereby the average daily admissions of 5 pre MCO has decreased to 3 admissions during MCO period (95% CI: 0.61, 3.15; $P = 0.005$). Besides, there were reduction of patients admitted to hospital due to respiratory illnesses observed whereby 196 (45.6%) patients admitted pre MCO and there was a slight reduction of the cases to 112 (43.6%) patients during MCO. Similarly, infectious disease cases also have shown reduction where 29 (6.7%) patients were admitted pre MCO and this has reduced to 15 (5.8%) patients during MCO. Nevertheless, there was a significant reduction of neurological cases ($P = 0.029$) was observed between the two periods.

Conclusion: Public health measures social distancing stop the outbreak of COVID-19 cases, and indirectly reducing the non-COVID-19 cases. There was a significant reduction of non-COVID paediatric hospital admissions observed in our study, which could potentially be as a consequences of these measures. Thus, the social distancing and good personal hygiene should be continued even though the COVID-19 era has reached endemic status.

Supervisor:

Dr. Fahisham Taib

Co-supervisors:

Dr. Wan Nor Arifin,

Dr. Rowani Mohd Rawi,

Assistant Professor Dr. Muhamad Azamin Anuar,

Associate Professor Dr. Asrar Abu Bakar,

Associate Professor Dr. Syed Abdul Khaliq Syed Abd Hamid

THE OUTCOME AND QUALITY OF WORKLIFE AMONG PAEDIATRIC GRADUATE OF UNIVERSITI SAINS MALAYSIA

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Introduction: There are few factors that contribute to the good quality of work life (QWL) among the qualified Paediatricians in Malaysia. This study aims to determine the factors that influence its outcome.

Objectives: The study aims to estimate the proportion of MMed Paediatric graduates with good and poor QWL and to determine the factors that influence the good QWL among them.

Methods: A cross-sectional study was carried out throughout June to December 2021. Invitation was distributed through online platform to the cohort of Master of Medicine (MMed) in Paediatrics, graduated from Universiti Sains Malaysia. The list of participants was obtained from the Postgraduate Office, and the current workplace were tracked using Malaysian Medical Council address and from the alumni social group. The QWL questionnaire was built onto Google sheet platform. The tool has a Cronbach alpha of 0.95.

Results: A total of 123 paediatricians participated in the study. Majority of the respondents were Malays (87.8%), Muslims (90%) and married (78%). 53.6% has good QWL. Factors that associated with good QWL were married status ($P = 0.02$) and higher salary ($P = 0.012$) using MLR test.

Conclusion: More than half of paediatricians graduated from USM have good QWL.

Supervisor:

Dr. Fahisham Taib

Co-supervisor:

Dr. Mohd Rizal Zain

GLYCAEMIC CHANGES FROM CONTINUOUS GLUCOSE MONITORING AMONG CHILDREN AND ADOLESCENTS WITH TYPE 1 DIABETES BEFORE AND DURING FASTING MONTH IN RAMADAN

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Introduction: Fasting from early dawn (*Sahur*) until sunset (*Iftar*) during Ramadan, the 9th month in Muslim Calendar, is one of the major five pillars of Islam and is compulsory for all healthy adult Muslims, as well as children and adolescents from the time of puberty. This long hour of enduring practice has raised concerns in particularly among the type 1 diabetes mellitus (T1DM) patients who are on insulin, as this group of patient reportedly to be associated with higher risk of developing acute metabolic complications such as hypoglycaemia, hyperglycaemia, diabetic ketoacidosis, dehydration and thrombosis while observing fasting in Ramadan month.

Objectives: We aimed to observe the changes and compare the glycaemic parameters using CGMS before and during Ramadan using from two centres, and also to study glycaemic variability during fasting and after breaking fast and to compare CGMS data from children with good and poor glycaemic control.

Methods: This study was conducted in two tertiary centres: Hospital Putrajaya (HPJ) and Hospital Universiti Sains Malaysia (HUSM) from February to May 2020. Muslim T1DM patients between ages 8 years old and 18 years old, who expressed intention to fast were recruited and given Ramadan focused education. Self-monitoring of blood glucose (SMBG) and retrospective CGMS by iPro2® (Medtronic) was used to assess the glycaemic changes.

Results: A total of 24 patients (12 female) were included with their mean age 13.6 ± 3.1 years old, HbA1c $9.6 \pm 1.9\%$ and duration of illness 5.4 ± 3.4 years. 91.7% were on multiple daily injections (MDI) and 8.3% on continuous subcutaneous insulin infusion (CSII). All had fasted without complications. CGMS analysis showed no changes in time in hyperglycaemia, time in hypoglycaemia, and time in range (TIR) for both periods before and during Ramadan fasting. Glycaemic variability as reflected by LBGI, HBGI, and MAGE, were also similar.

Conclusion: T1DM children and adolescents could fast safely in Ramadan, provided they are given focused education and compliant to SMBG. Ramadan fasting, in itself, is not associated with short-term glycaemic deterioration.

Supervisor:

Dr. Suhaimi Hussain

Co-supervisor:

Associate Professor Dr. Najib Majidi Yaacob

ADVERSE CHILDHOOD EXPERIENCES AND HEALTH RISK BEHAVIORS AMONG THE UNDERGRADUATE HEALTH CAMPUS STUDENTS

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Introduction: Adverse childhood experiences (ACEs) have been shown to be linked with health risk behaviours (HRBs).

Objectives: The aim of this study is to evaluate ACEs among the undergraduate Health Campus of a university in the northeast of Malaysia, and the associated health risk behaviours.

Methods: This cross-sectional study performed by recruiting 973 undergraduate students at the Health Campus of a public university from December 2019 to June 2021. An anonymous, self-reported questionnaire which consisted of the World Health Organization ACE-International Questionnaire and The Youth Risk Behavior Surveillance System (YRBSS) were distributed randomly to students according to the course and year of study by hard copies or via online questionnaires.

Results: This study found that ACEs were highly reported among participating university students ranging from 2.6 to 39.3%. The most commonly reported adversities were: emotional abuse (30.2%), emotional neglect (29.2%) and physical abuse (28.7%). The incidence of community violence was high, with about 39.3% of survey participants reporting the experience. The highest incidence of HRBs among respondents was 54.5% from physical inactivity, followed by overweight/obesity (28.8%) and safety negligence included text/email during driving (20.6%). The findings of this study showed that those who were exposed to ACEs were at risk of HRBs, for example participants with history of emotional neglect were more likely to have sexual risk behavior (AOR = 2.26; 95% CI: 1.040, 4.911). This study also supported that higher number of cumulative ACEs were associated with higher number of HRBs.

Conclusion: The study has provided evidence on child maltreatment as one of the important public health problems in Malaysia.

Supervisor:
Dr. Fahisham Taib

Co-supervisor:
Associate Professor Dr. Azriani Berahim @ Ab Rahman

COMPLIANCE TO FOLLOW-UP AMONG THE CHILD ABUSE CASES: A SINGLE CENTRE STUDY

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Introduction: Child abuse remains a taboo topic among the local Malaysian. It is associated with cultural belief especially in sexual abuse where the consequences of act fall on victims and its family members in relation to perpetrators (incest), social embarrassment, emotional, consequences and social issues. It is importance for follow up post episode to ensure well-being/determine emotional state of the victim. Poor socioeconomic background, type of abuse especially sexual abuse mainly one of risk factor for non-compliance to follow up. Suspected Child Abuse and Neglect (SCAN) team was developed in Malaysia in 1985 as an organization to safeguard children from abuse and neglect. Subsequently, August 1997, SCAN team was established at Hospital Universiti Sains Malaysia (USM). It is a multidisciplinary team involvement as it integrates multi-departments collaboration.

Objectives: The aim of the study was to explore the type of child abuse cases and explore risk factors associated with non-compliance to follow up.

Methods: The list of cases of was obtained from SCAN team at Hospital Universiti Sains Malaysia. A standardised proforma was made to capture demographic and clinical data. A retrospective case note review was done in cases captured from year 2014 until 2020, where 392 cases were identified.

Results: Only 311 folders could be traced and included in the study, while others unable to trace from record office due to missing folders. Sexual abuse cases were reported in the 261 cases (83.9%) followed by remaining physical abuse cases. Physical and emotional neglect were not documented as it may co-exist with other abuse and was not captured due to its retrospective record review. There were 190 (61.1%) children who were non-compliant to follow-up in the study period. Simple binary logistic regression revealed that the significant factors associated with non-compliance to follow-up following SCAN team review were age (between 14 years old and 18 years old, COR 1.60; 95% CI: 1.01, 2.80; P -value = 0.048), type of abuse (sexual abuse, COR 1.72; 95% CI: 0.94, 3.16; P -value = 0.08) and educational level of patients (COR 1.37; 95% CI: 0.85, 2.20; P -value = 0.19). In multiple logistic regression, we were not able to identify significant factors associated with non-compliance to follow-up at the outpatient's clinic.

Conclusion: This study provides a descriptive study on the child abuse cases locally. We could not identify any association from the sociodemographic profile to associate with the non-compliance to follow-up.

Supervisor:

Dr. Fahisham Taib

Co-supervisor:

Dr. Azriani Berahim @ Ab. Rahman

PROPORTION OF TRANSIENT CONGENITAL HYPOTHYROIDISM AMONG CONGENITAL HYPOTHYROIDISM AND ITS ASSOCIATED FACTORS

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Kelantan, Malaysia

Introduction: Congenital hypothyroidism (CH) is a disorder due to thyroid hormone deficiency. One important challenge in understanding the epidemiology of CH is that most patients will have transient CH, a temporary depression of thyroid hormone concentrations that can last from several days to several months. Prevalence of transient congenital hypothyroidism was 3–4 times higher than the permanent form. Most cases of congenital hypothyroidism are in fact transient and hence does not require a prolonged treatment and those of treated congenital hypothyroidism patients that have factors in favour of transient could be offered to have an earlier trial to off thyroxine even before the age of 3 years old.

Objectives: We aimed to study the proportion of transient congenital hypothyroidism among congenital hypothyroid patients and its associated factors in Hospital Universiti Sains Malaysia.

Methods: This is a retrospective study. Case notes of congenital hypothyroidism patients from January 2003 till December 2021 were traced from Hospital Universiti Sains Malaysia record office database and reviewed. Subjects that were included in this study were all babies diagnosed with congenital hypothyroidism during study period. Patients with only one reading of TFT and incomplete data were excluded in our study. We studied their demography (age, gender, ethnicity), clinical/auxological examinations (weight, height) and biochemical examination (TSH and T4) at diagnosis, before and after the initiation and cessation of treatment. Multiple logistic regression model was used to examine the association of studied factors with transient congenital hypothyroidism.

Results: A total number of 152 subjects, 88 (57.9%) were males and 64 (42.1%) females were recruited in this study, 71.1% (108) were term babies born at 38 weeks and above and 29.9% (44) were premature babies born at less than 38 weeks. 118 cases were diagnosed as transient congenital hypothyroidism making the proportion of transient congenital hypothyroidism 77.6% in Hospital USM during the studied period. Multiple logistic regression has

shown that patients with lower weight at last review had a decreased odds of having permanent form of congenital hypothyroidism by 22% than the patients with higher weight (adjusted OR, 95% CI: 0.78 (0.63, 0.94); $P < 0.01$) and lower serum TSH level after treatment initiation have decreased odds of having permanent congenital hypothyroidism by 30% than patients with higher serum TSH (adjusted OR, 95% CI): 0.70 (0.54, 0.91; $P < 0.009$).

Conclusion: The proportion of transient congenital hypothyroidism in Hospital Universiti Sains Malaysia was 77.6%. Lower current weight on last review and presence of lower TSH level after treatment initiation were the significant factors associated with transient congenital hypothyroidism.

Supervisor:

Dr. Suhaimi Hussain

Co-supervisors:

Professor Hans Vans Rosternberghe,

Associate Professor Dr. Najib Majdi Yaacob

SUBJECTIVE WELLBEING AND ITS ASSOCIATED FACTORS AMONG COMMUNITY IN A UNIVERSITY DURING THE COVID-19 PANDEMIC IN MALAYSIA

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Introduction: COVID-19 pandemic has impacted people negatively psychosocially. The university community (staff and students) are among those who are vulnerable to psychological distress during the movement control order (MCO) due to disruption of routine. Wellbeing can be influenced by negative emotions in stressful events.

Objectives: This study aimed to examine the psychological status and subjective wellbeing of the university staff and students during the COVID-19 pandemic as well as factors associated with wellbeing.

Methods: A cross-sectional online study, was conducted during the COVID-19 pandemic from March until April 2020, involving 1,148 staff and students of Universiti Sains Malaysia via voluntary response sampling. Questionnaires consisted of sociodemographic proforma and questions relating to COVID-19 and MCO. Depression, Anxiety and Stress 21 (DASS-21) and personal wellbeing index (PWI) were used to assess the psychological status and subjective wellbeing respectively. Descriptive analysis was used to describe the demographic characteristics. Multiple regression analysis was carried out to find the association between subjective wellbeing score with the sociodemographic data and DASS-21 scores.

Results: Of the 1,148 respondents, 27.4% reported to have moderate to very severe anxiety, compared to 18.4% and 11.5% for depression and stress of the same severity, respectively. The mean (SD) subjective wellbeing score among the university community was 7.67 (1.38).

Among the 8 domains of wellbeing, satisfaction with personal health was the highest (7.98). A relatively low level of satisfaction was found in the aspects of community relations, life achievement and future security with scores of 7.50, 7.49 and 7.44, respectively. Older age ($b = 0.016$; 95% CI: 0.008, 0.025) and being married ($b = 0.189$; 95% CI: 0.018, 0.359) were found to contribute to higher subjective wellbeing scores. Subjective wellbeing scores were lower among university staff ($b = 0.206$; 95% CI: 0.390, 0.022) than among students. Additionally, experiencing difficulties due to MCO ($b = -0.363$; 95% CI: -0.496, -0.231), as well as higher scores of depression ($b = -0.046$; 95% CI: -0.062, -0.030) and stress ($b = -0.022$; 95% CI: -0.037, -0.007) were found to significantly reduce subjective wellbeing scores.

Conclusion: Difficulties due to MCO, depression and stress are negatively affecting towards the wellbeing of the university community, especially staff, during the pandemic. Psychosocial support should be emphasized to reduce the negative impact on the wellbeing of the university community that can affect the productivity of a university.

Supervisor:

Associate Professor Dr. Asrene Ab Razak

Co-supervisor:

Associate Professor Dr. Wan Mohd Zahiruddin Wan Mohammad

EVALUATION OF INCIDENTAL CARDIOVASCULAR FINDINGS, SIGNIFICANT CARDIAC EVENT AND CLINICAL PRESENTATIONS IN PATIENTS WITH NEGATIVE CTPA STUDY IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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Introduction: Computed tomography pulmonary angiography (CTPA) is the standard diagnostic method for the detection of pulmonary embolism (PE). However, incidental cardiovascular findings have been commonly observed among the CTPA performed to diagnose PE. It is uncertain whether mentioning incidental cardiovascular findings (ICF) in CTPA reports translates into effective management of clinically significant diseases.

Objectives: This study aimed to determine the prevalence of ICF in patients with negative CTPA, to determine the proportion of significant cardiac events in patients with ICF and to determine the type of clinical presentations among patients with negative CTPA.

Methods: In this retrospective study, a total of 58 negative CTPA reports of patients suspected with PE at Department of Radiology, Hospital Universiti Sains Malaysia (HUSM) were collected through a computerised radiologic database, Picture Archive Communication System (PACS) and Visual Interaction Assistant for Radiology (VIARAD).

The CT images were examined for the presence of ICF. The significant cardiac event within 6 months after CTPA were documented by reviewing patients' medical records. The proportion of ICF in patients with negative CTPA and the proportion of significant cardiac events in patients with ICF were calculated as percentage values.

Results: Thirty (51.7%) of 58 patients with negative CTPA report had ICF. Among these 30 patients, nine types of ICF were discovered. Seventeen of the 30 patients with ICF had more than one ICF, making a total of 53 ICFs recorded. Nine (30%) of 30 patients with ICF had significant cardiac event in which, coronary artery calcification and thoracic aorta calcification were the most common findings. Of the 53 ICFs, 17 were found in patients with typical PE presentation, 21 were in those with acute coronary syndrome presentation and 15 were in those with atypical presentation.

Conclusion: Almost half of patients with negative CTPA have evidence of ICF. Slightly more than half of patients with ICF have more than one ICF. Nearly one third of patients with ICF had significant cardiac events. Coronary artery and thoracic aorta calcifications were the most common ICFs in patients with significant cardiac event and typical acute coronary syndrome presentation. Therefore, reporting ICF in all CTPA studies is still clinically important.

Supervisor:

Dr. Khairil Amir Sayuti

Co-supervisor:

Associate Professor Dr. Mohd Shafie Abdullah

CARDIAC IRON OVERLOAD IN THALASSAEMIA MAJOR PATIENTS WITH VARIOUS CHELATION THERAPY USING CARDIAC MAGNETIC RESONANCE (CMR T2*) VALUE: A STUDY IN HOSPITAL SEBERANG JAYA, PULAU PINANG

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Master of Medicine (Radiology)

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Introduction: Thalassaemia is the most common inherited blood disorder in Malaysia. Beta thalassaemia major is caused by impaired synthesis of the beta globin chain producing fragile erythrocytes and haemolytic anaemia. Lifelong blood transfusion leads to iron overload and toxicity. Cardiac involvement in TM patients, mainly characterised by left ventricular dysfunction due to iron over load. Cardiac magnetic resonance (CMR) T2* value is being used for quantitative evaluation of cardiac iron in recent years, for earlier detection of cardiac iron overload and helps to optimise chelation therapy for TM patients. To date the correlation between cardiac iron T2* value and left ventricular ejection fraction (LVEF) and types of chelation therapy is poorly defined in our population. Therefore this study was conducted to analyse the correlation between cardiac iron T2* with LVEF and types of chelation therapy.

Objectives: This study was designed to assess cardiac iron overload using CMR T2* value in TM patients undergoing chelation therapy and its correlation with LVEF as well as association with types of chelation therapy.

Methods: A cross sectional study was performed based on retrospective record review of TM patients who came for yearly cardiac iron surveillance in Radiology Department Hospital Seberang Jaya (HSJ), Pulau Pinang. Myocardial iron load was assessed using T2* value which was classified as none, mild, moderate and severe. The LVEF was assessed by area length ejection fraction (ALEF) method using long axis horizontal view. The proportion of cardiac iron value and its severity were presented as descriptive analysis. Pearson correlation was used to analyse the correlation between T2* value and LVEF. Paired *t*-test was used for comparison of mean value of T2* and LVEF between the baseline and the 24th month. *P*-value of less than 0.05 was considered statistically significant.

Results: There were 150 patients in this study with mean age of 17.25 (\pm 7.20) years old. Majority of them were males ($n = 78$, 52%) and mostly Malays ($n = 122$, 81.3%). Among this, 35 (23.3%) patients had cardiac iron overload CMR T2* < 20 ms at baseline. Significant improvement seen in the mean cardiac T2* value of the cardiac iron overload patients, from 12.49 \pm 4.93 msec at baseline to 15.51 \pm 8.76 msec at 24th month (*P*-value of 0.015). The mean LVEF of patients with cardiac iron overload was 58.91 \pm 3.45% at baseline which also showed significant improvement at 24th month, 61.11 \pm 5.49% (*P*-value 0.015). There was significant correlation noted between T2* value and LVEF of all patients with cardiac iron overload with *P*-value < 0.05. No significant association seen between the types of chelation therapy (single or combination) with the cardiac T2* value in patient with cardiac siderosis (*P*-value > 0.05).

Conclusion: Our study showed there was significant improvement of cardiac T2* and LVEF value in thalassaemia major patients cardiac siderosis with significant correlation seen between the cardiac iron T2* value and LVEF. No significant association was noted with the cardiac iron T2* value and types of chelation therapy.

Supervisor:

Dr. Noor Khairiah A. Karim

Co-supervisor:

Dr. Mazeda Murad

SMARTPHONE WHATSAPP APPLICATION RELIABILITY AS A TELERADIOLOGY FOR EVALUATION OF HEAD CT IN TRAUMATIC BRAIN INJURY

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Introduction: Teleradiology has been used as a method of consultation in traumatic brain injury (TBI) for hospitals without neurosurgical expertise. Capturing

images and recording videos of CT scans and sending via WhatsApp has become a common means of communication between physicians. It has been used as an aid for decision-making in triaging and transfer of TBI cases that need surgical intervention. It is known that WhatsApp uses video file compression for transmitting video, and combined with the limited size, resolution, and functionality of video compared to radiology workstation may increase the rate of misinterpretation.

Objectives: The purpose of this study is to evaluate the reliability of WhatsApp video as a method of teleradiology in TBI.

Methods: A prospective reliability and agreement study was conducted in HUSM on 85 patients. These patients are subjected to emergency head CT after being admitted to the emergency department for prior history of trauma. Video recording of CT scan was transmitted via WhatsApp and evaluated for intracranial haemorrhage, midline shift, fracture, and pneumocranium by two experienced raters from iPhone 7 plus. Reading of the CT scan of the same patients was repeated from a radiology workstation after 4 weeks interval. Kappa analysis was used to compare the interrater and intrarater agreement regarding the CT scan findings.

Results: For the assessment of both the intra and interrater agreement, the κ -values were found to be 0.68–0.70 for the presence of intracranial haemorrhage, 0.16–0.96 for types of intracranial haemorrhage, 1.0 for midline shift, 0.59–0.73 for fracture and 0.55–0.57 for pneumocranium.

Conclusion: There was an almost perfect agreement for subarachnoid haemorrhage and midline shift with most of the other findings showing less than 0.90 κ score. This signifies that using WhatsApp for teleradiology could be of limited value in the diagnosis of TBI-related injury.

Supervisor:

Dr. Muhamad Zabidi Ahmad

Co-supervisor:

Dr. Mahedzan Mat Rabi

ASSOCIATION BETWEEN MAMMOGRAPHIC IMAGE QUALITY, BREAST DENSITY AND BREAST VOLUME

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Introduction: High mammographic image quality is essential for excellent image interpretation. The audit of the mammogram image is needed to ensure that high standard quality is maintained. PGMI is a tool used to assess mammographic image quality and was adapted in the Malaysian College of Radiology Recommendations and Guidelines for Quality Assurance (QA) in Mammography 2008. A high proportion of good image quality based on PGMI ratings need to be achieved as part of the quality assurance. The College of Radiology Malaysia guidelines recommends more than 97% of images should be in perfect,

good or moderate categories with overall 75% in the perfect and good groups; more than 3% in the perfect group; and less than 3% images to be classified inadequate. Breast density was proven to be strongly associated with mammographic sensitivity in which dense breast reduced sensitivity of mammogram. Breast volume estimation was proven important in determining the breast-conserving surgery cosmetic outcome in which large breast volume causing less satisfying cosmetic outcome. Currently, there is no study that looked at the association between mammographic image quality, breast density and volume.

Objectives: This study aims to evaluate the image quality of mammograms performed in this institute and determine its association with breast density and volume.

Methods: A cross-sectional study was conducted in Hospital Universiti Sains Malaysia (HUSM), Kota Bharu, Kelantan, Malaysia, on 425 sets of images of mammograms which was performed from January 2016 to December 2019. PGMI rating was performed based on standard criteria of PGMI assessment adapted from the Malaysian College of Radiology Recommendation and Guideline. Breast density was determined using the Breast Imaging Reporting and Data System (BI-RADS) classification and further subcategorised to dense breast and non-dense breast. Breast volume (BV) calculation was performed using the formula proposed by Katariya, $BV = 1/3\pi R^2ccHcc$, and was divided into the small, medium, and large breast volumes. The association between mammographic image quality, breast density and volume was conducted using the Chi-square test.

Results: The proportion of mammographic images based on PGMI rating were 10.8% perfect, P; 29.2% good, G; 59.8% moderate, M and 0.2% inadequate, I. No statistically significant association between breast density and mammographic image quality ($\chi(1) = 0.58, P = 0.809$). No statistically significant association between breast volume and mammographic image quality ($\chi(1) = 0.45, P = 0.501$).

Conclusion: Most mammograms were classified as moderate. The overall percentage of image in perfect, good and moderate categories were satisfactory and within acceptable limits, but the overall achievement of perfect and good images was below the recommended percentage by the Malaysian College of Radiology. There is no significant association between mammographic image quality, breast density and volume.

Supervisor:

Associate Professor Dr. Juhara Haron

CT RENAL VOLUMETRY AND CONTRAST-INDUCED NEPHROPATHY IN PRE-CHEMOTHERAPY NON-RENAL MALIGNANCY IN KELANTAN

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Kelantan, Malaysia

Introduction: Contrast-induced nephropathy (CIN) is a known complication post-intravenous iodinated contrast study, particularly in patients with lower estimated glomerular filtration rate (eGFR). Correlations between eGFR and CIN as well as between renal volume and eGFR have been established. Various methods were used for renal volume calculation. Of all, CT is the most feasible and widely used. The purpose of this study is to determine the correlation between eGFR, CT renal volumetry and CIN among non-renal malignancy patients going for initial contrasted-CT staging.

Objectives: This study was designed to determine the proportion of CIN, eGFR and CT renal volumetry among non-renal malignancy patients in Hospital Universiti Sains Malaysia (HUSM).

Methods: A cross-sectional study was conducted in HUSMKubang Kerian, Kelantan, Malaysia on 59 patients who had been diagnosed with non-renal malignancy and underwent initial contrasted-CT for staging. CT renal volumetry was obtained from 3D automated calculation from VitreaCore software. Renal function was used to calculate baseline eGFR and another renal function taken within 24 h–48 h post-contrasted CT for evaluation of non-CIN or CIN patients. The CIN proportion was obtained in percentage. The correlation between CT renal volumetry and eGFR tested using Pearson's correlation coefficient. The mean CT renal volumetry between normal and CIN patients tested using independent *t*-test.

Results: The proportion of CIN among non-renal malignancy patients was 3.4%. There was no correlation between baseline eGFR and CT renal volumetry ($P > 0.05$). The mean (SD) CT renal volumetry for CIN and non-CIN patients was 159.12 (19.28) mL and 144.46 (27.30) mL, respectively; no significant mean difference of CT renal volumetry between CIN and non-CIN patients ($P > 0.05$). However, there was significant correlation between the baseline eGFR and CIN ($P < 0.05$) whereby all CIN patients are from stage 3b kidney disease.

Conclusion: Our study showed no correlation between baseline eGFR and CT renal volumetry probably because individual body weight was not accounted for in the eGFR calculation. Nonetheless, the proportion of CIN was consistent with previous study. Further research and other methods for CT renal volumetry and eGFR calculation might be plausible to show the association between eGFR, CT renal volumetry and CIN.

Supervisor:

Dr. Khairil Amir Sayuti

Co-supervisor:

Dr. Muhammad Imran Kamarudin

CORRELATION BETWEEN LIVER SHEAR WAVE ULTRASOUND AND BIOCHEMICAL PARAMETERS IN LIVER STEATOSIS AND FIBROSIS AMONG PATIENTS WITH METABOLIC ASSOCIATED FATTY LIVER DISEASE AND TYPE 2 DIABETES MELLITUS

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Introduction: Metabolic associated fatty liver disease (MAFLD), previously known as non-alcoholic fatty liver disease (NAFLD), is a liver pathology caused by metabolic dysfunctions. Shear wave elastography (SWE) is an ultrasound method which utilises the elastography technique to assess the liver steatosis and liver fibrosis condition. We aimed to study liver steatosis and fibrosis and correlate with the biochemical parameters among MAFLD patients with type II diabetes mellitus.

Objectives: This study is designed to evaluate the difference in liver sonographic features and biochemical parameters among MAFLD with type II diabetes mellitus.

Methods: Twenty patients were evaluated using the Siemens Acuson Sequoia ultrasound machine, where both conventional ultrasound and shear wave elastography was performed. The liver steatosis grading and shear wave elastography of all patients were recorded. Correlation made with biochemical parameters using Pearson's correlation coefficient.

Results: The 20 patients showed an equal number of having grade 1 and grade 2 liver steatosis. Thirty-five per cent of the subjects showed Fo-F1 (non-significant liver fibrosis). From the analysis, a moderate correlation was seen between the liver steatosis with LDL and CHOL levels, where $r < 0.3$. However, the rest of the variables show a weak correlation with liver steatosis and fibrosis.

Conclusion: SWE is one of the methods useful in assessing liver steatosis and fibrosis, thus valuable for diagnosing and monitoring MAFLD. However, a study with a larger number of subjects will be needed for a more significant assessment.

Supervisor:

Dr. Chandran Nadarajan

DIFFERENTIATING SCLEROTIC METASTATIC AND BENIGN BONE LESIONS ON SPECT-CT AMONG BREAST CANCER PATIENTS USING SEMI-QUANTITATIVE ANALYSIS

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Introduction: Breast cancer is the most common malignancy among women around the world, accounting for about 25.1% of all cancers. Approximately, 1,671,149 new cases and 521,907 deaths are documented in the world following breast cancer in the year 2012. The incidence of breast cancer in Asia has shown a rapid increase in recent years. This is due to many factors, including lifestyle changes, socio-economic status, and good healthcare system. In relation to Malaysia, the International Agency for Research in Cancer (GLOBOCAN) 2012 estimated the age standardised rate (ASR) of breast cancer as 38.7 per 100,000 with 5,410 new cases in 2012. Mortality rate associated with breast cancer was ranked second most in Malaysia. Bone metastasis was found in 60% of patients who died from breast cancer. In fact, breast cancer metastatic disease is associated with widespread skeletal involvement in 85% of patients. Patients who had metastatic bone disease had a median survival period of 24 months. Pathologic fractures, bone pain, spinal cord compression and hypercalcemia are some of the debilitating complications related to metastatic bone disease. With the rising cases of breast cancer in Malaysia associated with high morbidity and mortality rate, an accurate detection of bone metastasis is imperative. This ensures correct staging, rapid initiation of therapy, and may increase the life span of these patients. Bone scintigraphy or better known as bone scan is recognised as the most sensitive, non-invasive radiological modality to detect bone metastasis. It is highly sensitive, easily available and affordable. It involves administration of radiopharmaceutical agent which accumulates at the skeletal system due to changes of bone vascularity or osteoblastic activity. However, the interpretation of bone scan is often complicated with the presence of co-existing benign conditions like osteochondrosis, spondyloarthropathy, collectively known as degenerative diseases and bony islands which also demonstrate increased tracer uptake. This may cause false positive findings. It is often difficult to distinguish between metastatic and benign bone lesions especially in the spine, both of which often co-exist in breast cancer patients. With the introduction of hybrid imaging like SPECT-CT, the specificity of bone scan has improved. It has the advantage of providing morphological (low dose CT) and functional or metabolic (SPECT) information of detected lesions. It is shown to detect 20%-50% more lesions and has higher sensitivity and specificity. In current practice, a metastatic and benign bony lesion on SPECT-CT is distinguished by eye balling the characteristic of the lesion and its localisation only, known as qualitative method, which is subjective and interpreter dependent. To our best knowledge, there is limited data available on the usage of semi-quantitative measurement with SPECT SUV and HU in discriminating benign and metastatic bone lesions. Its clinical utility is not well established and not widely used in clinical practice. The aim of our study is to carry out a semi-quantitative analysis using mean SUVmax and mean HU to distinguish between a metastatic and benign bone lesion among breast cancer patients. It helps in patient's diagnosis especially for indeterminate or suspicious bony lesion on SPECT-CT.

Objective: Qualitative interpretation of metastatic bone lesions among breast cancer patients on bone scan is often complicated by the presence of co-existing benign

lesions which may also demonstrate radiotracer uptake. The aim of the study is to compare Technetium 99m-methyl diphosphonate (^{99m}Tc -MDP) tracer uptake between benign and metastatic bone lesions using semi-quantitative analysis with single-photon emission computed tomography with computed tomography (SPECT-CT) mean maximum standard uptake value (SUVmax) and mean Hounsfield unit (HU) and determine the correlation between these two variables to differentiate between benign and metastatic lesion.

Methods: A total of 185 lesions were identified in bone scan and SPECT-CT from 32 patients, of which 109 were sclerotic metastatic lesions and 76 were benign lesions. Lesions were classified as benign or metastatic based on morphology on low dose CT. Next, a semi-quantitative analysis using mean SUVmax and mean HU performed on each of the lesions. The mean SUVmax and mean HU for benign and malignant lesions were then compared. Correlation between mean SUVmax and mean HU to discriminate benign and metastatic lesions were determined. The reliability of region of interest (ROI) delineation was assessed in our study using the intraclass correlation coefficient (ICC).

Results: Metastatic lesions have higher mean SUVmax ranging 10.88–6.33 and lower for benign lesions ranging 6.49–7.17, showing high significance with P -value < 0.001 . Metastatic lesions have lower mean HU ranging 166.62–202.02 but higher for benign lesions ranging 517.65–192.8, demonstrating high significance with P -value < 0.001 . A weak positive correlation exists between mean SUVmax and mean HU on malignant lesions with no statistical significance ($P = 0.148$). Whereas a weak negative correlation exists between mean SUVmax and mean HU for benign lesions with no statistical significance ($P = 0.311$).

Conclusion: Semi-quantitative assessment with SUVmax and HU can complement qualitative analysis. Metastatic lesions have higher mean SUVmax and lower mean HU compared to benign lesions, whereas benign lesions demonstrate higher mean HU and lower mean SUVmax. A weak positive correlation exists between mean SUVmax and mean HU on malignant lesions. On the contrary, a weak negative correlation exists between mean SUVmax and mean HU for benign lesions.

Supervisor:

Dr. Wan Aireene Wan Ahmed

Co-supervisor:

Dr. Norazlina Mat Nawi

EVALUATION OF RENAL CORTICAL SHEAR WAVE ELASTOGRAPHY IN EARLY TYPE 2 DIABETIC KIDNEY DISEASE

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Introduction: Diabetic kidney disease (DKD) is one of the major contributing causes for increasing morbidity among patients with type 2 diabetes mellitus (DM). The natural progression of DKD is glomerular hyperfiltration, followed by progressive albuminuria, declining GFR and lastly, ESRD. DKD often progress silently, with no overt manifestations until much of the renal tissue had been replaced by fibrotic tissue. Currently, GFR and proteinuria is the usual laboratory markers used for detection and follow up DKD patients. Gold standard investigation to diagnose renal fibrosis even in early stages of DKD is renal biopsy, however this procedure is an invasive procedure, expensive, with risk of bleeding and not routinely done to evaluate renal fibrosis in DKD patients. Ultrasound shear wave imaging (US SWE) is a non-invasive technique that measures tissue elasticity. The core technique of SWE is measurement of shear waves velocity propagating in the examined tissue. Fibrotic tissues will be less elastic thus giving higher SWE value compared to normal tissues. Quantification of scar burden during early DKD stage may identify patients at high risk for disease progression even before the development of significant renal dysfunction. This may help clinicians to provide appropriate treatment, regular follow up and early referral to Nephrologist to delay further deterioration of renal function in this high-risk group of patients.

Objective: The purpose of this study is to evaluate renal cortical SWE in early stages DKD patients, thus this high-risk group of patients can be identified and given appropriate treatment.

Methods: A prospective cohort study was conducted at Hospital Universiti Sains Malaysia involving 38 patients with type 2 DM and 16 control group. Measurement of renal length, renal cortical thickness and mean renal cortical SWE value in 54 subjects were done. Estimated glomerular renal function (eGFR) and urine protein creatinine ratio (PCR) of these subjects were also analysed.

Results: There was a significant difference between mean renal cortical SWE value of control group and type 2 DM patients ($P = 0.001$). Spearman rank correlation showed significant correlation of mean renal cortical SWE value with eGFR ($r = -0.327$, $P = 0.016$) and proteinuria stages ($r = 0.297$).

Conclusion: Renal cortical SWE value is significantly correlated with eGFR and proteinuria, and significantly higher in early-stage type 2 DKD patients compared to control group. This signifies that US SWE can be used as a non-invasive tool for early detection of renal morphological changes in DKD patients.

Supervisor:

Dr. Wan Aireene Wan Ahmed

Co-supervisor:

Dr. Imran Kamarudin

MAGNETIC RESONANCE IMAGING BRAIN VOLUMETRY AMONG ADULT MALAY MALE REGULAR KRATOM LEAVES USERS.

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Introduction: *Mitragyna speciosa* (Korth.) or commonly known as kratom is an indigenous plant commonly found in Southeast Asia with a long history of traditional use as herbal remedies for various ailments, usually consumes as painkillers and to combat fatigue. More recently, apart from the medicinal benefit, it has gained popularity for use as a recreational drug and as an opioid substitute. Despite the increasing usage across the globe, the potential side-effects of prolonged kratom use on brain morphometry, however, are currently unclear.

Objectives: This study is designed to investigate the brain volumetry (total intracranial volume, total brain volume, volumes of caudate nucleus, putamen) among regular adult Kratom leaves users.

Methods: Twenty-two regular adult kratom users and thirty non-kratom users who underwent brain magnetic resonance imaging (MRI) for prior research were included in this cross-sectional study. Manual tracing of brain volumetry for total intracranial volume (TIV or ICV), total brain volume (TBV), caudate nucleus and putamen were performed for all the participants. The difference in means for TIV, TBV, caudate nucleus and putamen between kratom and non-kratom users were determined using a statistical independent *t*-test.

Results: The mean (SD) total intracranial volume and mean total brain volume (SD) among regular adult kratom leave users were 1,502.28 (95.41) cm³ and 1,388.63 (118.03) cm³, respectively. For kratom user subjects, the mean (SD) for the right, left and total caudate nucleus volumes reported were 3.89 (0.48) cm³, 3.96 (0.49) cm³ and 7.86 (0.95) cm³, respectively. While for the right, left and total putamen volume, the mean (SD) reported were 4.31 (0.29) cm³, 4.37 (0.26) cm³ and 8.67 (0.52) cm³, respectively. There were no significant differences ($P > 0.05$) in the mean total intracranial volume (TIV or ICV) and total brain volume (TBV) between kratom users and the controls. However, there was an increase in mean caudate nucleus and putamen volume ($P < 0.05$) for kratom users relative to the controls.

Conclusion: This study showed long-term consumption of kratom is associated with altered subcortical brain structures (caudate nucleus and putamen) in regular kratom users in traditional settings. However, further study is needed to establish more data on kratom use and its effects with regard to brain morphometry.

Supervisor:

Dr. Muhamad Zabidi Ahmad

CORRELATION OF SONOGRAPHIC FINDINGS WITH TECHNETIUM PERTECHNETATE UPTAKE OF THYROID GLAND IN PRIMARY HYPERTHYROID PATIENT

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Introduction: Radioactive iodine (RAI) has been used since 1941. Despite its long existence and has become a mainstay in treating hyperthyroidism, there's still debate regarding its dosing method. Technetium pertechnetate thyroid uptake study had been widely used as a preliminary investigation before deciding the actual dose of radioiodine therapy. Besides causing extra radiation to the patient, the technetium pertechnetate thyroid uptake study also caused an additional cost to the patient. Ultrasound has been one of the essential modalities in assessing the thyroid gland. It is a cost-effective, non-radiation study and can determine both the morphological and vascularity status of the thyroid gland. This study aims to determine the correlation of thyroid gland sonographic study (USG) with the value of technetium pertechnetate thyroid scan (TcTU).

Methods: A prospective cross-sectional study was conducted in Hospital Universiti Sains Malaysia, Kota Bharu, Kelantan. A total of 17 patients who underwent their TcTU scan for RAI treatment that fulfilled the inclusion and exclusion criteria were included in the study. All patients were subjected to ultrasound prior to the TcTU scan. The subjects' demographic data were collected and analysed using descriptive analysis and were presented as frequency and percentage. During USG, the thyroid volume (TV-USG) parameter and superior thyroid artery peak systolic velocity (PSV) was recorded, and data were presented as mean and standard deviation. During the TcTU scan, the parameter for TcTU volume (TV-Tc) and TcTU percentage uptakes were recorded, and data were presented as mean and standard deviation. Spearman correlation was used to correlate USG and TcTU findings as the data are not normally distributed.

Results: Our subjects' mean age was 41.29 (14.01), with most of the subjects being female ($n = 12$, 70.6%). The mean volume of TV-USG was 34.63 (22.10) mL and TV-Tc was 43.41 (24.02) mL. The PSV of the thyroid gland was 41.64 (12.81) cm/s and the percentage of TcTU uptake was 15.58 (12.65) %. There is a strong positive correlation between TV-USG and TV-Tc and a moderate positive correlation between PSV and percentage TcTU uptake ($P < 0.05$).

Conclusion: Our study showed a significant positive correlation of volume measurement and a moderate correlation between peak systolic velocity and percentage thyroid uptake between the sonographic findings and the TcTU study. Thus, an ultrasound may play a role in predicting the possible dosage and outcome of the RAI treatment.

Supervisor:

Dr. Ahmad Hadif Zaidin Samsudin

Co-supervisor:

Dr. Norazlina Mat Nawi

NOVEL STUDY TO DELINEATE, MEASURE AND TO COMPARE THE ORIENTATION OF DUODENUM USING MRI IN NORMAL POPULATION AND PATIENT WITH FUNCTIONAL DYSPEPSIA: A PILOT STUDY IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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Introduction: Functional dyspepsia (FD) is a heterogeneous spectrum of symptoms that originate at the gastroduodenal region. It is characterised by chronic and recurrence upper abdominal pain or discomfort in the absence of an organic, systemic, or metabolic disease that could explain the symptom. Gastric perturbation, such as delayed gastric emptying, impaired gastric fundus relaxation, impaired gastric accommodation, gastroduodenal dysmotility, inflammatory and immune responses of the gastroduodenal region and infection, such as *Helicobacter pylori* (*H. pylori*) infection, are some of the most widely discussed and associated mechanisms. Previously, there were very few research that investigated the relationship between duodenal structure and FD. The study was small-scale, and it had to be replicated to show a better correlation with FD. The advancement of modern medical imaging technology in the last 20–30 years, particularly with the introduction of cross-sectional imaging techniques such as computed tomography (CT) and magnetic resonance imaging (MRI), has improved the ability to image the UGIT and allows for 3-dimensional (3D) analysis of the UGIT. Hence, better research to establish the link between the morphology of the upper gastrointestinal tract, particularly the duodenum, and dyspepsia is feasible.

Objectives: This study was designed to measure the segmental duodenal length and angulation; and determine the duodenal angulation in normal populations and patients with functional dyspepsia using magnetic resonance imaging (MRI).

Methods: This is a prospective study that was conducted in Hospital Universiti Sains Malaysia (HUSM), Kubang Kerian Kelantan from 21 June 2021 to 1st March 2022. A total of 18 subjects who met the inclusion and exclusion was included in this study. Among the recruited participants, 14 of them were normal healthy volunteers (control group) which comprised of 7 male and 7 female participants (age range: 22 years old–36 years old), mean age 27.1 years old) without dyspeptic symptoms or previous medical and surgical history. While a total of four FD female patients with a mean age of 49.25 years old, age range from 36 years old–65 years old; who is under KPP HUSM follow up. All eligible subjects underwent non-contrasted upper abdominal MRI 20 min after drinking 250 mL of milk as oral contrast. MRI images were reviewed in PACS and segmentation of the duodenum was performed. Measurement of duodenal length and angulation, determination of duodenal angulation was made based on the 3D duodenal segmentation images. All data were analysed using Statistical

Product and Service Solutions (SPSS). Mann-Whitney U test was used to correlate the segmental duodenal length and duodenum angulation. Fisher's exact test was used to detect the association between the control group and FD patients.

Results: Only inferior duodenal angulation showed a statistically significant difference ($P = 0.025$) between the control population and FD patients. There were no statistically significant differences in the segmental duodenal length, duodenal length, and superior duodenal angulation between the control population and FD patients. Fisher's exact test showed there was no statistically significant correlation in duodenal orientation with the control population or FD patients ($P = 0.323$).

Conclusion: Current advancement in the MRI sequences and post-processing technique have shown as a promising and safe tool in duodenum imaging. It may play a role in the management of FD patient in the future.

Supervisor:
Dr. Ahmad Hadif Zaidin Samsudin.

Co-supervisors:
Dr. Chandran Nadarajan,
Dr. Bilgin Keserci,
Professor Dr. Lee Yeong Yeh

COMPARISON OF HIGH RESOLUTION COMPUTED TOMOGRAPHY FINDINGS OF THORAX BETWEEN SMEAR NEGATIVE PULMONARY TUBERCULOSIS AND NON-PULMONARY TUBERCULOSIS AMONG PATIENTS WITH SUSPECTED PULMONARY TUBERCULOSIS IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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Introduction: Pulmonary tuberculosis (PTB) has been around for over 100 years since it was first discovered. Despite its long existence, medical practitioners still found it challenging to diagnose sputum smear negative PTB. The ability of high resolution computed tomography (HRCT) in diagnosing PTB is still under discussion and investigation in the sputum smear-negative setting.

Objectives: This study was conducted to determine the HRCT findings in diagnosing early stage of active smear negative PTB and to study specific HRCT findings in diagnosing smear negative PTB.

Methods: A cross-sectional study was conducted in Hospital Universiti Sains Malaysia (USM), Kota Bharu, Kelantan, Malaysia on 22 patients whose sputum smears were negative and had undergone HRCT thorax. HRCT findings were collected and described using descriptive statistic, count (n) and percentage (%); and comparative HRCT findings between smear negative PTB versus non-PTB was analysed using the Pearson's chi-square test.

Results: The tree-in-bud appearance showed a significant association with smear negative PTB, with P -value of 0.046. And this main findings of tree-in-bud appearance showed significant association with smear negative PTB at S5 (medial segment) of right middle lobe and S3 (anterior segment) of left upper lobe, with P -value of 0.025 on both sides.

Conclusion: Tree-in-bud appearance which indicates the early stage of active PTB, had shown significant association with smear negative PTB, and can be detected in HRCT. Hence, HRCT could be used as an alternative method to detect active PTB in the background of sputum smear-negative setting among higher risk patients.

Supervisor:

Dr. Wan Aireene binti Wan Ahmed

Co-supervisors:

Dr. Nurashikin Mohammad,

Dr. Mohd Jazman Che Rahim

ASSOCIATION BETWEEN CLINICAL PARAMETERS AND VENOUS ACCESS WITH THE IMAGE QUALITY OF COMPUTED TOMOGRAPHY PULMONARY BANGIOGRAPHY IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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Objective: This study aims to determine the association between clinical parameters and venous access with the objective and subjective image quality of computed tomography pulmonary angiography (CTPA).

Methods: One hundred patients were included in our study. Clinical parameters (gender, age, body weight, blood pressure, heart rate) were collected. The size and location of venous access were documented. Objective CTPA image quality assessment [pulmonary arterial enhancement (Objective PA_{enhanc}), signal to noise (SNR), contrast to noise ratio (CNR)] were measured. Two radiologists independently assessed subjective image quality.

Results: Positive linear relationship was demonstrated between age and objective PA_{enhanc} (P -value = 0.007, β = 0.251), SNR (P -value = 0.007, β = 0.251), CNR (P -value = 0.001, β = 0.301) and subjective image quality (P -value < 0.000, β = 0.450). Negative linear relationship was shown between body weight and objective PA_{enhanc} (P -value < 0.00, β = -0.473). SNR (P -value < 0.00, β = -0.473) and CNR (P -value < 0.000, β = -0.462). Higher subjective image quality was seen in male (mean = 3.782) compared to female (mean = 3.156) (P -value = 0.001). Better subjective image quality was also seen in patients with IV cannula placed at the foot as opposed to hand (P -value = 0.02; 95% CI: 0.197, 3.153) or antecubital fossa (P = 0.04; 95% CI: 0.038, 2.839) and in patients with IV cannula at lower limb (mean = 4.400)

as opposed to upper limb (mean = 3.347) (P = 0.014). There is no association between venous access and objective image quality.

Conclusion: Patient age and weight showed a significant impact on the image quality of CTPA. Blood pressure and heart rate did not significantly affect the image quality. Even though the males had statistically better subjective image quality than females, this might not be clinically significant due to minimal absolute difference.

Supervisor:

Dr. Chandran Nadarajan

PERCUTANEOUS NEPHROSTOMY VERSUS RETROGRADE URETERAL STENTING FOR ACUTE UPPER OBSTRUCTIVE UROPATHY: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Introduction: Acute obstructive uropathy poses significant morbidity among patients with any condition leading to urinary tract obstruction. Immediate urinary diversion is required to prevent further damage to the kidneys. Two main treatment options performed in many centres include percutaneous nephrostomy (PCN) and retrograde ureteral stenting (RUS).

Objectives: To assess the efficacy of PCN in the treatment of obstructive uropathy in comparison to RUS.

Methods: We searched the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, CINAHL, EMBASE and the WHO International Clinical Trials Registry Platform, and ClinicalTrials.gov. We also searched the reference lists of included studies to identify any additional trials. We included randomised controlled trials and controlled clinical trials comparing the outcomes of clinical improvement (septic parameters and duration of hospitalisation), quality of life, urinary-related symptoms, failure rates, post-procedural pain (VAS) and use of analgesics. We performed statistical analyses using the random-effects models and expressed the results as risk ratio (RR) and risk difference (RD) for dichotomous outcomes and mean difference (MD) for continuous outcomes, with 95% confidence intervals (CI).

Results: A total of seven trials were identified that included 667 patients. Meta-analysis of the data revealed no difference in the two methods in improvement of septic parameters, quality of life, failure rates, post-procedural pain (VAS) and use of analgesics. Patients receiving PCN experienced lesser rates of haematuria and dysuria after the procedure but with longer duration of hospitalisation.

Conclusion: Both methods are effective in the decompression of an obstructed urinary system with no significant difference in most outcomes. PCN is preferable to RUS because of a lesser impact on patient quality of life after

procedure due to haematuria and dysuria although associated with slightly longer duration of hospitalisation.

Supervisor:
Professor Dr. Mohd Shafie Abdullah

Co-supervisor:
Associate Professor Dr. Norhayati Mohd Noor

ABDOMINAL SURGERY INVOLVING THE DIGESTIVE SYSTEM A RANDOMISED BLINDED COMPARATIVE STUDY

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Introduction: The benefits of carbohydrate loading prior to elective surgery is well researched and documented, and guides surgeons based on texts published by the group for Enhanced Recovery after Surgery (ERAS). Commonly, maltodextrin extracts are utilised for this purpose, which can be quite expensive.

Objectives: Honey, a naturally occurring substance that is well tolerated amongst the Asian population is known to have antibacterial, anti-inflammatory as well as wound healing properties. If Kelulut honey, the locally available variant is shown to have a significant effect in carbohydrate loading, it can be used as a cheaper alternative in our setting. This study aims to determine the effect of Kelulut honey on insulin resistance and residual gastric volume as well as compare several post-operative outcomes when used as carbohydrate loading preoperatively in patient undergoing abdominal surgery involving the gastrointestinal tract in Hospital Universiti Sains Malaysia (HUSM).

Methods: This is a prospective single centre randomised double blinded comparative study conducted at HUSM. A total of 64 patients undergoing elective intra-abdominal surgery involving the digestive system, above the age of 18 will be recruited into the study. Patients with background history of Diabetes, Fasting Glucose level > 7 mmol/L, poor pre-morbid condition (American Society of Anaesthesiology [ASA] > 3) on concurrent steroid treatment, recent infection in the past 3 months, pre-operative unintentional weight loss > 10% of usual body weight within 6 months, minors and those with allergies to maltodextrin and honey will be excluded from the study. Objective data analysis is conducted using the independent sample t-test. Secondary objective data assessment will be done using Chi-square test.

Results: A total of 64 patients were recruited, however one patient was excluded as they were unable to complete the consumption of the carbohydrate loading solution from the Carborie® group. Measurement of residual gastric volume analysis showed no significant difference between both groups. Mann-Whitney U test was performed to analyse the comparison of blood glucose level which also showed no significant difference throughout measurement time.

The average blood glucose on induction was 5.3 mmol/L–5.6 mmol/L and the post-operative blood glucose analysis showed blood glucose below 10 mmol/L where insulin administration was not required. Within 6 h of surgery, 20 (31.7%) of participants started passing flatus and by 12 h, 53 (84%) of the participants were able to pass flatus. Eleven (17.5%) of patients initiated ambulation within 6 h of surgery and by 12 h this rose to 49 (77.8%), 37 (58.7%) of the patients were started on clear fluid within 6 h of surgery and 59 (90.4%) of all patients were able to tolerate clear fluid consumption by 12 h. Comparison between the groups indicates no significant difference in terms of complications, length of stay, pain control and return to function. The intention to treat analysis reveals that there is no significant difference in primary and secondary outcome of both groups.

Conclusion: Kelulut honey is safe to be used as an alternative to conventional carbohydrate loading in patients undergoing abdominal surgery involving the digestive system and its effects on insulin resistance, residual gastric volume and post-operative outcomes are similar with the commercially available carbohydrate loading product.

Supervisor:
Associate Professor Dr. Andee Dzulkarnaen Zakaria

Co-supervisors:
Dr. Mohd Shahrulsalam Mohd Shah,
Dr. Mohd Zulkifli Mustafa,
Associate Professor Dr. Najib Majdi Yaacob,
Dr. Zalina Zahari

RETROSPECTIVE REVIEW OF CLINICOHISTOPATHOLOGIC CHARACTERISTICS OF BASAL CELL CARCINOMA AND SQUAMOUS CELL CARCINOMA IN PATIENTS OPERATED ON AT DEPARTMENT OF PLASTIC SURGERY, HOSPITAL KUALA LUMPUR FROM 2004–2018

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Introduction: Non-melanoma skin cancers (NMSC) are the most common skin cancer worldwide. Highest incidences have been reported among the Caucasian population. Asian countries display a lower prevalence of NMSC, however its onset in the region has been rising over time.

Objective: To study clinical and histopathologic characteristics following surgical excision of basal cell carcinomas and squamous cell carcinomas within the Malaysian population in a tertiary centre.

Method: Histopathology reports of patients diagnosed with basal cell carcinoma (BCC) and squamous cell carcinoma (SCC) were retrieved from the clinic of the Plastic

and Reconstructive Surgery Department in Hospital Kuala Lumpur from 2004 to 2018 and analysed.

Results: A total of 777 patients, with a total of 1,346 lesions were reported from 2004 to 2018. BCC comprised 71.5% (555) and SCC 28.5% (222) of patient cases. A rise in incidence of BCC and SCC cases was observed from 2004 to 2018. Chinese patients made up for the majority of cases for both NMSCs, at 46.8% (260) and 59.4% (132) for BCC and SCC, respectively, followed by Malay patients at 43.7% (242) and 29.2% (65), Indian patients at 4% (23) and 9% (20), and patients of other ethnicities at 5%(29) and 2%(5). Average age of onset for both NMSCs was above 60 years old. Mean size (diameter) of lesions examined was 16.98 mm for BCCs (SD 19) and 30 mm for SCCs (SD 30). For BCC, the nodular variant was the commonest histopathological subtype, making up 81% (742) of all lesions. The majority of SCCs were well differentiated, comprising 46% (198) of all lesions. A total of 866 (64.3%) of all lesions excised achieved adequate margin clearance, that of 63% (577) of BCCs and 67.2% (289) of SCCs. For SCCs, larger lesions > 2 cm were linked to poorer rates of histological margin clearance (adjusted 95% CI: 0.98, 0.99; $P = 0.002$).

Conclusion: Surgical excision remains as the most effective choice of treatment for NMSCs, compared with other existing techniques.

Supervisor:

Professor Dr. Wan Azman Wan Sulaiman

Co-supervisor:

Mr. Mohd Ali Mat Zain

EVALUATION OF SMARTPHONE THERMAL CAMERA IN PERFORATOR DETECTION: PREOPERATIVE FLAP PLANNING USING DYNAMIC INFRARED THERMOGRAPHY

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Kelantan, Malaysia

Introduction: Thermography with the FLIR One Pro smartphone attached Infrared camera has increasingly been used in clinical practice for perforator selection and flap planning.

Objectives: The aim of this study is to compare three different methods of thermography using the FLIR One Pro Infrared camera against traditional handheld acoustic ultrasound doppler (HHD) to detect perforators on commonly used perforator flap donor sites: deep inferior epigastric perforator flap (DIEP) and anterolateral thigh flap (ALT).

Methods: In this prospective cross sectional concordance study, forty DIEP and eighty ALT donor sites on volunteers were examined using a standardised protocol for thermography. Three methods were used for hotspot detection; dynamic infrared thermography using fan cooling (DIRT 1), ice pack (DIRT 2) as cold challenges and static infrared thermography (SIRT). Their accuracy and reliability

were compared against hand held doppler (HHD) signals as a gold standard. The influence of temperature on hotspot and distribution of hotspots detected on each method were quantitatively and qualitatively analysed.

Results: DIRT 1 with fan cooling has the highest accuracy for HHD signal detection (overall PPV 98.4%; first appearing hotspot (FAH) PPV 99.4; sensitivity 68.9%) versus DIRT 2 with ice cooling (overall PPV 97.8%; FAH PPV 98.1%; sensitivity 65.7%) and SIRT (overall PPV 96.6%; FAH PPV 98.9%; sensitivity 65.1%). All methods are highly reliable (ICC >0.9; $P < 0.001$). There is no overall correlation between the temperature difference of the cooling methods with number of hotspots detected however ice pack cooling (DIRT 2) resulted in highest incidence of subject reported discomfort (8.3%). SIRT results in a higher ratio of FAH/ total hotspots detected compared to DIRT 1 with fan and icepack cooling (31.5% versus 27 % and 25.85%). Fan cooling provides more uniform cooling and rewarming pattern, compared to ice pack resulting in better distribution of hotspots. FLIR One Pro camera allows modification to SIRT technique to simulate and achieve comparable accuracy to DIRT.

Conclusion: DIRT 1 with fan cooling is the better method compared to DIRT 2 with ice cooling and SIRT for perforator detection with FLIR One PRO. Qualitative assessment of matching hotspots provides additional value to improve accuracy of flap planning. Second appearing hotspots (SAH) are not negligible entities in flap planning using thermography.

Supervisor:

Professor Dato Dr. Ahmad Sukari Halim

Co-supervisors:

Dr. Chai Siew Cheng,

Dr. Siti Fatimah Noor Mat Johar

FUNCTIONAL OUTCOMES OF FREE MUSCLE TRANSFER FOLLOWING ONCOLOGICAL RESECTION IN EXTREMITY SARCOMA: A COMPARISON STUDY BETWEEN NEUROVASCULARISED AND NON NEUROVASCULARISED FLAPS

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Introduction: Wide margin surgery combined with adjuvant radiotherapy has become the mainstay of treatment in extremity sarcomas, even in large sarcomas. Free muscle transfers are usually indicated for reconstruction of major defect following massive oncological resection. Apart from soft tissue coverage, functional restoration is possible by motorising the recipient motor nerve of the muscle flap.

Objectives: We aim to determine and compare the functional outcomes of neurovascularised and non neurovascularised free muscle transfer following oncological resection in extremity sarcoma.

Methods: This was a retrospective cohort study to determine and compare the functional outcomes between neurovascularised and non-neurovascularised flaps, as well as the donor site morbidity who had undergone free muscle transfer following oncological resection surgery for extremity sarcoma. Functional outcomes of the surgery were then determined based on clinical examination, including muscle power and range of motion (ROM) of the affected extremity; and questionnaires, including the Musculoskeletal Tumour Society (MSTS) score, Lower Extremity Functional Scale (LEFS) and QuickDASH (Disabilities of Arm, Shoulder and Hand) questionnaire.

Results: A total of 16 patients (11 males and 5 females) with a median age of the patients was 33 years old were recruited for this study. All the patients had lesions in the lower extremity and were reconstructed with a free latissimus dorsi muscle flap. Overall functional outcome ranged from excellent to fair (median MSTS score of 26 and median LEFS score of 57), with muscle strength of replace muscle of at least M3 in all but two patients. There were no significant association in the functional outcomes between both neurovascularised and non neurovascularised groups. There was only one patient with minor donor site complication (seroma) and functional outcome of the donor site was acceptable.

Conclusion: The functional outcomes of limb salvage surgery are shown to be good to excellent, however there is no significant difference between the type of free muscle transfer in the reconstruction of the resected muscle compartment in our study. This result implied that functional neurovascularised muscle flap in major resection also achieved good functional outcome. Donor site morbidity for latissimus dorsi muscle harvest is acceptable, but not negligible with limited to no functional limitations in activities of daily living.

Supervisor:
Professor Dr. Wan Azman Wan Sulaiman

Co-supervisor:
Professor Dr. Wan Faisham Nu'man Wan Ismail

A COMPARATIVE STUDY ON SUCCESS RATE AND PROCEDURE RELATED MORBIDITY OF PERCUTANEOUS TRANSHEPATIC BILIARY DRAINAGE AND ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY FOR BILIARY DRAINAGE IN HUSM

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Introduction: Biliary sepsis or stasis is one of the most common problem encountered in a daily basis practice in general surgery. Early intervention is required to reduce the mortality and morbidity in this group of patient.

Objectives: To determine the overall outcome with success rate and procedure related morbidity of percutaneous transhepatic biliary drainage and endoscopic retrograde cholangiopancreatography for biliary drainage in Hospital Universiti Sains Malaysia (HUSM) in years 2019–2020. There are aetiological factors that should be considered in choosing either one of these procedures hence this study is performed to identify these factors, to ensure appropriate early intervention in order to achieve less morbidity and mortality in biliary sepsis or obstructed patient.

Methods: This is a retrospective study of case record of patients diagnosed with biliary sepsis or obstruction in Hospital Universiti Sains Malaysia from 1st January 2019 to 31st December 2020. Subjects who met the inclusion criteria were recruited in this study. The outcome of PTBD and ERCP, aetiological factors leading to its failure were studied. The data were analysed using Statistical Package for the Social Sciences (SPSS) version 27.0.

Results: During the period of study, 83 patients were included in this study. Median age of patient involved in biliary drainage was 58.8 years old in PTBD and 60.6 years old in ERCP. While 71.4% of patients were male in PTBD arm compared with 53.7% patients in ERCP group who underwent biliary drainage. About more than 95% (97.6% - PTBD and 95.1% - ERCP) of patients were Malay in origin, followed by Chinese 2.4% in PTBD and 4.6% in ERCP arm. No significance differences observed in premorbid conditions of both arms. While on clinical presentation to hospital, most patients have right hypochondriac pain, jaundice and fever in both arms with no significant *P*-value in comparison. However significant symptoms for malignancy was noted in 23 (54.8%) patients in PTBD arm with *P*-value < 0.001. The mean length of hospital stay was 4.9 days and 6.9 days for ERCP and PTBD, respectively with *P* = 0.102. Finally the success rate in ERCP arm higher compared PTBD (87.8 versus 78.6%) although no significant *P*-value difference was observed. Multiple logistic regressions demonstrated that only malignancy factor has significant association with success of PTBD with *P*= 0.039. Meanwhile in ERCP arm, none of these variables were significant (*P*-value < 0.001) after the multiple logistic regression. However when compared factors contributing to success ERCP over PTBD using multiple logistics regression, the variable that were significant (*P*-value < 0.05) were malignancy (*P* = 0.009), ALT (*P* = 0.003) and ultrasound findings for stone (*P*-value = 0.011).

Conclusion: In this study overall result shows similar success and complication rate between ERCP and PTBD although ERCP arm slightly higher. When look into superiority between this two procedures, ERCP shows better outcome in biliary drainage with the background of malignancy, raised ALT and imaging findings for stone.

Supervisor:
Associate Professor Dr. Ikhwan Sani Mohamad

3D PHOTOGRAMMETRY OF FACIAL ATTRACTIVENESS IN MALAYSIAN MALAY MEN

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Introduction: Facial proportion is a geometric feature that plays a role in attractiveness. This study was carried out to determine the standard and attractive facial anthropometric measurement of Malaysian Malay men (MMM)'s face. The validity of the neoclassical canon and its variation was tested for our population.

Objectives: To determine the attractive facial anthropometric features in MMM using photogrammetry; to establish normative facial anthropometric values for MMM, to assess the validity of neoclassical facial canons and their variations in MMM, to compare 2-dimensional photogrammetry with 3-dimensional imaging of face in MMM and to identify facial regions that contribute to attractive face among the MMM.

Methods: The study involved the acquisition of two-dimensional (2D) digital photogrammetry and three-dimensional (3D) imaging of 97 subjects aged between 18 to 40 years with a mobile phone. Thirteen standard anthropometric measurements were taken and tested against six neoclassical canons. Images were evaluated to establish the attractive MMM face by taking the top 15 percentage rating.

Results: MMM face has a broader nose with shorter height, higher ear length to nose height, and wider interocular distance to palpebral distance. The neoclassical canon was not valid for our population. Comparison between methods for image acquisition between 2D photogrammetry and 3D imaging showed no statistically significant difference with P -value of < 0.05 . Attractive facial features of the MMM includes a smaller lower face height, narrower and longer nose, smaller interorbital distance, with a slimmer cheek and jaw size.

Conclusion: Facial measurements and neoclassical canon variation of the MMM are similar to other Asian ethnicities and differ from the Caucasian face. 3D imaging is a valid substitute for 2D photogrammetry. MMM with a smaller lower face height, narrow and longer nose, shorter interorbital distance, with a narrow cheek and jaw are more attractive.

Supervisor:
Dr. Siti Fatimah Noor Mat Johar

Co-supervisor:
Dr. Nur Azida Mohd Nasir

ESTIMATION OF TOTAL BODY SURFACE AREA BURNED—A COMPARISON BETWEEN BURN UNIT AND REFERRING FACILITIES

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Introduction: Accuracy of burn size estimation is critical in acute burn management which directly affects the patient's outcome and prognosis.

Objectives: This study aims to quantify the discrepancies of TBSA (Total Body Surface Area) calculated by the Burn Unit staffs (TBSAb) and the personnel from the referring facilities (TBSAr).

Methods: A retrospective review of all referred adult and pediatric patients admitted to the Hospital Universiti Sains Malaysia (HUSM), Burn Unit within 24 h post burn was performed from years 2015 to 2019. Percentage TBSA discrepancies were calculated the difference between TBSAb and TBSAr.

Results: A total of 208 patients (111 adults and 97 pediatrics) were recruited in this study. Of these, the measurements were 60.58% overestimated, 13.46% underestimated and 7.69% accurate. A total of 18.27% of the referrals had no TBSAr stated. The %TBSA discrepancy was the highest in severe burns with mean difference of 10.80 in adults and 7.59 in paediatrics ($P < 0.001$). Time interval between referral and reassessment and patients' BMI were not statistically significant for magnitude of TBSA discrepancies. Number of burn areas involved correlated with the %TBSA discrepancies with the highest recorded discrepancy being 21.50 in whole body involvement.

Conclusion: There was significant discrepancies of TBSA estimation between the referring facilities and that of the HUSM Burn Unit. Implementation of educational programs by the burn care experts and agreement of a universal method of TBSA assessment are deemed necessary in reducing the discrepancies. Accurate TBSA estimation serves as an important course for the development of a universal tool for fast and accurate TBSA estimation even in the hands of inexperienced medical staffs.

Supervisor:
Professor Dr. Ahmad Sukari Halim

Co-supervisors:
Professor Dr. Wan Azman Wan Sulaiman,
Dr. Siti Fatimah Noor Mat Johar

ASSESSMENT OF EAR POSITION IN MALAYSIAN MALAY POPULATION IN KUALA LUMPUR

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Introduction: The external ear is one of the most prominent features of the face. The auricular appearance and symmetry contribute to facial aesthetics. Any defect of the auricle such as disproportionate size, abnormally long lobe or missing parts are easily noticeable. Its shape and size vary between sex, age and ethnic origin.

Objective: This study seeks to establish anthropometric ear position norm in Malay population.

Methods: It is a prospective, cross-sectional and observation study, 11 anthropometric parameters were taken for left and right ears.

Results: Mean left n-obs for male is 116.37 ± 13.09 mm, for female is 109.74 ± 4.29 mm, mean left n-obi for male is 122.65 ± 5.4 mm, for female is 109.74 ± 4.28 mm, mean left gn-obs for male is 157.43 ± 13.34 mm, for female is 141.71 ± 6.8 mm, mean left gn-obi for male is 123.63 ± 10.47 mm, for female is 113.35 ± 6.04 mm, mean right n-obs for male is 121.70 ± 4.44 mm, for female is 113.68 ± 6.01 mm, mean right n-obi for male is 123.66 ± 6.38 mm, for female is 116.01 ± 5.34 mm mean right gn-obs for male is 159.12 ± 9.22 mm, for female is 146.12 ± 7.27 mm, mean right gn-obi for male is 125.05 ± 10.25 mm, for female is 114.63 ± 6.06 mm. Nasoaural canon is valid for 96.8% of male and 100% of female, naso-aural inclination is valid for 71% of male and 62.5% of female.

Conclusion: Ear size and location are affected by gender and ethnicity. Males not only have larger ears than females, but they also have larger insertion and longer ear to facial midline landmark distance.

Supervisor:
Professor Dr. Wan Azman Wan Sulaiman

Co-supervisor:
Dr. Salmi Mohamed Sukur

EVALUATION OF THE DRY EYE DISEASE PARAMETERS WITH EXPOSURE TO DRY ERASE INK AMONG SCHOOL TEACHERS

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Introduction: Previously, school teachers write on blackboards using chalk. Chalk produces a lot of dust which accumulates on surfaces and causing irritating respiratory tract symptoms when inhaled. Therefore, almost all schools

nowadays substitute the chalkboards with whiteboards. Dry-erase ink is a type of ink used in most whiteboard marker pen which contain volatile solvent vehicle that easily vaporises allowing the mark to dry on the surface. Most whiteboard markers use dry-erase ink which easily vaporises allowing the mark to dry on the surface of the whiteboard. The solvents used in dry erase ink can cause irritation to the eyes, especially to school teachers using whiteboard.

Objectives: To evaluate the effect of dry-erase ink marker usage among school teachers towards the dry eye disease parameters including tear film breakup time (TBUT), Schirmer test and ocular surface disease index (OSDI) score.

Methods: A cross-sectional study was conducted from June 2020 to December 2021 involving 116 school teachers and 145 control subjects. Assessment include demographic data, average of hours of teaching in a day and a week for school teachers, TBUT test, Schirmer test and OSDI score among school teachers and control subjects. Dry eye disease was defined as OSDI score more than 12, and either TBUT less than ten seconds or Schirmer test less than 6 mm in 5 min or both. Statistical analysis was done using SPSS version 26.0.

Results: There were 116 school teachers with mean age of 48.0 year-old and 145 control subjects with mean age of 42.0 year-old involved in this study. There was statistically significant difference of OSDI score and TBUT results among school teachers compared with control subjects ($P < 0.01$). However, there was no significant difference in Schirmer test results. There was no statistically significant relationship between hours of teaching with the TBUT test ($P = 0.450$) and Schirmer test ($P = 0.327$). There was no significant relationship of OSDI score with the TBUT test ($P = 0.629$) and Schirmer test ($P = 0.230$) among school teachers or control group ($P = 0.225$, $P = 0.840$).

Conclusion: Ocular surface integrity and tear film are not affected by usage of dry-erase ink marker among school teachers. However dry eye among school teachers can affect the quality of work and classroom learning.

Supervisor:
Professor Dr. Mohtar Ibrahim

Co-supervisor:
Dr. Rohana Abdul Rashid

OUTCOMES OF TRAUMATIC BRAIN INJURY IN AGED 60 YEARS OLD AND ABOVE; A SINGLE CENTRE: RETROSPECTIVE STUDY

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Introduction: Traumatic brain injury (TBI) is one of the major causes of mortality and morbidity in Malaysia. The elderly is at risk for TBI, but their outcome following these injuries remain unclear. We aim to provide further insight on the prognosis factor as well guide us in managing older patients with TBI.

Objectives: We aim to evaluate functional outcomes of patients in aged 60 years old and above by using GOS. Further, to compare the functional outcome and mortality rates of TBI in each severity and associated factors contributing to poor outcomes.

Methods: This retrospective study carried out in department of Neuroscience, Hospital Universiti Sains Malaysia, Kubang Kerian, Kelantan. Patients aged 60 years old and above with mild-to-moderate-to-severe TBI between June 2018 to May 20210 were included in the study. Their functional outcome and mortality at discharge, 30th day and 90th day of trauma was reviewed.

Results: A total of 248 patients fulfilled the criteria for this retrospective study. The mean age of the TBI patients were 67.5 years old. Of the 248 patients, 156 (62.9%), 26 (10.5%) and 66 (26.6%) had mild, moderate and severe TBI, respectively. There was a statistically significant difference in GOS outcomes after 90 days $\chi^2(2) = 136.76, P < 0.001$. There was a significant association of aetiology of TBI (crude OR 5.54; 95% CI: 2.23, 13.56; $P < 0.001$), multitrauma (crude OR 5.54; 95% CI: 2.23, 13.56); $P < 0.001$, GCS level (crude OR 0.27; 95% CI: 0.180.41; $P < 0.001$), moderate TBI (crude OR 145.44; 95% CI: 29.02, 729.07); $P < 0.001$, SDH (crude OR 0.23; 95% CI: 0.13, 0.43; $P < 0.001$) and SAH (crude OR 0.06; 95% CI: 0.010.28; $P < 0.001$) with poor outcomes. There was a significant association of multitrauma (crude OR 16.40; 95% CI: 4.73, 56.86; $P < 0.001$), mortality (crude OR 0.68; 95% CI: 0.59, 0.79; $P < 0.001$), moderate level TBI (crude OR 36.91; 95% CI: 4.11, 331.36); $P = 0.001$ and severe level TBI (crude OR 58.13; 95% CI: 7.56, 446.81); $P < 0.001$ and mortality among the patients.

Conclusion: Multitrauma and moderate-severe head injury are associated with poor functional outcome and high mortality rate. CT imaging with SDH and SAH are significantly associated with poor GOS. It is important for us to be of high vigilance to old adults who came in with good neurological condition initially as they may deteriorate suddenly.

Supervisor:

Professor Dato' Dr. Abdul Rahman Izaini Ghani

Co-supervisors:

Dr Ang Song Yee,

Dr. Bazli Md Yusoff

TRANEXAMIC ACID AS ANTI-FIBRINOLYTIC AGENT IN NON-TRAUMATIC INTRACEREBRAL HAEMORRHAGE (TANICH II)

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Introduction: Spontaneous intracerebral haemorrhage (ICH) can be devastating, particularly if haematoma expansion occurs. Efficacy of tranexamic acid

(TXA), an antifibrinolytic agent, in reducing hematoma expansion is now being studied worldwide, with promising results. However, the optimal dosage of tranexamic acid is yet to be determined.

Objective: This study was designed with the purpose to further establish the potential of different doses of TXA, together with strict blood pressure (BP) control, in reducing haematoma expansion in patients with spontaneous ICH. Possible TXA adverse reactions were also being monitored, as a higher dosage of TXA was being used in this clinical trial.

Methods: Single-blinded, randomized, placebo-controlled trial was carried out among adults with spontaneous ICH. Recruitment was done in two main tertiary hospitals in Kota Kinabalu, Sabah, Malaysia. Sixty eligible study subjects were randomly assigned to receive either placebo, 2 g TXA treatment (1 g slow bolus over 10 min followed by 1 g infusion over 8 h) or 3 g TXA Treatment (1 g slow bolus over 10 min followed by 2 g infusion over 8 h). Study group randomization was done via permuted block. All study subjects were blinded. Strict BP monitoring and optimisation were ensured throughout the study (target systolic BP < 140 mmHg–160 mmHg) using labetalol infusion; or other options of anti-hypertensives; if indicated. haematoma volumes before and after intervention were measured using planimetric method and documented.

Results: We did not find statistically significant difference in the mean haematoma volume at presentation, as well as upon completion of study, among the three study groups. Nevertheless, haematoma volume reduction was seen in 3 out of 20 subjects in the placebo group; 8 out of 20 Subjects in the 2 g TXA group; and 14 out of 20 subjects in the 3 g TXA group. Overall analysis, moreover, revealed slightly more obvious mean haematoma expansion in the placebo group (1.77 cm³) and 2 g TXA group (0.32 cm³); whereas mean haematoma reduction was seen in the 3 g TXA group (0.18 cm³, $P = 0.751$), along with strict SBP optimisation (140 mmHg–160 mmHg). However, there was no statistically significant correlation observed between acute reduction of SBP and hematoma expansion; also between WBC count and the volume of haematoma. Similarly, GOS and mRS assessment at 30 days after ICH revealed no major difference among the placebo and TXA treatment groups.

Conclusion: To our knowledge, this is the first clinical trial using 3 g TXA in the management of spontaneous ICH. Haematoma volume reduction in individual cases seemed to be more obvious in the 3 g TXA group (14 out of 20 subjects), along with strict SBP optimisation (140 mmHg–160 mmHg). Giving the promising finding, future research targeting a larger study population or multicentre recruitment, with a longer interval of post-intervention mRS assessment, may provide stronger evidence for the clinically significance benefit of TXA along with strict SBP optimisation, and further determine the optimal dosage of TXA in the management of ICH.

Supervisor:

Professor Dato' Dr. Jafri Malin Abdullah

Co-supervisors:

Professor Dr. Zamzuri Idris,

Datuk Dr. Pulivendhan Sellamuthu,

Dr. Ananda Arumugam

A CADAVERIC STUDY OF SUPERIOR SAGITTAL SINUS & ITS DRAINING VEINS IN SABAH POPULATION

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Introduction: The superior sagittal sinus and its draining veins are important venous structure that pose a formidable obstacle to surgical management. It is crucial and essential for the surgeon to acquire the knowledge of the normal course and variations of the sinus and draining veins for pre-operative planning and executing pre-operative measures/maneuvers needed to minimise blood loss or injuries to the sinus during surgery. Hence, this study was conducted to delineate the microsurgical anatomy of the superior sagittal sinus for better planning and a more focused surgery. This study was based on dissection of fresh cadavers.

Objectives: To study the anatomy of superior sagittal sinus and its draining veins and its correlation with neurosurgical landmarks and craniometric points

Methods: Thirty fresh cadavers were examined in Forensic Department, Hospital Queen Elizabeth, Sabah between August 2020 and June 2021. They were anatomically analysed and studied through a data collection sheet. All data were analysed using Statistical Package for the Social Science (SPSS).

Results: The study revealed that male was predominantly significant and 43% were of Bajau race. Fifty percent of cadavers were around the 50 years old–60 years old age group. The position of superior sagittal sinus (SSS) was variable and within 1cm distance from the midline. The origin of SSS varied from at the foramen caecum to posterior for the foramen caecum. The total length of SSS averages around 321 mm–351 mm. The number of draining veins on the right and left side of SSS were divided into anterior, middle and posterior components with an average of 3 to 6 veins, respectively, on each side. The number of venous lacunae on the right and left side of SSS were divided as well into anterior, middle and posterior components with an average of 1–2 venous lacunae on each side, respectively. The central sulcus was located 48.87 mm posterior to coronal suture and 131.1 mm anterior to the lambdoid suture. The Trolard vein was located 53.56 mm posterior to coronal suture and 127.36 mm anterior to the lambdoid suture. The Trolard vein was situated in average 3.68 mm posterior to central sulcus and predominantly drains into the venous lacuna. Ninety percent of SSS terminate on the right of the transverse sinus. The position of torcula varies from the location on the external occipital protuberance to slightly on the right side of the external occipital protuberance.

Conclusion: This study shows that anatomical landmarks among the local population does not differ significantly from that reported by other studies throughout the world. Therefore the basic neurosurgical principles and

craniometric points outline universally is applicable to this population without the need for any modifications.

Supervisor:
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Co-supervisors:
Dr. Ananda Arumugam,
Dr. Mohd Sofan Zenian

MRI IMAGING IN ASSESSING THE VIABILITY OF NASOSEPTAL FLAP POST ENDOSCOPIC TRANSSPHEOIDAL SURGERY

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Introduction: Nasoseptal flap has proven to be a reliable and versatile flap that can readily reconstruct majority skull base defects especially in transsphenoidal pituitary surgery. It has shown successful closure of 94% of high-flow CSF intraoperative defects and the incidence of postoperative CSF leak has reduced substantially from 20% to 5%. While flap failure remains a rare complication, the consequences of it can be severe including CSF leak, flap necrosis and meningitis which increases patient morbidity, mortality, and need for revision surgery.

Objectives: Hence the aim of this study is to use MRI as a tool for detail analysis of this HG flap to evaluate the postoperative MR imaging appearance for its viability and determine the variations like enhancement, thickness and displacement in MRI that may suggest potential flap failure. These findings are also related with endoscopic assessment for its viability and the comparison between both modality been made.

Methods: We performed a single center prospective cohort study between 18 March 2020 and 17 March 2021 in Hospital Kuala Lumpur where 40 patients who had pituitary macroadenoma who underwent endoscopic transsphenoidal surgery were evaluated post-operatively 1 month–2 months with MRI imaging to assess the viability of the hadad flap and determine the variation. The outcomes of flap enhancement postoperative via MRI, post-operative flap thickness, migration and CSF leak were compared with endoscopic assessment. The statistical analysis was performed using SPSS version 23.0. Cross-tabulations was performed to study the sensitivity and specificity of MRI and endoscopy. Fisher's exact test was performed to determine the associations of the study outcome.

Results: The mean age of the study participants are 48.33 years old (SD 14.05). Of the 40 patients, the majority of patients were female (57.5%), Malay (60%) and had at least a comorbidity (57.5%). The majority of the patients (85%) had no displacement of the flap and 95% had no CSF leak. All the patients had flap enhancement as detected via MRI.

Details detected via the endoscopy indicates that 82.5% of patient had a pink flap, 90% had no displacement and 95% had no CSF leak. The result indicates the MRI's sensitivity for detecting displacement is 66.7% and the specificity was 100%. The association between displacement or migration of the flap via MRI and the migration or displacement via endoscopy was statistically significant ($P < 0.001$). The result also indicates that the MRI correctly picked up all cases of CSF leakage as compared to the endoscopy procedure. The sensitivity and specificity of the viability of the flap detected shows that MRI correctly detected 82.5% of the viable flaps correctly but it could not pick up the non-viability of the flaps compared to endoscopy method. The association of the overall result indicates that there is a significant association between MRI an endoscope result ($P < 0.001$).

Conclusion: MRI is a very useful tool in assessing the viability of the flap postoperatively and to evaluate for variations that may suggest potential flap failure. Being an imaging tool which provide an objective assessment of the flap and it also shows better sensitivity in comparison to endoscopy where it accurately detects 91.2% of healthy flaps and 83.3% of unhealthy flaps. Therefore it should be noted that post-surgical visualisation via MRI provides comparable visualisation, thereby lowering the risk of surgical complications

Supervisor:
Prof. Dr. Zamzuri Idris

Co-supervisors:
Mr. Azmi Alias,
Dr. Kartikasahwah Abd Latif

A PILOT OBSERVATIONAL STUDY OF INTRAOPERATIVE ULTRASOUND IN BURRHOLE SURGERY FOR CHRONIC SUBDURAL HAEMORRHAGES

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Introduction: This study is to evaluate the role of intraoperative ultrasound in determining clearance of chronic subdural haemorrhage in burrhole surgery, and its predictive value in determining early recurrence.

Objectives: The specific objective is to compare intraoperative ultrasound and postoperative CT brain imaging in predicting early recurrence of chronic subdural haemorrhages. Other objectives include characterising intraoperative ultrasound findings for chronic subdural haemorrhage and frequency of complete clearance of haemorrhage using ultrasound.

Methods: This is a pilot observational single armed study with a total of 25 patients undergoing burrhole surgery for the diagnosis of chronic subdural haemorrhages. An intraoperative ultrasound examination is performed prior

to and following irrigation of the subdural space via the burrhole. Postoperative subperiosteal drainage is utilised, with CT imaging within 48 h performed. The patients are then followed up for 3 months following discharge, with clinical recurrences noted.

Results: This study had a 16% overall recurrence rate and an 8% mortality rate at 3 months. We found that intraoperative ultrasound clearance was more significantly associated with nonrecurrence of chronic subdural haemorrhages compared to CT imaging, though barely missed reaching significant ($P = 0.053$), but with a significant odds ratio relationship (OR = 0.476; 95% CI: 0.304, 0.746). There was an improvement in clinical outcomes in terms of mRS score from 1.80 at discharge to 1.33 at 3 months.

Conclusion: Intraoperative ultrasound determined clearance is more predictive than early postoperative CT (computerised tomography) brain imaging for the non-recurrence of chronic subdural haemorrhage.

Supervisor:
Professor Dr. Zamzuri Idris

Co-supervisor:
Mr. Albert Wong Sii Hieng

CLINICAL AND RADIOLOGICAL PRESENTATION OF GLIOMA PATIENTS TESTED FOR ISOCITRATE DEHYDROGENASE (IDH) AND METHYL GUANINE METHYL TRANSFERASE (MGMT) PROMOTER METHYLATION

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Introduction: Advancement of medical field has led to the molecular classification of tumours for better accuracy and prognostic evaluation. In the World Health Organization (WHO) Classification of Central Nervous System Tumor 2016, glioma was divided based on its isocitrate dehydrogenase (IDH) mutation and further divided based on their methyl guanine DNA methyl transferase (MGMT) promoter methylation status. The aim of this study is to establish any correlation between MGMT promoter methylation status with clinical and radiological presentation of patients with glioma.

Objectives: The objectives are divided into general objective and specific objectives. Our general objective is to describe patients with MGMT promoter methylation status glioma with clinical presentation and radiological findings. Our specific objectives are to describe and correlate seizures in patient with MGMT promoter methylation status glioma, to describe and categorised the imaging of patients with MGMT promoter methylation status glioma and to assess the outcome related to MGMT promoter methylation status glioma.

Methods: Twenty-three patients whom was operated from 2009 until 2017 for glioma and the sample was archived using formalin-fixed paraffin embedded whom has been screened for MGMT promoter methylation status were included in this retrospective study. The case notes were traced and patients were categorized into two groups according to their MGMT methylation status. Patients demographic data was identified and categorised by age, gender, race and patients comorbidities. The clinical presentation was categorised into presence of seizure and the Karnofsky performance score (KPS) on first hospital presentation. Radiological presentation was categorised based on the laterality and the location of the tumour, presence of haemorrhage and degree of cerebral oedema. These data will be divided based on each respective MGMT status. The patients outcome will be measured as KPS on the last documented follow up in the clinic or the ward.

Results: Fifty percent of methylated MGMT promoter patients has no seizure with another 40% was on single antiepileptic and another 10% needs multiple antiepileptic while 53.8% of unmethylated MGMT promoter patients did not have seizures, 46.2% of patients needing single antiepileptic agent ($P = 0.656$). During initial presentation, 70% of methylated MGMT promoter patient has KPS > 70 while 53.8% of unmethylated MGMT presented with KPS score of > 70 ($P = 0.431$). In term of radiological findings, 50% of methylated MGMT promoter glioma patients tends to have tumour over the left side, 30% on the right side and remaining 20% is in the midline. 46.2% of unmethylated MGMT promoter glioma group has tumor over the right side and left side and the remaining 7.7% was in the midline ($P = 0.591$). Also 50% of methylated MGMT promoter patients has a tendency of developing tumour at the frontal lobe followed by temporal lobe (20%), while in the unmethylated MGMT group, frontal lobe has 38.5% of tumor followed by 30.8% in the temporal lobe and 23.1% in others ($P = 0.433$). 80% of methylated MGMT promoter patient has cerebral oedema: tumour ratio of > 3 while its all of its unmethylated MGMT promoter counterparts develop cerebral oedema: tumour ratio of > 3 ($P = 0.192$). Haemorrhage are present in 60% of patients with methylated MGMT promoter while 76.9% of unmethylated MGMT promoter glioma patients have tumoral haemorrhage ($P = 0.382$). There are statistically significant different in the outcome ($P = 0.046$) as 70% of patients with methylated MGMT promoter glioma has KPS of < on their last follow up with 30% mortality and median of 30 weeks while 53.8% from the unmethylated group has KPS < 70 with mortality of 23.1%.

Conclusion: Based on our study, there are no significant correlation between MGMT promoter methylation glioma with patients clinical presentation and radiological findings. However in view of our study limitation, a further study is suggested involving multicentre to gain a higher sample population in order to gain a better yield.

Supervisor:

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Co-supervisor:

Dr. Regunath Kandasamy,

Dr. Farizan Ahmad

EXPRESSION OF MMR PROTEINS AND THEIR RELATIONSHIP TO FIGO STAGING IN PATIENT WITH ENDOMETRIAL CARCINOMAS OF ENDOMETRIOID TYPE IN HOSPITAL QUEEN ELIZABETH, KOTA KINABALU, SABAH

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Introduction: Endometrial carcinoma is the most common carcinoma arising from the endometrium. The classification of endometrial carcinoma has been updated several times since it was first introduced by Bokhman in 1983. In the latest WHO classification of tumours for the female genital tract, molecular subtypes were included to help in stratifying the prognosis of high-grade endometrial carcinoma. The Cancer Genome Atlas Research Network identified four integrated genomic characterisation groups. Group 1, with POLE mutations, has a good prognosis; group 2, with microsatellite instability (MSI), has an intermediate prognosis; group 3, with low-copy-number alterations, also has an intermediate prognosis; and group 4, with high-copy-number alterations and TP53 mutations, has a poor prognosis. Microsatellite instability occurs when there is an error in mismatch repair proteins during DNA replication. The aim of this study was to look at the expression of mismatch repair (MMR) proteins particularly on MLH1 and MSH2 in endometrioid endometrial carcinoma (EEC) and its association with the FIGO staging. The expression of the MMR proteins in EEC was determined by assessing its expression using immunohistochemistry (IHC).

Objectives: The general objective for this study is to study the expression of mismatch repair proteins particularly on MLH1 and MSH2 using immunohistochemistry in endometrioid endometrial carcinoma and its association with FIGO staging in Hospital Queen Elizabeth, Kota Kinabalu, Sabah. While the specific objectives are to determine the association between MLH1 and MSH2 expressions with FIGO staging in endometrioid endometrial carcinoma.

Methods: This was a cross-sectional study conducted from January 2015 until December 2020 on patients diagnosed with EEC at Hospital Queen Elizabeth, Kota Kinabalu, Sabah. The expression of the MMR protein was assessed using IHC staining. The MMR proteins studied were MLH1 and MSH2. The nuclear staining pattern was then assessed. Any tumour cells with more than 1% of any intensity were interpreted as positive and considered to have no mismatch repair protein defects. The relationships between the expression of MLH1 and MSH2 with FIGO staging then analysed using Pearson's chi-square test and Fischer's exact test. The strength of association between variables and MLH1 and MSH2 proteins was considered statistically significant when the P -value was less than 0.05.

Results: A total of 118 cases of EEC were recruited. Loss of expression of MLH1 was significantly associated with advanced FIGO stage ($P = 0.001$) and absence of

lymphovascular invasion (LVI) ($P = 0.044$). In contrast, no significant association was found between MLH1 expression and other clinicopathological characteristics such as age, ethnicity, tumour grade and depth of myoinvasion. On the other hand, MSH2 expression did not show any significant association with any of the clinicopathological parameters studied.

Conclusion: Loss of expression of MLH1 was significantly associated with advanced FIGO stage and the absence of LVI. There was no significant association between MSH2 expression and any of the clinicopathological parameters. Thus, MMR proteins could be reliable markers to predict prognosis in endometrioid endometrial carcinoma.

Supervisor:

Associate Professor Dr. Md Salzihan Md Salleh

Co-supervisor:

Dr. Angeline Madatang

EXPRESSION OF FOXP3⁺ TREGS AND ITS ASSOCIATION WITH THE STAGE AND GRADE OF COLORECTAL CANCER PATIENTS IN HOSPITAL SULTANAH BAHYIAH AND HOSPITAL UNIVERSITI SAINS MALAYSIA.

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Introduction: The roles of regulatory T-cells (Tregs) expressing the transcription factor forkhead-box protein P3 (FoxP3⁺ Tregs) have been established in various types of cancer. However, their role in colorectal cancer (CRC) is still debated. FoxP3⁺ Tregs have been postulated to play a vital role in inhibiting the protumorigenic effect of Th17 cells in CRC, leading to a favourable prognosis. In contrast, others found that FoxP3⁺ Tregs promote tumour growth in CRC by hindering the antitumour immune response. Thus, the prognostic relevance of these FoxP3⁺ Tregs in CRC remains controversial.

Objectives: This study aims to determine the expression of FoxP3⁺ Tregs in colorectal cancer and evaluate its association with the stage and grade of CRC in Hospital Sultanah Bahiyah (HSB) and Hospital Universiti Sains Malaysia (HUSM).

Methods: This cross-sectional study involved 202 CRC cases diagnosed in two tertiary hospitals; HSB and HUSM, between January 2017 and December 2019. The clinicopathological characteristics were obtained from the electronic Hospital Information System (eHIS) at HSB and the Laboratory Information System (LIS) at HUSM. The formalin-fixed paraffin-embedded (FFPE) colorectal cancer tissue blocks were retrieved from the pathology archives. Sectioned samples were stained immunohistochemically with FoxP3 antibody to highlight the brown colour of the nuclei of FoxP3⁺ Treg cells. The evaluation of the expression

of FoxP3⁺ Tregs infiltration within the tumour stroma was assessed using Sinicrope method at the most representative areas within the intra- and peri-tumoural stroma under light microscopy at 10 high power fields (400× magnification). The FoxP3⁺ Tregs expression was divided into a low and high group using the median value (19.7) as a separating point. The association between the expression of FoxP3⁺ Tregs and the clinicopathological characteristics of CRC was statistically analysed using the Pearson's chi-square test and Fischer's exact test. A level of significance of less than 0.05 ($p < 0.05$) was considered as statistically significant.

Results: The median value of FoxP3⁺ Tregs counted was 19.7 (17.8) cells per high power field (average number from 10 high power fields calculated). Using the median to classify between high and low expression groups, there were 102 (50.5 %) cases that showed high expression and 100 (50.5 %) cases with low expression of FoxP3⁺ Tregs within the intra- and peritumoural stroma of CRC. There was a significant association found between the expression of FoxP3⁺ Tregs with the pathologic T stage ($P = 0.001$), status of nodal metastasis ($P = 0.025$) and Modified Dukes Stage ($P = 0.032$). In contrast, no significant association was found between the expression of FoxP3⁺ Tregs and other clinicopathological characteristics such as age, race, gender, tumour grade, tumour location, resection margin involvement, diabetes mellitus, hypertension or smoking status.

Conclusion: The expression of FoxP3⁺ Tregs within the intra- and peri-tumoural CRC stroma was significantly associated with tumour stage, nodal metastasis and modified Dukes stage. Thus, these results indicate that FoxP3⁺ Tregs could be implemented as a reliable marker to predict prognosis and its potential for classifying early-stage CRC in the future.

Supervisor:

Dr. Nur Asyilla Che Jalil

Co-supervisors:

Dr. Noorasmaliza Md Paiman,

Dr. Suhaily Mohd Hairon,

Dr. Seoparjoo Azmel Mohd Isa,

Dr. Andee Dzulkarnaen Zakaria

DIAGNOSTIC ACCURACY OF FINE NEEDLE ASPIRATION CYTOLOGY OF THE THYROID IN HOSPITAL SULTANAH NUR ZAHIRAH, KUALA TERENGGANU

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Introduction: In the pre-operative examination of thyroid lesions, fine needle aspiration cytology (FNAC) has been used as an initial screening method. Prior to the establishment of the Bethesda system for reporting thyroid cytopathology (TBSRTC) in 2008, diagnostic cytology

interpretation among reporting pathologists and physicians around the world was inconsistent. The TBSRTC offered six categories to help clinicians decide on the treatment approach by standardising thyroid cytology reporting among pathologists. The goal of this study is to assess how accurate fine needle aspiration of thyroid lesions is in Hospital Sultanah Nur Zahirah (HSNZ), Kuala Terengganu.

Objectives: The general objective for this study is to determine diagnostic accuracy of fine needle aspiration cytology (FNAC) as pre-operative screening of thyroid lesions according to the TBSRTC, version 2017. While the specific objectives are to determine the proportion of FNAC cases of thyroid lesions in HSNZ based on Bethesda system as well as the sensitivity and specificity of FNAC of thyroid lesions in comparison with histopathology together with to evaluate the cyto-histopathological correlations based on Bethesda system reporting.

Methods: This is a retrospective cross-sectional study conducted at the Department of Pathology, HSNZ, Kuala Terengganu from January 2017 to December 2019. It is based on data collected from the Laboratory Information System (LIS) and Hospital Information System (HIS).

Results: A total of 389 thyroid lesions had been referred for FNAC. Of these, 162 cases that had subsequent surgical resections and met the criteria were recruited for the study. The patients age varied from 15 years old to 76 years old, with a median age of 43.3 years old and a male to female ratio of 1:5.3. Eighty-five cases (52.5%) were benign, 23 cases (14.2%) were atypia or follicular lesion of undetermined significance, 9 cases (5.6%) were follicular neoplasm, 21 cases (13%) as suspicious for malignancy, 12 cases (7.4%) as malignant and 12 cases (7.4%) unsatisfactory. The study found an 85.8% diagnostic accuracy rate with 66.7% sensitivity and 96.2% specificity. The positive predictive value is 90.5%, and the negative predictive value is 84.2%.

Conclusion: Fine needle aspiration (FNA) has emerge as an accurate diagnostic method for screening patients with thyroid lesions, and the findings of our investigation are comparable to published data in current literature.

Supervisor:

Associate Professor Dr. Wan Faiziah Wan Abdul Rahman

Co-supervisors:

Associate Professor Dr. Anani Aila Mat Zin,

Dr. Ahmad Fazlin bin Nasaruddin

EXPRESSION OF CYCLOOXYGENASE-2 IN COLORECTAL ADENOMA AND ADENOCARCINOMA IN HOSPITAL PULAU PINANG AND ITS ASSOCIATION TO CLINICOPATHOLOGICAL FEATURES

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Introduction: A new prognostic biomarker for colorectal cancer (CRC) is imperative, and cyclooxygenase-2 (COX-2) is potentially a new candidate. Hence, this study aims to investigate the differential expression of COX-2 in colorectal neoplasms and determine its relationship with the clinicopathological features.

Objectives: This study aims to determine the differences of COX-2 expression among patients with colorectal adenoma and adenocarcinoma from Hospital Pulau Pinang and its association with the clinicopathological features.

Methods: Paraffin-embedded tissue samples of 91 colorectal adenoma cases and 215 adenocarcinoma cases were retrospectively collected from the Department of Pathology, Hospital Pulau Pinang diagnosed within January 2014 to December 2018. Immunohistochemical assessment of COX-2 expression in the neoplastic epithelial and stromal cells was performed. The differential COX-2 expression and its association with clinicopathological features was statistically evaluated.

Results: Significantly high expression of COX-2 was observed in the cytoplasm of the epithelial cells of adenocarcinoma (66.0%) and stromal cells of adenoma (50.5%). In comparison, low expression was seen in the stromal cells of adenocarcinoma (5.1%) and epithelial cells of adenoma (26.4%) ($P < 0.0005$). The epithelial COX-2 overexpression of adenocarcinoma was significantly associated with moderate differentiation ($P = 0.030$), usual-type histology ($P = 0.049$), deeper invasion ($P = 0.007$), higher Astler Coller stage ($P = 0.009$), positive nodal metastasis ($P = 0.011$) and lymphovascular invasion ($P = 0.005$). In adenoma, high epithelial COX-2 expression showed significant association with advanced age ($P = 0.008$) and smaller adenoma ($P = 0.034$), while stromal COX-2 overexpression was significantly associated with low-grade dysplasia ($P = 0.003$).

Conclusion: COX-2 overexpression is significantly associated with favourable features of colorectal adenoma and advanced features of adenocarcinoma, thus portraying its potential as a prognostic biomarker for CRC detection.

Supervisor:

Associate Professor Dr. Sharifah Emilia Tuan Sharif

Co-supervisors:

Dr. Shazana Hilda Shamsuddin,

Dr. Lee Suk Kam

IDENTIFICATION OF POTENTIAL BIOMARKERS AND METABOLIC CHANGES IN THE SERUM OF BREAST LUMP PATIENTS IN HOSPITAL USM BASED ON ¹H NMR METABOLOMICS

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Introduction: Breast lumps are a typical presentation for patients with breast pathology, and they can be caused by benign or malignant lesions. Current investigations for breast cancer have some limitations and newer biomarkers which can detect early breast lesion are required to improve breast cancer management.

Objectives: The goal of this study is to determine the serum metabolic fingerprint level of patients with breast lump and healthy control. This study also aims to identify potential biomarkers between patient with breast lump and healthy control.

Methods: This was a case-control study conducted at the Hospital USM BestARi unit. Serum samples from healthy control (HC), benign breast lump (BE) and malignant breast lump (BC) were characterised using proton nuclear magnetic resonance spectroscopy (¹H NMR). A multivariate data analysis approach was applied to analyse the data.

Results: The OPLS-DA and clustered heat map approaches were successful in distinguishing between the three groups. Significant metabolite variations were discovered between groups and the prospective biomarkers by using OPLS-DA loading plots as well as S plots.

Conclusion: The metabolomics approach with multivariate analysis was able to fingerprint metabolites and identify key metabolites that lead to separation between groups as well as the discovery of putative biomarkers that may be used to diagnose breast cancer. D-glucose, glycerol, and glycine, were proposed as the potential biomarkers in diagnosing breast cancer. However, much more research and information integration with other 'omics' is required before any clinical translation can be undertaken.

Supervisor:

Dr. Tengku Ahmad Damitri Al-Astani Tengku Din

Co-supervisors:

Dr. Wan Norlina Wan Azman,

Associate Professor Dr. Julia Omar

EVALUATION OF PROCALCITONIN AS A BIOMARKER IN INFECTED DIABETIC FOOT ULCER PATIENTS IN A TERTIARY TEACHING HOSPITAL IN MALAYSIA

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Introduction: Infected diabetic foot ulcer may lead to serious complications if not recognised in early stage. Diagnosis of infection is particularly challenging during the early stage thus inflammatory biomarkers may be helpful.

Objectives: We aim to evaluate procalcitonin (PCT) as a reliable biomarker of infection in diabetic foot ulcers.

Methods: This case-control study was conducted at Klinik Rawatan Keluarga (KRR), Orthopaedic clinic and Orthopaedic wards in Hospital Universiti Sains Malaysia (HUSM) from May to December 2020. Total of

264 participants were recruited and divided into 3 groups consisting of 50 diabetic patients with no ulcer, 107 diabetic patients with non- infected ulcer (NIDFU) and 107 patients with infected diabetic foot ulcer (IDFU). Baseline PCT was taken for all patients. Total white count (TWC) and c-reactive protein (CRP) were taken only for IDFU patients. Diagnosis of infection is based on Infectious Disease Society of America-International Working Group of Diabetic Foot (IMWGDF) and severity of infection was graded according to Wagner classification.

Results: Baseline PCT was higher in IDFU when compared to NIDFU and diabetic patient with median (IQR) 0.355 (0.63) ng/mL, 0.077 (0.15) ng/mL and 0.028 (0.02) ng/mL, respectively. Only PCT and CRP showed clinically significant positive correlation with diagnosis of infection in DFU but not TWC.

Conclusion: This study shows PCT is useful biomarker for diagnosis of infection in DFU patient and it has clinically significant positive correlation with CRP but not TWC.

Supervisor:

Associate Professor Dr. Julia Omar

Co-supervisors:

Dr. Wan Norlina Wan Azman,

Dr. Noor Azlin Azraini Che Soh @ Yusof,

Dr. Najib Majdi Yaacob,

Dr. Nur Sabrina Abdul Ghani

AGREEMENT OF PARATHYROID HORMONE STATUS MEASURED BY INTACT AND BIOINTACT PARATHYROID HORMONE ASSAYS AMONG CHRONIC KIDNEY DISEASE PATIENTS AND ITS ASSOCIATION WITH BONE TURNOVER PARAMETERS

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Introduction: Overestimation of intact parathyroid hormone (iPTH) assay has led to diagnostic inaccuracy in the management of chronic kidney disease-mineral and bone disorder (CKD-MBD), subsequently leads to development of biointact parathyroid (PTH) assay.

Objectives: This study aims to determine the agreement between intact and biointact PTH assay and to correlate both assays with bone markers.

Methods: This cross-sectional study includes 180 patients with CKD stage 3 to stage 5 (60 subjects per stage). We measured iPTH, biointact PTH, serum 25(OH)D, C-terminal telopeptide collagen (CTX) and Procollagen type 1 N-terminal propeptide (P1NP), calcium, phosphate and alkaline phosphatase (ALP).

Results: iPTH concentration was higher compared to biointact PTH concentration. There was a good agreement seen between both PTH assays among all subjects with intraclass correlation coefficient of 0.832, and Passing-

bablok regression line shows equation of biointact PTH = $0.64 \text{ intact PTH} + 15.80$, with $r = 0.99$. However, Bland-Altman plots showed huge bias with increasing PTH concentration. Both PTH assays shows only strong positive correlation with CTX and P1NP, and iPTH was observed to have stronger correlation than biointact PTH assay.

Conclusion: Unacceptable large bias indicates that both PTH assays cannot be used interchangeably. iPTH has stronger correlation with bone markers than biointact PTH, however further study that correlates these bone markers with bone biopsy is needed in determining their discriminative ability for diagnosing CKD-MBD.

Supervisor:

Dr. Tuan Salwani Tuan Ismail

Co-supervisors:

Dr. Noor Azlin Azraini Che Soh,

Dr. Mahaya Che Mat,

Dr. Zuad Firdaus Rapih

ASSOCIATION OF SERUM URIC ACID IN PATIENTS WITH ESSENTIAL HYPERTENSION IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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Introduction: Hyperuricaemia is common in essential hypertension with varying results in different populations.

Objectives: To study the percentage of hyperuricaemia among essential hypertensive patients in Hospital Universiti Sains Malaysia, to study the association between serum uric acid with stage and duration of hypertension, to investigate the relationship between serum uric acid and laboratory parameters (serum urea, serum creatinine, serum total cholesterol, serum triglycerides, serum low-density lipoprotein LDL, serum high-density lipoprotein HDL) and to determine the association of serum uric acid in the presence of hypertension.

Methods: Case-control study involving 132 subjects which further grouped into essential hypertension (88 subjects) and healthy control (44 subjects) aged 18 years old–40 years old of both genders. This study was conducted in Hospital USM from May 2020 to May 2021.

Results: The percentage of hyperuricaemia among hypertensive patients was 46.6%. A significant difference in the serum uric acid levels between the case and control groups ($P = 0.023$) was observed. No significant difference of mean (SD) serum uric acid in hypertension < 5 years and ≥ 5 years ($P = 0.331$) and in between stages of hypertension ($P = 0.136$) were observed. In case group, correlation was found between serum uric acid and serum triglycerides ($r = 0.255$, $P = 0.017$), serum HDL ($r = -0.223$, $P = 0.037$), serum urea ($r = 0.299$, $P = 0.005$), and serum creatinine ($r = 0.486$, $P < 0.01$). No correlation between serum uric acid levels and serum total cholesterol levels ($P = 0.143$)

and serum LDL ($P = 0.299$). Serum uric acid was an important variable for developing hypertension ($P = 0.025$) but not when adjusted for age and body mass index (BMI) ($P = 0.082$).

Conclusion: The percentage of hyperuricaemia in essential hypertension patients was 46.6%. No association between mean (SD) serum uric acid with duration and stages of hypertension. Significant associations were found between serum uric acid and triglycerides, serum uric acid and HDL, serum uric acid and urea and serum uric acid and creatinine in essential hypertension. Serum uric acid was a significant variable for developing hypertension but the association was weakened by other confounders as age and BMI.

Supervisor:

Dr. Zulkarnain Mustapha

Co-supervisors:

Dr. Aniza Mohammed Jelani,

Associate Professor Dr. Najib Majdi Yaacob

EVALUATION OF HBA1C USING HIGH PERFORMANCE LIQUID CHROMATOGRAPHY AND CAPILLARY ELECTROPHORESIS IN TYPE 2 DIABETES MELLITUS PATIENTS SUSPECTED TO HAVE HAEMOGLOBIN VARIANT

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Introduction: High Performance Liquid Chromatography (HPLC) is widely used for HbA1c measurement. However, it is prone to haemoglobin (Hb) variant interference. Capillary electrophoresis (CE) is believed to have better performance in patients with Hb variant. This study aimed to compare HbA1c level between HPLC and CE among Type 2 diabetes mellitus (T2DM) patients suspected to have Hb variant, determine the type of Hb variant among those patients, and evaluate the agreement between both methods.

Objectives: To identify the type of Hb variant among T2DM patients suspected to have Hb variant. To compare the mean level of HbA1c measured by HPLC and CE in T2DM patients suspected to have Hb variant. To evaluate the agreement of HbA1c results between HPLC and CE in T2DM patients suspected to have Hb variant from HPLC.

Methods: A cross-sectional study conducted at Endocrine Laboratory, Hospital Universiti Sains Malaysia, from June till December 2020. HbA1c results of adults T2DM from HPLC with suspected Hb variant were re-analysed using CE. The comparisons of HbA1c were made using paired *t*-test and Wilcoxon signed rank test. The correlation and method comparison were made using Pearson's correlation coefficient, Bland Altman (BA) and Passing-Bablok (PB), whereas the agreement using intraclass coefficients correlation (ICC).

Results: 250 patients were included with a median (IQR) age of 52.19 (11.11) years old. For reportable results ($\geq 3.8\%$ – $\leq 18.5\%$), both methods showed no difference ($P = 0.382$) whereas the results were difference for HbA1c $> 18.5\%$ ($P = 0.048$). 26 patients had Hb analysis with majority having Hb E trait 14 (5.6%). HPLC overestimated HbA1c in patients with Hb J and alpha Hb variant while CE able to report. Pearson correlation and PB regression analysis showed good correlation ($r = 0.987$, $P < 0.001$) and good agreement [slope of 1.0 (95% CI: 1.00, 1.03); intercept of -0.3 (95% CI: -0.61 , 0.30)]. BA plot revealed a mean difference of 0.30% (95% CI: 0.00 , 0.50) with limits of agreement from -0.54 to $+0.14$. ICC showed excellent reliability (0.983 ($P < 0.001$)).

Conclusion: HPLC and CE can be used interchangeably for HbA1c analysis across the measurement range. CE is the preferred in T2DM with certain Hb variant

Supervisor:
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Co-supervisors:
Dr. Tuan Salwani Tuan Ismail,
Dr. Najib Majdi Yaacob

RED BLOOD CELL ALLOIMMUNISATION AMONG RHESUS D NEGATIVE PATIENTS IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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Introduction: Rhesus D (RhD) negative patients are considered rare blood group in Asian country including Malaysia. Thus, the red blood cell (RBC) alloimmunisation among RhD negative patient is considered significant because of the availability and rarity of the blood itself make it more difficult to find compatible blood.

Objectives: The aim of the study is to determine the prevalence, specificities of alloantibodies, and associated factors of RBC alloimmunisation among RhD negative patients admitted to Hospital Universiti Sains Malaysia (HUSM).

Methods: This cross-sectional study involved 562 RhD negative patients admitted to HUSM, from January 2011 to December 2019. Demographic, clinical and transfusion data were collected from patients record and laboratory information system retrospectively. The blood samples were subjected to the standard immuno-hematological procedure for RBC alloantibody screening and identification using Diamed ID gel microtyping system. Pearson's chi-square test and Fisher's exact test were used for statistical analysis and P -value less 0.05 is considered significant.

Results: The mean age of patients is 41 years old with majority were female (71.4%), Malay (87.5%) and blood group O (40.2%). The main reason of admission is due to pregnancy related (48.5%) and trauma (18.1%). Majority

of the patients were rr (67%). The prevalence of RBC alloimmunisation was 3.6% ($n = 20$). Most of alloimmunised patients were with single alloantibody ($n = 18$), and belong to rhesus antibody ($n = 16$). The commonest alloantibody specificity is anti-D ($n = 14$) followed by anti-Le ($n = 4$). The significant associated factors with RBC alloimmunisation were history of blood transfusion ($P = 0.049$) and Rh phenotype ($P = 0.047$).

Conclusion: The rate of RBC alloimmunisation in RhD negative patients was low. Nevertheless, it still mandatory that there should be one standard universal protocol to identify RhD negative patients and screening for antibody especially anti-D which is clinically significant.

Supervisor:
Dr. Mohd Nazri Hassan

Co-supervisor:
Dr. Marini Ramli

CHARACTERISTIC OF ABO ANTIBODIES AMONG GROUP O BLOOD DONORS IN HOSPITAL UNIVERSITI SAINS MALAYSIA, KELANTAN

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Introduction: Blood group O components are the most available component in our transfusion unit. The transfusion of group O red cells or platelet concentrate to non-O-recipients are common practice here particularly in emergency cases such as trauma and obstetric bleeding. However, group O transfusion is not entirely safe. Few cases of intravascular hemolysis due to anti-A and anti-B antibodies in group O blood products have been reported.

Objectives: This study aims to identify the prevalence of high ABO antibodies titer and the immunoglobulin classes either IgM only or with IgG combination. We also intended to estimate the prevalence of high IgG titers and hemolysins antibodies in group O blood donors and to determine the association of the above parameters with gender and age.

Methods: Plasma from group O blood donors was tested for ABO antibody titration using the conventional tube technique at room temperature, and titer obtained ≥ 64 were considered high. The plasma was then treated with 0.01 M Dithiothreitol (DTT) to determine the presence of IgG antibodies and their titer. IgG titers of ≥ 64 were considered high. Test for haemolysis was done using tube method by mixing the plasma with 3% of fresh A and B cells suspension and incubated at 37° temperature. The haemolysis was observed macroscopically. Statistical analysis was done using SPSS version 25.0 and P -values less than 0.05 were considered statistically significant.

Results: From 311 donors, 238 (76.5%) showed high anti-A and/or anti-B antibody titer. The highest antibody titer obtained was 256. High anti-A and anti-B titer were

found more in younger age group (< 40 years old). We found anti-B titer showed an association with gender ($P < 0.001$), in which female donors (77.8%) demonstrated a high anti-B titer. From 311 donors, 209 also showed the presence of IgG types of ABO antibodies. Of these, 124 (59.3%) donors had high anti-A and/or anti-B IgG titer. Our population showed a low prevalence of hemolysins which was 3.5%. No association was seen between haemolysins and antibody titers.

Conclusion: Our study showed high prevalence of blood donors with high ABO antibodies titer and IgG titers, but low prevalence of haemolysins. Hence, the risk of intravascular haemolysis may not be significant. However, we still suggest antibody titration in younger female donors less than 40 years old to prevent transfusion of high titer O blood product into the non-O recipient to ensure safe blood products are given to the patient.

Supervisor:
Associate Professor Dr. Noor Haslina Mohd Noor

Co-supervisor:
Dr. Shafini Mohamed Yusoff

HAEMATOLOGICAL PARAMETERS ANALYSIS OF HB ADANA AND DELETIONAL α -THALASSAEMIA AMONG SCREENED FORM 4 STUDENTS IN KELANTAN

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Introduction: Hb Adana is a non-deletional, unstable α -variant haemoglobin. This mutation compromises the stability of haemoglobin. When compounded with alpha-globin gene deletions, it could result in transfusion dependency or even hydrops fetalis. Confirmatory by the molecular test is imperative for the diagnosis of Hb Adana.

Objectives: This study explored the proportion of Hb Adana among confirmed α -thalassaemia carriers in Form 4 students in Kelantan screened for alpha thalassaemia and described the haematological characteristics of Hb Adana. This study also compared the differences in haematological parameters and haemoglobin analysis between Hb Adana and common deletional alpha-thalassaemia (single α -gene and two α -gene deletions) of the study population.

Methods: A cross-sectional study involving a review of secondary data of 13,721 Form 4 students screened for α -thalassaemia from the National Thalassaemia Screening Programme sent from all districts in Kelantan to HRPZ II from June 2017 until June 2020. Diagnosis of confirmed α -thalassaemia carriers (Hb Adana, non-deletional and deletional types) was made based on a combination of full blood count (FBC), haemoglobin analysis and DNA analysis by multiplex polymerase chain reaction (PCR). Their demographic data and haematological features were collected for descriptive and statistical analysis.

Results: We identified 2,327 (17.0%) students were α -thalassaemia carriers, 711 (5.2%) subjects had no detected α -gene mutations and the remaining were either not sent for DNA analysis or results were not available. Out of 2327 subjects, there was 31 (1.33%) heterozygous Hb Adana ($\alpha^{CD59}\alpha/\alpha\alpha$), 1 (0.04%) compound heterozygous Hb Adana with 3.7kb single gene deletion ($\alpha^{CD59}\alpha/\alpha^{3-7}$), 24 (1.03%) Hb Quong Sze, 1234 (53.03%) Hb Constant Spring, 702 (30.17%) one α -gene deletion and 335 (14.39%) two α -gene deletions. There were incidental findings of seven subjects with double heterozygous HbE/Hb Adana. The heterozygous Hb Adana in this study behaved as α^+ -thalassaemia even when being compounded with single α -gene deletion. However, the interaction of HbE with Hb Adana appeared to resemble α^+ -thalassaemia. Statistical analysis between groups (Group I: heterozygous Hb Adana, Group II: single α -gene deletion and Group III: two α -gene deletions) showed significant differences in RBC, MCV and MCH (ANOVA, post-hoc [Dunnett C], $P < 0.05$). There was no significant difference in haemoglobin analysis between groups.

Conclusion: This study showed a higher proportion of Hb Adana among confirmed α -thalassaemia carriers in Form 4 students in Kelantan. The disease nature of Hb Adana varies dependent on the coinheritance of other types of thalassaemia. This study demonstrated that the FBC indices had a more significant discriminative value than haemoglobin analysis to differentiate between Hb Adana and deletional α -thalassaemia. Given the risen population and diversity of Hb Adana disease behaviour, it is recommended that selective molecular testing be performed for subjects with abnormal indicative FBC indices.

Supervisor:
Dr. Marini Ramli

Co-supervisors:
Associate Professor Dr. Rosnah Bahar,
Dr. Suryati Hussin

CLINICAL CHARACTERISTICS AND ITS ASSOCIATION WITH DRIVER GENE MUTATIONS (JAK2 V617F, CALR, AND MPL) IN MYELOPROLIFERATIVE NEOPLASMS

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Introduction: Mutations of *JAK2V617F*, *CALR* and *MPL* genes confirm the diagnosis of myeloproliferative neoplasms (MPNs).

Objectives: This study aims to determine the genetic profile of *JAK2V617F*, *CALR* exon 9 Type 1 (52 bp deletion) and Type 2 (5 bp insertion) and *MPL* W515 L/K genes among Malaysian patients and correlate these mutations with clinical and hematologic parameters in MPNs.

Methods: Mutations of *JAK2V617F*, *CALR* and *MPL* were analysed in 159 Malaysian MPNs patients using allele-specific polymerase chain reaction, including 76 polycythemia vera (PV), 41 essential thrombocythemia (ET) and 42 primary myelofibrosis (PMF), and the demographics including clinical and laboratory data of the patients were retrieved.

Results: The result showed that 73.6% *JAK2V617F*, 5.66% *CALR* and 27.7% were triple-negative mutations. No *MPL W515L/K* mutation was detected. In ET and PMF, the predominance type was the *CALR* type 1 mutation. Serum LDH showed higher in mutated *CALR* PMF compared to PV and ET. PV has a higher risk of evolving to post PV myelofibrosis compared to ET. A thrombotic event at initial diagnosis of 40.9% was high compared to global incidence. Only one PMF patient had a *CALR* mutation that transformed to acute myeloid leukemia.

Conclusion: *JAK2V617F* and *CALR* mutations play an important role in diagnostics. Hence, every patient suspected of having a myeloproliferative neoplasm should be screened for these mutations.

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Co-supervisors:

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COMPARISON OF FLUORESCENT SPOT TEST AGAINST QUANTITATIVE ENZYME ASSAY FOR DETECTION OF GLUCOSE-6-PHOSPHATE DEHYDROGENASE DEFICIENCY

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Introduction: Glucose-6-phosphate dehydrogenase (G6PD) deficiency is the most common enzymopathy in the world. Some countries have practiced fluorescent spot test (FST) as a neonatal screening method since the 1980s. However, FST has its own limitations. Quantitative assays such as the careSTART™ BioSensor1 have been demonstrated to be able to overcome some of these limitations.

Objectives: The objectives of this study are to compare the performance of FST with BioSensor1 in detecting G6PD deficiency in neonates and to verify the reference range of G6PD level for cord blood using BioSensor1.

Methods: This study was a cross sectional study involving 455 neonates born in Hospital Universiti Sains Malaysia (HUSM), Kelantan, Malaysia beginning June 2020 until December 2020. Two millilitres of cord blood were taken in EDTA bottles to be analysed with BioSensor1 and dried cord blood spots on filter paper were sent for FST to determine the levels of G6PD. Demographics data and birth

characteristics were taken from labour room records. Data was recorded and analysed using the Statistical Package for the Social Software (SPSS) version 27.0. *P*-value less than 0.05 were considered as significant.

Results: The sensitivity of FST was 91% whilst its specificity was 97% at 30% cut-off G6PD activity level. In contrast, at 60% cut-off G6PD activity level, the sensitivity drastically decreased to 29% whilst the specificity was 100%. The overall prevalence of G6PD deficiency was 5.1% and 17.8% for FST and Biosensor1, respectively, demonstrating a drastic difference between the two tests ($P < 0.001$). The mean G6PD level for term neonates was 6.84 U/gHb whilst for preterm neonates was 6.63 U/gHb. Using independent *t*-test, there was no significant difference in the mean G6PD levels between term and preterm neonates. There was also no significant association between different gestational age groups, maternal blood group and birthweight with mean G6PD level when tested using one way ANOVA test.

Conclusion: FST has low sensitivity at 60% cut-off G6PD level. This cut-off level reflects intermediate G6PD activity, hence FST missed a significant proportion of G6PD intermediate individuals in our study. At the same time, the prevalence of G6PD deficiency significantly increased with the use of BioSensor1. Gestational age, birthweight and maternal blood group do not have significant association with G6PD level. In a budget constrained facility, it is recommended to use quantitative enzyme assay to screen female neonates and to use FST for male neonates especially in areas where G6PD deficiency is prevalent.

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PREVALENCE OF PHENOL SOLUBLE MODULIN-MEC GENE IN HOSPITAL-ACQUIRED METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS AND ITS ASSOCIATION WITH THE CLINICAL OUTCOME

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Introduction: *Psm-mec* gene which located in mobile genetic element plays an important role in determining the virulence properties of hospital-acquired methicillin-resistant *Staphylococcus aureus* (HA-MRSA). This study aims to determine the prevalence of *psm-mec* gene among HA-MRSA and the association with clinical outcome of MRSA infections.

Methods: A total of 230 HA-MRSA clinical isolates obtained from clinical samples that were sent to Microbiology Laboratory, Hospital Kuala Lumpur (HKL) from 1st January 2020 until 1st January 2021 were enrolled in this study.

A total of 179 isolates which fulfilled the inclusion criteria of the study were tested for antibiotic susceptibility and *psm-mec* gene detection using conventional PCR. The inclusion criteria of this study were clinical samples that fulfilled the criteria of HA-MRSA and taken from patients more than 18 years old. We compared the clinical characteristics and outcome of the patients harbouring MRSA isolates with presence and absence of *psm-mec* gene.

Results: A total of 179 isolates fulfilled the inclusion criteria and included in the study. Out of those isolates, *psm-mec* gene was detected in only one isolate (0.6%). The *psm-mec* gene positive isolate was seen in a patient treated for skin and soft tissue infection (SSTI). The common clinical presentations in the remaining patients (absent *psm-mec* group) was SSTI, $n = 64$ (36%), bacteremia $n = 47$ (26.4%) and pneumonia $n = 31$ (17.4%). Isolate with *psm-mec* had longer length of stay compared to isolates with absent *psm-mec* (mean, 20 days versus 17.4 days). Inpatient mortality in this study was $n = 32$ (17.9%), and none harboured *psm-mec* gene. Most of the isolates showed resistance to penicillin, $n = 179$ (100%) and erythromycin, $n = 118$ (65.9%). Isolates were relatively susceptible to trimethoprim-sulfamethoxazole, $n = 177$ (98.9%) and linezolid, $n = 177$ (98.9%).

Conclusion: In this study, *psm-mec* gene was only detected in one MRSA isolate, hence the the difference in patients' clinical characteristics and outcomes, as well as isolates antibiotic profiles cannot be significantly compared. Since *psm-mec* gene is SCCmec type specific further study is warranted to determine the predominant genetic background of HA-MRSA isolates in Hospital Kuala Lumpur.

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A 10-YEAR REVIEW OF RISK FACTORS, OUTCOMES AND GENETIC DETERMINANTS OF TRIMETHOPRIM-SULFAMETHOXAZOLE NON-SUSCEPTIBLE *STENOTROPHOMONAS MALTOPHILIA* ACQUISITIONS FROM MALAYSIA

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Introduction: *Stenotrophomonas maltophilia* has emerged as an important opportunistic pathogen associated with hospital-acquired infections. This organism is intrinsically resistant to many antibiotics, and its resistance to the recommended antibiotic, trimethoprim-sulfamethoxazole (TMP-SXT), is increasingly reported.

Objectives: To determine the risk factors, outcomes, antibiotic susceptibility profile and antibiotic resistant determinants in trimethoprim-sulfamethoxazole non-susceptible *S. maltophilia* (TRSM).

Methods: All 123 patients with microbiologically proven *S. maltophilia* isolates from January 2011 until April 2021 were included in a retrospective observational study. The risk factors of TRSM were determined by a case-control study, compared to TMP-SXT susceptible *S. maltophilia* (TSSM). The factors associated with mortality among *S. maltophilia* acquisition cases were determined by logistic regression. All twenty-three available TRSM isolates were tested for antibiotic-resistant gene determinants by PCR.

Results: Among *S. maltophilia* isolates, 95 (77.2%) were TSSM while 28 (22.7%) were TRSM. All TMP-SXT non-susceptible isolates fall in the resistance range. Length of hospital stay prior to *S. maltophilia* isolation ($P = 0.039$) was found to be a significant risk factor for TRSM occurrence. The mean duration of hospital stay after *S. maltophilia* isolation was longer in TRSM ($P = 0.021$). Septic shock and mechanical ventilation were identified as independent risk factors for death by multivariate analysis ($P < 0.001$) and ($P = 0.009$), respectively. The overall antibiotic susceptibility rates of *S. maltophilia* against minocycline, levofloxacin, TMP-SXT and ciprofloxacin were 94.4%, 94.3%, 77.2% and 83.3%, respectively. A total of 23 TRSM isolates were available for evaluation of antibiotic-resistant determinants and we found nine (39.1%) isolates harbouring class 1 integron associated intergrase gene (*intI1*) and/or sulfonamide resistant gene (*sulI*).

Conclusion: Increased isolation of TRSM from patients with prolonged hospitalisation may lead to the emergence of a difficult-to-treat nosocomial pathogen. Continuous monitoring and surveillance are important to prevent the outbreak and further resistance.

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SEROPREVALENCE, SEROLOGICAL CUT-OFF AND CLINICAL CORRELATIONS OF CONGENITAL TOXOPLASMOSIS AND CYTOMEGALOVIRUS AMONG INFANTS IN A TERTIARY HOSPITAL

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Introduction: Congenital toxoplasmosis and cytomegalovirus (CMV) infections can contribute to significant prenatal and infant morbidity and mortality and remain as global public health threat. Serological methods remain the most available and affordable option and play an important role in the diagnosis of this diseases. This study aimed to determine the seroprevalence and significant serological cut-off titre in the diagnosis of congenital toxoplasmosis and cytomegalovirus infection among infants

in a tertiary teaching hospital. The study also aimed to look for any associations of this cut-off titre with clinical manifestations of the disease.

Objectives: To study the seroprevalence, serology and clinical manifestations of *Toxoplasma gondii* and cytomegalovirus infections among infants in Hospital Universiti Sains Malaysia (HUSM).

Methods: This retrospective record review was conducted among infants in HUSM from January 2019 to December 2019. A total of 500 *Toxoplasma gondii* and 527 CMV serological tests results were tested by electrochemiluminescence immunoassay 'ECLIA' method using Elecsys and cobas e601 analyser. Out of this figure, a total of 151 samples suspected for toxoplasmosis and 151 samples suspected for CMV infection were recruited in the study. The demographic and clinical data were collected and analysed using SPSS. The determination of the best cut-off point of IgM and IgG was determined by using sensitivity and specificity test. The multivariate analysis was proceeded with binary logistic regression to determine the significant clinical manifestations among infants with the chosen optimal cut-off titre.

Results: The seroprevalence of *T. gondii* and CMV infection among infants in HUSM was 53.0% (95 CI: 49.0%, 57%) and 98.7% (95 CI: 97.0%, 99.5%), respectively. The optimal cut-off index of *T. gondii* IgM was 30.8 cut-off index (COI) with 100% sensitivity, 99.3% specificity, 99.3% accuracy, 75% positive predictive value and 100% negative predictive value (NPV) in relation to the disease. The significant associated clinical feature with this cut-off was presence of anaemia (aOR 28.66; 95%CI: 1.98, 414.18; *P*-value = 0.014). The AUC for anti-CMV IgM and anti-CMV IgG was 87.8% (95 CI: 80.0%, 95.6%) *P*-value < 0.001 and 32.2% (95% CI: 18.9%, 45.4%) *P*-value = 0.01. The best cut-off index for anti-CMV IgM was 31.0 COI with 75% sensitivity, 90% specificity, 88% accuracy, 55% PPV and 95% NPV in predicting the disease. The significant clinical features associated with this cut-off was transaminitis (aOR 5.00 ; 95% CI:1.38,18.02 ; *p*=0.014). Overall, for anti-CMV IgG titres, it had a high sensitivity but a low specificity at low titres and a low sensitivity but a high specificity at high titres. Specificity, accuracy, and negative predictive value were 96%, 85%, and 87%, respectively, at higher CMV IgG titres (2,000 U/mL).

Conclusion: Serology plays an important role in the diagnosis of *T. gondii* and CMV infection among infants, especially in settings with limited resources for molecular testing. Based on our study, IgM has better accuracy in predicting the disease, while IgG interpretation is challenging due to its transplacental passage. However, the relationship of the serological cut-off titres especially in congenitally infected infants needs further study using larger populations of affected infants.

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DETECTION OF *CAMPYLOBACTER JEJUNI* AND *CAMPYLOBACTER COLI* FROM RETAIL BROILER CHICKEN BY DUPLEX PCR

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Introduction: Campylobacteriosis is one of the most common infections worldwide. Few studies in Malaysia and Singapore were done more than 20 years ago, reported a low *Campylobacter* isolation rate of 3%–5% but the actual prevalence may be 5–10 times greater than that of industrialised countries. Limited published data was available for the past 10 years to reflect the current epidemiology of Campylobacteriosis in Malaysia. Conventional detection of *Campylobacter* in naturally contaminated samples such as food and clinical are fastidious and time consuming, usually it requires at least 4 days due to their slow growth, that excluding the phenotyping test for species differentiation. Several alternative and quick method have been developed to overcome the issues including serological and molecular method. Multiplex polymerase chain reaction (PCR) has become an appealing method for epidemiology purpose in poultry industry as this approach has been established for *Campylobacter* and non-*Campylobacter* isolates, moreover, a single sample can yield multiple identifications quickly and efficiently.

Objectives: This study was designed to determine the prevalence of *Campylobacter coli* and *C. jejuni* contamination in poultry retail meat in Kota Bharu by duplex PCR from direct samples.

Methods: A total of 50 fresh and chilled poultry chicken meat were purchased from 13 retail markets. The samples were put into polyethylene bag and wash with phosphate-buffered solution, the bacterial lysate were prepared directly from chicken wash, enriched in CCDA broth for 48 h and the presence of *C. coli* and *C. jejuni* were detected by duplex PCR.

Results: Overall results revealed 22% contamination of *Campylobacter* occur in poultry retail meat in Kota Bharu, Kelantan. Out of 50 samples of fresh (*n* = 16) and frozen/chilled (*n* = 34) chicken thigh, 10/50 (20%) was positive for *C. coli* and/or *C. jejuni*. Majority (9/10, 90%) of contamination were *C.coli* whereas, the remaining (1 sample) was *C. jejuni*. Frozen/chilled samples have lower frequency of *Campylobacter* contamination, 11.8% (4/34) as compared to fresh samples, 37.5% (6/16). No *C. jejuni* contamination was observed in fresh samples and only 2.9%(1/34) in frozen/ chilled samples. While *C. coli* detected at rate 6/16 (37.5%) in fresh chicken samples and 4/34 (11.7%) in frozen/chilled chicken samples.

Conclusion: The prevalence of *C.coli* and *C.jejuni* among poultry retails chicken meat in Kota Bharu, Kelantan is low as compared to limited data in other part of Malaysia. However, more studies with a larger sample sizes and involvement of retail market are required.

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DIAGNOSTIC EVALUATION OF A NEW SYPHILIS RAPID TESTS AMONG ECLIA REACTIVE BLOOD SAMPLES IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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Introduction: Syphilis point-of-care tests may facilitate early diagnosis and access to rapid treatment. We assessed the diagnostic accuracy of two commercially accessible screening methods.

Methods: A total of 166 serum samples of reactive ECLIA were included in this study. These samples were tested with rapid plasma regain (RPR), ProDetect and *Treponema pallidum* particle agglutination (TPPA) assays. TPPA was considered as the gold standard test for syphilis.

Results: Out of 166 serum samples, 80.1% were diagnosed with syphilis. Overall, 45.8% were diagnosed with syphilis in relation to true positive RPR. Most cases were male (65.4%) with median age of 65.6 years old and mostly were Malay (93.2%). Co-infection with HIV, hepatitis B and hepatitis C were detected in 6.8%, 1.5% and 0.8% of cases, respectively. Co-infection with both hepatitis B and hepatitis C was found in 0.8% of the cases. Further testing with TPPA revealed that 1.2% cases were false-positive ECLIA. The sensitivity, specificity, PPV and NPV are 62.4%, 96.9%, 97.6%, 38.3% for ProDetect syphilis rapid test and 57.1%, 93.9%, 97.4%, 35.21% for RPR, respectively. The strength of agreement revealed 'moderate agreement' between the ProDetect syphilis rapid test and RPR for syphilis detection with 71.2% (K = 0.435; 95% CI: 0.298, 0.572).

Conclusion: The ProDetect syphilis rapid treponemal test should be considered to be used for screening suspected syphilis case, as point-of-care testing. However, further large-scale studies are required to clarify the diagnostic accuracy of this rapid test.

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