

# Letter to Editor: Teleconsultation in Neurosurgery: Comparing the Multimodal Approach in Image Transfer in Kuala Lumpur Hospital

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Dear Editor,

I read with interest the article titled "An Observation Study of Blood Glucose Levels during Admission and 24 Hours Post-Operation in a Sample of Patients with Traumatic Injury in a Hospital in Kuala Lumpur" published in the *Malaysian Journal of Medical Sciences*, Volume 18, Issue 4, 2011 by Rahmat Haron et al., (1). We would like to highlight the teleconsultation aspect of brain injuries in Hospital Kuala Lumpur the largest referral center in Malaysia.

Wong et al., conducted a randomized controlled trial have concluded that telephone consultation equipped with teleradiological images or video consultation achieved a higher diagnostic accuracy as compared with a conventional telephone conversation (2). Another series led has demonstrated that teleradiology was able to reduce the unnecessary transfer by 21% (3).

We recently completed a non-randomized, prospective observational study in Hospital Kuala Lumpur, whereby consultations from various peripheral hospitals were made with a tertiary neurosurgical center. The scan images were sent either using a telephone equipped with Multimedia Messaging (MMS) capabilities, or by any commercially available email system, or by using a web interface (Telehealth, TH). The system chosen by the peripheral hospital will depend on the availability of that particular system in their hospital. Equipped with clinical history alone, Walters KA has voiced the inadequacy of the history which is fraught with multiple problems during a transfer of a head injured, or suspected intracranial haemorrhage (4).

In our series, a total of 372 consecutive referrals from various institutions were enrolled after fulfilling a stringent criterias from December 2009 until July 2010. A smartphone equipped with third generation (3G) internet connection (BlackBerry Bold 9700, RIM, Ontario Canada), a computer networking stations with PACSPLUS viewer 2.0 (WorldCare Malaysia Pte Ltd), and any personal computer can be used to retrieve

all the scan images by the officer on duty, who will subsequently discuss the above cases with the neurosurgeon on call for definitive decision making. Whenever a situation arise, whereby an original films needed to be sent to us, this will reflect a failure of that particular image transfer system in replacing the original films.

The patients were categorized into three categories, mild (44.6%), moderate (22%) and severe (33.4%) head injury. Males comprises of 255 (68.5%) while 117 (31.5%) were females. Our youngest patient was four years old and the oldest was 89 years old. Majority of the patients were within 13-24 years old (23.9%), and most of them suffered from road traffic accidents. Telehealth consultation comprises of 23.9%, email recorded a 37.6% while MMS yielded a 38.5% of consultation respectively.

Using a chi-square test, the three modes of image transfer systems were compared head to head; ( $P = 0.424$ , TH vs email), ( $P = 0.324$ , email vs MMS), ( $P = 0.169$ , TH vs MMS). The results clearly indicates that there is no difference among the modalities being compared.

Similarly we used chi-square test in order to see the difference in Glasgow Outcome Scale (GOS) of patients upon discharge or referral to the rehabilitation center among those managed by the neurosurgeons, and those managed in periphery. GOS were further dichotomised into favourable and unfavourable group.  $P < 0.001$  demonstrates that the outcome of those patients managed in tertiary neurosurgical center was better as compared with those patients managed at the peripheral centers. The outcome might be interpreted as biased as our result may be influenced by poor neurological condition upon admission to the peripheral centers, thus rendering these group of patients from being transferred to a tertiary center.

In our study, we managed to reduce the unnecessary transfer to 66%. The diagnostic accuracy improves from 87.8%, 90.7%, and 96.5% whenever the scan images were reviewed by the

medical officers, clinicians, and the radiologists respectively. In our experience, we believe that MMS is very handy as well as portable while TH is a very comprehensive system as close as looking into the original films despite its bulky appearance, while the email system appears to be lying in between those two systems.

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