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CASE REPORT

TRANSNASAL ENDOSCOPIC REPAIR FOR BILATERAL CHOANAL ATRESIA

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Choana atresia is a congenital abnormality of the posterior nasal apertures affecting the newborn. The aetiology is considered to be a persistence of the embroyological bucconasal membrane which separates the nasal cavity from the stomatodeum until it breaks down at seventh week, allowing communication through the primitive posterior nares. Bilateral choanal atresia almost always present as a respiratory emergency because newborn babies are obligate nasal breathers. The definitive surgical treatment is repair under general anaesthesia. We report our experience in doing a new technique of transnasal endoscopic repair.

***Key words**: Bilateral Choanal Atresia, Newborn, Respiratory Emergency, Transnasal Endoscopic Repair*

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Introduction

Congenital choanae atresia describes a narrowing of the anterior or posterior nasal apertures but the term is generally used with respect to posterior occlusion, which may be membranous (10%) or bony (90%) (1). It is one of the more commonly observed congenital abnormalities of the nose. The incidence is one per 8000 births (2). Unilateral atresia is more common than bilateral atresia in the proportion of 3:2. Females appear to be affected twice as often as males. The reports of associated congenital anomalies vary from 43% to 72% (3) and are more often associated with bilateral than unilateral disease.

The aetiology is considered to be a persistence of the embryological bucconasal membrane, which separates the nasal cavity from the stomatodeum until it breaks down at seventh week of intrauterine development, allowing communication through the primitive posterior nares. It has also been suggested that the aberration is due to a failure of the bucconasal membrane to undergo involution. However the majority of cases are due to persistence of the epithelial cells which proliferate within the nasal cavities during the sixth to eighth weeks of intrauterine development (2).

Case Report

A premature baby girl was referred from Hospital Tanah Merah, Kelantan to HUSM for ventilation due to respiratory distress and cyanosis 5 hours after birth. At 3 hours of life on admission to Hospital Tanah Merah, the baby was doing well and no cyanosis noted. At 4 hours of life, she had an episode of cyanosis and bradycardia. Active resuscitation was performed and she improved 15 minutes later. At 5 hours of life, she again developed a second episode of cyanosis and stoped breathing. Ambubagging was done and intubation was attempted. However, intubation via nostril failed and patient was then intubated orally. She was pink on ambubagging via oro-tracheal intubation with size 2.5 tube, anchored at 13 cm. Her vital signs were stable. Her blood pressure and pulse rate were normal. Subsequently, the endotracheal tube was changed to size 3.0 and anchored at 8.5 cm. There was a failure to insert a nasogastric tube even the smallest. There was a left iris coloboma (atypical coloboma). Both auricles and external auditory meatus were normal. Examination of the external nose revealed no abnormality. The CT Scan (axial view) demonstrated a thickening of vomer, bowing of lateral wall of the nasal cavity and fusion of bony elements in the both the choanal region. Rigid

nasoendoscopy showed bilateral bony hard choanal atresia.

The operation was done under general anaesthesia via oral intubation. The endoscope was passed to examine the nasopharyngeal surface of the atretic plate (by the 120°). The 0° paediatric rigid endoscope was then introduced along the middle meatus to examine the nasal cavity and the atretic plate. An upward-based rectangular flap was elevated from the nasal surface of the atretic plate using a micro-dissector and suction tips. A skin chisel was then passed along the floor of the nose to the level of the occluding plate. The opening was widened by a curette. These steps were repeated on the opposite side. Endotracheal tube size 2.5 mm inner diameter was inserted and left in situ in the nasal cavity up to posterior choanae and anchored at the alar with silk. Postoperatively the patient was well and was discharged home the following day with both of the endotracheal tube in situ. Advice was given to the parents to come immediately to the nearest hospital if the patient developed any problems. One month later the patient was readmitted and both of the endotracheal tube were successfully removed. A flexible endoscope showed patent lumen of both choanae.

Discussion

Bilateral choanal atresia almost always present as a respiratory emergency because newborn babies are obligate nasal breathers. Indeed the reflex to facilitate breathing through the open mouth in response to nasal obstruction only developed weeks to months after birth although an infant will mouth-breathe if the mouth is opened either during crying or if an artificial oral airway is inserted (2). Thus, neonates with bilateral choanal atresia will sometimes demonstrate a cyclical change in oxygenation, becoming cyanosed during quiet periods, normal colour returning when the child cries. Choanal atresia may be found as an isolated anomaly but 60-70% of cases are associated with other congenital defects (3).

The so-called CHARGE associations are colobomatous blindness, heart disease, atresia of the choanae, retarded growth or development, genital hypoplasia in males and ear deformities, including deafness.

In term of diagnosis, traditionally the failure to pass a soft transnasal catheter in a suspected case (as occured in this patient) could be considered diagnostic of congenital choanal atresia although the turbinate or adenoids may impede passage. Some authors advocate auscultation over the nostrils to assess airflow (2). Other simple clinical tests include absence of misting on a metal spatula or of movement of a wisp of cotton wool in front of the nostrils (1). However, the current investigation of choice is a combination of nasal endoscopy and CT scanning. The CT scanning indicates whether the atresia is membranous or bony and demonstrates the thickness in addition to excluding other differential diagnoses such as encephaloceles or dermoids. For this patient, the diagnosis is suspected with early presentation of respiratory obstruction soon after birth, failure to pass a transnasal catheer and later confirmed by endoscopic and CT scan findings.

For definitive surgery, four different approaches to the posterior end of nasal cavity have been described: (1) transnasal, (2) transpalatal, (3) trans-septal and (4) transantral. Of these, only the first two are in common use. Trans-septal repair is still occasionally used for older patients with unilateral atresia (4) and transantral route is of historical importance only (5).

The transpalatal approach is the one most commonly practiced because it gives better visualization during atretic bone removal. It is the preferable approach when the atresia is thick. The approach is similar to that used in cleft palate surgery, the child's head overhanging the end of the table and resting on the surgeon's lap. Although the transpalatal route allows good access, it is associated with a longer operating time, greater blood loss and longer convalescence than some of the other approaches and may lead to disruption of palatal growth. There is also a risk of palatal perforation if palatal flap is too short (2).

The transnasal route is simpler, safe, and quicker and requires minimal tissue handling but gives a more limited operative field to see and work within [6]. It is valid only for membranous atresia or where bony plate is thin. The simplest procedure is perforation of the atretic lamina followed by dilatation. The female urethral dilators, which being curved, direct the perforating force safely downwards, into the lumen of the nasopharynx. The atretic plate is almost always thinnest and weakest at the junction of the floor of the nose and posterior end of the septum.

The use of rigid endoscope in the management of choanal atresia represents a significant advancement in choanal surgery. It provides an extremely sharp image, with high resolution and bright illumination. It enables the surgeon to see the

tips of his instruments so that the bony atretic plate can be removed under direct vision. It allows assessment of the size of the created opening and allows a more exact removal to be performed. As compared to the more common transpalatal approach, this procedure has less blood loss, no risk of stunted palatal growth or palatal fistula (6). The procedure may be repeated if the first one fails without increasing the risk to palatal growth.

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