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Choanal Atresia: Experience with Transnasal Endoscopic Technique

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Abstract:

l < age Choanal atresia has been recognized for over 200 years, first described by Roederer- in 1775 (Lantz and Brick, Lar-NInt,oscope 91, 1981, 1626: Samuel and Fernandes, Laryngoscope 95, 1985, 326). This condition is uncommon, occurring in approximately 1 in 7000 live births. Unfortunately, a single ideal procedure for this condition does not exist. Stankiewicz is credited with the first description of endoscopic techniques for choanal atresia repair. All patients diagnosed to have choanal atresia treated between 2014 and 2015 were reviewed. Out of four patients two underwent endoscopic repair. This article attempts to address this controversy between endoscopic and traditional approaches to neonatal choanal atresia.

Key Words: Choanal atresia, nasal obstruction, transnasal endoscopy

INTRODUCTION:

Choanal atresia is an uncommon congenital anomoly. The reported incidence ranges between 1 in 5000-10,000 live births. Bilateral choanal atresia is a medical emergency, and almost always presents in the new born as respiratory distress and cyanosis, which are relieved by crying." The reflexes to facilitate breathing through the open mouth in response to nasal obstruction develop only weeks to months after birth, although an infant will mouth breath if the mouth is opened either during crying or with the help of an artificial airway. Unilateral atresia, on the other hand, may go unrecognized until later in life, since associated respiratory distress is usually not encountered at birth. Since the first description of choanal atresia by Roederer in 1775, many surgical approaches have been described. Transnasal, transpalatal, and trans-septal approaches are the most commonly used procedures. The aim of this study is to present our experience in the surgical correction of choanal atresia through the transnasal endoscopic approach.

MATERIALS AND METHODS

The medical records of all patients diagnosed to have choanal atresia and treated at Sree Balaji Medical College & Hospital, chennai between 2014 and 2015 were reviewed. Information collected included sex, age at presentation, type and site of atresia , presence or absence of other congenital anomalies, method of surgical repair and postoperative complications. The diagnosis was made clinically and confirmed by CT scanning. The immediate management of these neonates presenting with intermittent cyanosis was the insertion of an oral airway and feeding via orogastric tube. Out of four, two patients underwent surgical repair of choanal atresia through the transnasal endoscopic technique. Curved urethral dilators were used to dilate membranous atresia. In the case of bony atresia, the atretic plate was perforated transnasally using a urethral dilator, to enlarge the posterior choana. 0° and 30°, 4 mm Storz-Hopkins rod telescopes were used for visualization. All cases were stented, using portex polyvinyl chloride endotracheal tubes for a period of 4 weeks. All patients were given postoperative antibiotic prophylaxis for the whole period of stenting. Postoperative follow-up periods ranged from 1 to 2 years.

RESULTS

During the study period, four patients with choanal atresia, comprising two males and two females were managed at our institution. Their ages ranged between 6 days and 2 years. Choanal atresia was bony in two patients, membranous in one and bony membranous in one patient. The atresia was unilateral in two and bilateral in two. None of the patients had other congentital anomalies, including submucosal cleft palate, Down syndrome and Apert's syndrome.

The outcome of the surgical approach to correct the choanal atresia showed an overall success rate of 100% after a single procedure. None of these patients required revision surgery. During the postoperative period, close monitoring was done in the ICU and no major complications were encountered. During the stenting period, normal saline drops were instilled into the stent tubes at regular intervals.

DISCUSSION

Choanal atresia is an uncommon congenital anomaly, which consists of a bony, membranous or cartilagenous plate obstructing one or both posterior nasal apertures. The posterior choanal atretic plate is attached superiorly to the basisphenoid, laterally to the pterygoid plates, medially to the vomer and inferiorly to the bony palate. The atresia plate may be thicker below than above; in unilateral cases the sphenoid may be absent or hypoplastic on the atretic side. The lateral wall becomes progressively thicker as it goes posteriorly; the nasal floor slopes upward as it progresses posteriorly, and the vomer may be deformed posteriorly, all contributing to obstruction.l2l. Classic theories of embryogenisis of posterior choanal atresia implicate persistence of either the nasobuccal membrane or failure of the buccopharyngeal membrane to recanalise or the presence of adhesions in the area. J2' Hengerer and Stromel3J have proposed that neural crest cells may migrate into this area, which, if already abnormal, may alter the flow of neural crest cells. Many methods are used to diagnose choanal atresia. Absence of misting on a metal plate or the movement of a wisp of cotton wool in front of the nostrils or failure to pass a soft nasal catheter would be considered diagnostic of the choanal atresia. Choanography has been the traditional method of confirming the diagnosis of choanal atresia. The current investigation of choice however is computerized tomography.l4" This gives more information with regard to the actual structures involved and their thickness, and whether the obstruction is bony or membranous. Recent discussions have centered primarily on which approach yields the best results with the least morbidity and probability of requiring revision surgery.l5-161 .The key to successful treatment is probably the surgical approach, as the particular anatomic abnormality responsible of the atresia. The endoscopic trans-nasal repair is preferred in cases, of infants, as it is quick, safe and avoids hard palate and alveolar arch growth retardation, which are possible complications of the transpalatal approach. Recent advances in endonasal endoscopic surgery have opened the way for endoscopic trans-nasal repair of choanal atresia, as it provides direct and excellent visualization of nasal cavity and posterior choana. It is associated with less morbidity than the transpalatal approach. The rate of stenosis seems to be lower when the vomer is removed, be it through transpalatal or transnasal approaches. In our institution we prefer the transnasal puncture and dilatation as the initial procedure of choice. The type and duration of nasal stenting are important factors in the outcome of choanal atresia. Many types of stents have been suggested. We had good results and fewer complications using endotracheal portex tubes (Polyvinylchloride).

CONCLUSION

Transnasal puncture and dilatation followed by stenting with endotracheal portex tubes for 4-6 weeks is the initial surgical procedure of choice. It is quick and safe, with minimum blood loss, and avoids hard palate and alveolar arch growth retardation. The present series has a low incidence of other congenital anomalies. However, the key to success with the transnasal approach is dependent on the following factors.

1. Prevention of excessive granulation tissue formation, which is achieved by
   (a) Prevention of excessive damage or removal of mucosa during surgery;
   (b) Use of soft polyvinyl chloride (portex) tube for stenting;
   (c) Use of broad spectrum antibiotics for the whole period of stenting.
2. Following perforation and dilatation, the choanae must be stented for a period of at least 4 weeks. The removal of the stent tubes must be performed as gently as possible, to avoid trauma and bleeding. Therefore, it is preferable to remove stents under general anaesthesia in the operating theatre.

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