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Endoscopic bilateral congenital choanal atresia repair of 112 cases, evolving concept and technical experience

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ABSTRACT

Objective: This study aims to present 18 years' experience with endoscopic treatment of bilateral congenital choanal atresia as regard to management concept, surgical technique, results, pitfalls, and complications.

Patients and methods: A retrospective study including 112 cases of bilateral congenital choanal atresia, treated at Mansoura University Hospital endoscopically in the period from January 1998 to March 2015. As far as we know, this is the largest study group on transnasal endoscopic choanal atresia repair in literature.

Results: One hundred and twelve infants (87 females, 25 males) were included in the study. Age at operation ranged between 1 day and 28 days (8.75 days in average), and body weight average was 2.76 kg. All patients were diagnosed at birth except 3 infants. In this study, 85 cases were mixed atresia, 25 cases were bony atresia, and only two cases were membranous. In all cases, obliterated choana bone and vomer bone was removed, lateral wall drilling was used in 33 cases. Follow up ranged between 6 months and 18 years (95.6 months in average). The most common complication was restenosis, occurred in 42% (47 cases). Second-look procedure was done in 68 cases. The need for second-look evaluation with stent group was 74.5% (62 out of 83 infants), whereas in non-stent group was 20.6% (6 out of 29 infants).

Conclusion: Endoscopic repair of bilateral choanal atresia is a safe, effective technique with minimal complication. Usage of 30 degree sinuscope permits better visualization and higher accessibility for the surgical instruments. Surgically formed wide single neochoana with removal of all intervening tissue surroundings, and good follow up permit higher success rate without stenting. Advanced learning curve permits tailoring the perfect surgery with minimal tissue injury and better outcome. Post-operative choanal dilatation using esophageal dilators under endoscopic examination decrease the need for stenting and second-look evaluation.

Introduction

Choanal atresia is a narrowing or obliteration of the posterior nasal aperture leading to failure of the posterior nasal cavity to communicate with the nasopharynx [1]. Congenital bilateral choanal atresia is formed by thickened posterior vomer with ossification of the posterior lateral nasal wall closed to the pterygoid plates [2].

Choanal atresia is the most common congenital nasal anomaly with estimated incidence 1 case per 8000–10,000 live births [3], and it is more prevalent among females [4].

Surgery of choanal atresia aims at complete removal of the atretic plate and assurance of long-term wide patency. This entails proper preoperative assessment and good intraoperative visualization [5].

Objective

Early experience for the authors was published in 2002 and 2009, respectively [6,7].

This study aims to present 18 years' experience with endoscopic treatment of bilateral congenital choanal atresia as

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regard to management concept, surgical technique, results, pitfalls, and complications

Patients and methods

A retrospective study including 112 cases of bilateral congenital choanal atresia, treated at Mansoura University Hospital endoscopically in the period from January 1998 to March 2015. As far as we know, this is the largest study group on transnasal endoscopic choanal atresia repair in literature.

All infants were referred by the pediatrician. Careful history from the parents and axial CT scan was done for all infants. CT scan is examined to confirm the diagnosis, assess the choanal area, vomer width, septum and lateral nasal wall area, medial pterygoid projection, and thickness of the atretic plate.

Complete preoperative work up including laboratory investigation, pediatric and anesthetic consult. Echocardiography was done as a rule to exclude congenital heart disease. Preoperative counseling for the parents was done (nature of the condition, postoperative care, expectation, and 2nd look evaluation).

Surgical technique

GA with endotracheal tube with moist gauze was used in the oropharynx. Bulky gauze in the oral cavity was avoided as this will narrow the nasopharynx especially over the soft palate. Supine position with vasoconstrictor nasal drops preparation was done. A zero, 30-degree in 4 mm and 2.7 mm diameter nasal endoscopes were used. Few pediatric endoscopic instruments are needed; nevertheless, the otologic microsurgical instruments were very helpful. Although the technique remains the same, some modifications were made directed by the building-up experience through the years. An incision is made in the posterior septum close to the obliterated choana. Multiple instruments can be used including sickle knife, radiofrequency needle, or coblation needle (Fig. 1). The incision is extended to the atretic plate. The mucosa over the atretic plate is removed. In cases with mixed atresia, the atretic plate is perforated with suction tip inferiorly and medially. Removal of the vomer is the most important step. Extra-long burs, ear curretes and dissectors are used to create the neochoana. The superior level of neochoana is marked by the middle turbinate attachment to skull base to assure safe drilling and dissection (Figs. 2 and 3).

Usage of 30-degree sinuscope with downward beveling was very helpful during surgery to work with a top view allowing easy passage of the surgical instruments, not hindered by the endoscope, and better visualization. Also, a 4 mm sinuscope gives wider surgical view than a 2.7 mm sinuscope and was preferred by the authors in all the cases in this study. The 2.7 sinuscope was needed in few infants (4) with narrow nostril to make the incision and the earlier steps in the surgery; however, the 4 mm sinuscope can be used even in the earlier steps without difficulty. Caution was taken to keep the cartilaginous septum and alar cartilage intact. Attention was then directed to the lateral boundary of the neochoana. In some infants (33), drilling is required to obtain a good sized neochoana keeping in mind the continuous healing attempts of all tissues in the area of surgery (Fig. 4). One choanal repair was done in most cases (Fig. 5). However, bichoanal repair could be done with preservation of posterior septal mucosa in some cases if the width of the choana is accepted which was not the rule.

In this study, 83 cases with stenting and 29 cases without stenting were included. Portex endotracheal tube size 3–3.5 (mm ID) was used as a stent. The length is measured by suction tube; it is fixed sublabially or transeptally. Stenting was kept for about 2–6 weeks. Stenting was used as a rule early in this study (the first 70 cases); however recently, stenting was done only in some selected cases with narrow choana after drilling, difficult follow up situations and patients with associated congenital anomalies.

Post-operative care

Early feeding is helpful for the baby and the mother. Antibiotic, local vasoconstrictor drops, and eye drops (Dexamethasone and Tobramycin) were given to all infants. Patient is discharged usually at the second day after pediatric consultation. In cases with

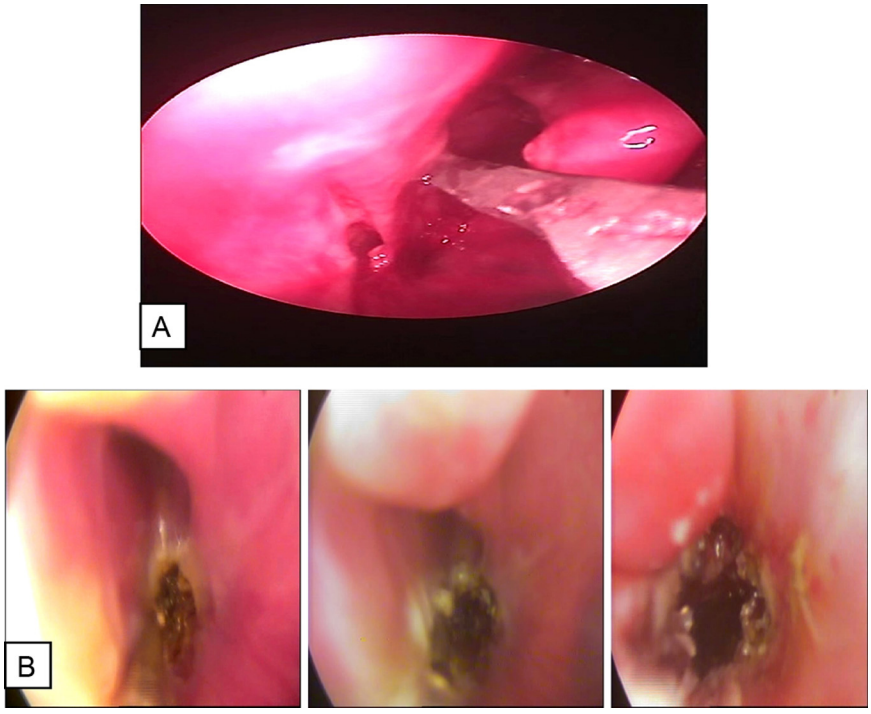

Fig. 1. Incision made by sickle knife and dissector (A), coblation needle (B).