Bilateral Choanal Atresia: Is it Really a Surgical Emergency?

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Abstract To review the need of emergency recanalization surgical procedure in cases of bilateral choanal atresia. A retrospective analysis was undertaken for the cases of bilateral choanal atresia which were recanalized between January 2000 and February 2010 in a teaching hospital. Out of 135,954 live births (0.004%), six cases of bilateral choanal atresia were diagnosed and operated during this period. Five cases were hospital deliveries from our hospital whereas one case was referred from another hospital. Three cases were recanalized with dilatation procedure whereas the other three were endoscopically recanalized with micro-drill. All the cases were operated in routine operation theatre. All were managed with orogastric tube or oropharyngeal airway during the waiting period for surgery. No neonate required emergency intubation or tracheostomy. The average age at the time of surgery was 10 days (range 5–21 days). As per our observations recanalization surgery for bilateral choanal atresia is not a surgical emergency. Neonates can be managed temporarily with orogastric tube/oropharyngeal airway during waiting

period. Subsequently surgery can be done in routine and unhurried operation theater by experienced surgical hands thus minimizing the morbidity.

Keywords Choanal atresia · Bilateral · Nasal · Endoscopic management

Introduction

Choanal atresia is lack of communication between the nasal cavity and nasopharynx. It is uncommon condition leading to respiratory distress in a new born. Congenital choanal atresia was first described by Roederer in 1755 [1]. The incidence of choanal atresia is reported in frequency of 1/7000 live births [2]. Unilateral stenosis is more common than bilateral and more frequent in females [3]. Unilateral cases are generally asymptomatic and present with unilateral nasal discharge and persistent nasal obstruction after first episode of upper respiratory tract infection in a new born [2].

Bilateral choanal atresia (BCA) presents as medical emergency at birth [4]. New born with BCA makes vigorous attempts to inspire often sucks lips and develop cyanosis. Distressed infant then cries and cyanosis disappears. Emergency airway management includes passage of oropharyngeal airway, orotracheal intubation or tracheostomy [2, 4, 5]. The definitive treatment includes nasal recanalization through transpalatal or transnasal route.

We retrospectively reviewed the cases of recanalization of BCA, operated in our department between January 2000 and February 2010. The aim of this study was to evaluate the need of emergency recanalization surgery in cases of bilateral choanal atresia. We share our experience in this manuscript.

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Table 1 Demographic data of children with bilateral choanal atresia

Patient	Birth history	Age at surgery	Type of atresia	Associated anomalies	Surgery
1	FTNVD, F	11 days	Membranous	Nil	Dilatation
2	FTNVD, M	10 days	Mixed	Nil	Dilatation
3	FTNVD, M	5 days	Membranous	Nil	Dilatation
4	FTNVD, M	21 days	Mixed	Coloboma, inguinal hernia and microphthalmia	Endoscopic drilling
5	FTNVD, M	6 days	Mixed	Nil	Endoscopic drilling
6	Preterm (36 weeks) VD, M	7 days	Bony	Maternal polyhydramnios, left choroido-retinal coloboma, bilateral polydactyl, developed post-operative meningitis	Endoscopic drilling

FTNVD full term normal vaginal delivery, VD vaginal delivery, M male, F female

Material and Method

Clinical records of children who underwent nasal recanalization surgery for BCA between January 2000 and February 2010 were analyzed retrospectively. The records were reviewed for antenatal history, clinical symptoms, sex, age at surgery, type of surgical repair, recurrence, follow-up time and postoperative outcome. The associated anomalies were also noted in these cases. All cases had pre-operative CT scans to confirm the diagnosis, to see the extent of obstruction and to rule out any other craniofacial anomalies. The full review was also given to hematological as well as radiological investigations in all cases.

There were 6 cases of BCA who had undergone recanalization surgery during same period. All were full term normal vaginal deliveries except the last case which was preterm (36 weeks). All these cases underwent elective surgery in routine operation theater. All of them had respiratory distress at birth. The diagnosis was made by failure to pass infant feeding tube number (6 F). Neonates who presented with respiratory distress and in whom

catheter (6 F) failed to pass through the nasal cavities to nasopharynx were diagnosed as cases of BCA. After making provisional diagnosis of BCA, an orogastric tube/oropharyngeal airway was inserted. Neonates were relieved of their respiratory distress. Patient who was referred from other hospital with respiratory distress already had an orogastric tube in situ. The patients were also clinically evaluated to rule out any other syndromic associations.

Routine hematological examinations were unremarkable. Computed tomographic scans of nose and paranasal sinuses was done in all the cases. The demographic summary of cases is given in Table 1.

Surgical Technique

All cases were taken-up for transnasal recanalization under general anesthesia in routine operation theater after obtaining the informed consent. After decongesting the nasal mucosa with 0.05% xylometazoline, diagnostic nasal endoscopy was done with 0° nasal endoscope (2.7 mm) (Fig. 1). Another 4 mm, 120° nasal endoscope was passed

Fig. 1 Choanal atresia as seen through 2.7 mm 0° nasal endoscope

Fig. 2 Bilateral choanal atresia as seen by 4 mm 120° endoscope from nasopharynx

through the oral cavity and atretic plate was confirmed from nasopharynx (Fig. 2). Thereafter atretic plate was palpated with blunt probe. Under the endoscopic guidance atretic plate/membrane was perforated. First three cases were serially dilated with Haeger Dilaters. In rest of the cases micro drill was used to perforate and widen the opening. After the procedure in all the cases stent was inserted and kept for 4 weeks. A U shaped stent was tailored from endotracheal, Portex tube no. 3.5 mm, with hole at the bend. The position of stent in nasopharynx was confirmed again with the help of 120° endoscope which was passed through oral cavity (Fig. 3). The hole in stent was positioned in the nasopharynx in such a way that air could travel through both nostrils to nasopharynx (Fig. 4). The stent was secured at anterior nares with silk sutures and nasal packing was done along the stent which was removed after 24 h.

Fig. 3 Stent seen in situ through 4 mm 120° nasal endoscope

During the post-operative period suction was done through the tube to avoid any crust formation. Subsequently parents were taught to do the suction. Patients were discharged after 7 days and were followed up at 2 weekly intervals. After 4 weeks the stent was removed under general anesthesia. Nasal endoscopy was done at 6 weeks post-operative period to check for the patency of nasal cavity.

Results

There were 135,954 live births between January 2000 and February 2010 in our hospital. Six cases (0.004%)

Fig. 4 Diagram showing choanal stent

underwent nasal recanalization for BCA. Five patients were referred from pediatrics section to us for respiratory distress after the birth. One patient was referred from another hospital and had similar problem of respiratory distress after birth. The other demographic data is summarized in Table 1.

All cases were managed temporarily with orogastric tube/oropharyngeal airway till the recanalization surgery was done. None of our patients required intubation or tracheostomy till they were taken up for surgery in routine O.T. The average age at the time of surgery was 10 days (range 5–21 days). Case no. 1 and case no. 2 had repeated dilatation because of stenosis twice after the interval of 3 and 6 months, respectively. In two cases breast feeding difficulty was noted as stent was protruding at anterior nares, which was later shortened. In the rest of the cases post operative period was uneventful. Cases no. 4 and 5 required dilatation once at the age of 6 and 8 month, respectively. The last case is still on follow up after removal of stent at the time of writing.

Discussion

Bilateral choanal atresia is a developmental anomaly which presents with respiratory distress and requires urgent airway intervention. Neonates have obligatory nasal breathing and BCA cases are often intubated or tracheostomized for their respiratory distress. Surgical correction is encouraged early in life to prevent prolonged intubation and to ease oral feeding.

Choanal atresia may be isolated case or may occur with other congenital malformations. Syndromic associations should preferably be investigated prior to corrective surgery and its anesthetic feasibility [4]. Generally these cases are referred to otolaryngologist for recanalization surgery for emergency procedure. Such cases should be managed temporarily with oropharyngeal airway or orogastric tube or intubation for airway obstruction. Subsequently recanalization surgery is planned in routine, unhurried operation theatre. These cases are not done routinely in ENT practice, especially in emergency, and experienced hands are required to operate such cases to minimize the morbidity.

As in present study oropharyngeal airway and orogastric tube allowed neonatal breathing and aided in feeding. Inserting oropharyngeal airway and orogastric tube is a better alternative to intubation/tracheostomy, as it decreases the morbidity associated with emergency procedures. Francesco et al. [6] concluded that in case of prolonged nasal obstruction in infant, the use of a pacifier enhances the infant's ability to maintain a more adequate oral air flow.

In a large study of 52 cases mean age at surgery was 11.1 days, however all cases were intubated prior to

surgical management [3]. In another study mean age at surgery was 8 days [7]. In present study, none of the neonates required intubation and all cases were managed temporarily by orogastric tube/oropharyngeal airway with average age of 10 days at the time of definitive surgery.

Our hospital is tertiary care teaching hospital having a big obstetric wing and a separate childrens hospital. In present study only 6 cases (0.004%) were recanalized for BCA during 2000–2010, although there were 135,954 live births during this period. No case of unilateral atresia was operated during same period. In literature the prevalence for choanal atresia is 1 in 5000–9000 live births [2, 4, 8]. However, in present study only 0.004% cases of BCA were identified and operated. Similar data is not available in literature so it is difficult to compare the results particularly from India. Choanal atresia incidence is mentioned as one in 5000–9000 live births but the exact incidence of BCA is not very clear. The plausible explanation may be that occurrence of BCA in India is less.

Emergency surgical procedure has its inherent morbidity. BCA cases can be managed temporarily with conservative methods and are not dire surgical emergencies. Once infant with BCA is fully investigated for other syndromic associations and experienced surgical hands are available, technically challenging recanalization surgery can be planned in routine and unhurried operation theater. These cases are not routine surgical cases and require considerable surgical experience. Thus BCA cases should not be operated in emergency, once experience hands are available, these can be taken up in routine operation thereby minimizing the morbidity.

Conclusion

The cases of bilateral choanal atresia can be managed temporarily with orogastric tube/oropharyngeal airway and subsequently recanalization surgery can be planned in routine operation theater by experienced surgical hands.

Summary

- Bilateral choanal atresia cases are often intubated or tracheostomized for their respiratory distress.
- The main aim of this study was to evaluate the need of emergency recanalization surgery in cases of bilateral choanal atresia.
- We came to a conclusion that bilateral choanal atresia can be managed temporarily with orogastric tube/oropharyngeal airway and subsequently recanalization surgery can be planned in routine operation theater.

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