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Original Article

Endoscopic management of congenital choanal atresia: Second look is mandatory

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Abstract

Congenital choanal atresia (CA) is a rare abnormality characterized by unilateral or bilateral obstruction of the posterior end of the nasal cavity. With an incidence of 1:1000 to 1:8000 births, it is more in female than in males and unilateral more common than bilateral. Surgical procedures aim to provide adequate functional choanal patency and a low rate of rest enosis, with shorter surgery and hospitalization times, to minimize morbidity and mortality, this study done to evaluate the effectiveness and safety of endoscopic nasal surgical techniques for the treatment of congenital choanal atresia in patients with unilateral and bilateral atresia and to emphasis in the important of second look procedure at the time of removal of stent to assess the wideness of neochoana, and to remove any granulation tissue ,or polyps, it involved 13 patients, 10 with unilateral CA and 3 bilateral CA, all involved in surgery and second look.

Key words: *Neck infection, restenosis, choana*

Introduction

CA is a congenital disorder where the back of the nasal passage (choana) is blocked, usually by abnormal bony or soft tissue (membranous) due to failed recanalization of the nasal fossae during fetal development. It was first described by Roederer in 1755.

It can be suspected if it is impossible to insert a nasal catheter through the nostril to nasopharynex. Also, if one notices a continuous stream of mucus nasal discharge from one or both nostrils, it could be a sign of an atresia. Another common sign is cyanosis in an infant while breast feeding, as breathing is dependent on nasal patency in this age.

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Clinical presentation of CA varies from acute airway obstruction to chronic recurrent sinusitis depending on whether CA is unilateral, bilateral.

Sometimes, a unilateral choanal atresia is not detected until much later in life because the baby manages to get along with only one nostril available for breathing. 90% of choanal atresia is bony and 10% is membranous. 30% of such malformations consist of purely bony obstructions and 70% of a mixed bony - membranous obstruction[1].

The diagnosis is by history ,clinical examination and confirmed by CT scan[2].

By 1920s, most of CA clinical features were recognized, and four surgical techniques including trans-nasal, trans-septal, trans-palatal, and trans-maxillary approach had been devised[1].

Surgery of choanal atresia aims to complete removal of the atretic plate and assurance of long term wide patency. this needs proper preoperative assessment and good

intraoperative visualization which can be only through transnasal endoscopic surgery that provides excellent visualization and enables accurate surgery to be performed in the newborns, as well as in adults[3].

The transnasal endoscopic approach is believed to be the best approach for surgery of choanal atresia.it helps to preserve most of mucosa, and avoid injury to other structures.. after surgery, endoscopic follow up helps to detect and treat any mucosal adhesions, granulations, crusting and to ensure choanal patency[4].

Methods

This study included 13 patients diagnosed as congenital choanal atresisa: 9 females (69%) and 4 males (30.8%), 3 cases with bilateral CA and 10 cases unilateral. their ages ranged between 1 day to 18 years. All cases operated in Muhyl and Jizan hospitals south of Saudi Arabia by the same surgeon at the period between January 2003 to August 2012 with a follow up period from 12 to 24 months. All neonatal cases were diagnosed clinically and referred by the attending and treating pediatrician. Childhood and young adult cases presented to our ENT clinic with unilateral nasal symptoms. Careful history was taken from the parents and patients. Complete ENT examination was conducted. All cases had CT scan to confirm the diagnosis , evaluate the type and thickness of the atresia plate and to detect any associated abnormalities in the septum, lateral nasal wall or base of the skull. preoperative blood investigation done and consents for the surgery and approval from the medical ethics of the hospital were taken.

Surgical Technique

Under general anesthesia with oral intubation, after decongestant nasal drops, we used storz rigid endoscopes with 0, 30, 120 degree deflection angles. The endoscope was passed first into the nasal cavity to evaluate the size of the atresia and nasal cavity, nasal mucosa over the atretic plate was infiltrated with adrenaline 1:200,000 normal saline .incision was made longitudinally over the posterior septum just anterior to the plate using sickle knife. The incision was extended from its upper and lower ends horizontally over the atretic plate dissected from the posterior septum and the atretic plate laterally. The posterior bony septum was partially removed by dissector and Blakesley forceps, to make a common posterior opening. A long burr of a micro dill was passed along the floor of the nose to the level of the occluding plate. Since the atretic plate is almost always, thinnest and weak at the junction of the floor of the nose and posterior end of the septum, the burr should be hinged at this point. the perforating force should be safely directed downwards and medially, to avoid injury to the base of sphenoid. The bone of the atretic plate removed under endoscopic direct vision using curettes and back biting forceps, keeping in mind not to injure the posterior pharyngeal wall and the cervical spine. The nasal mucosa flap was rotated posteriorly to cover the raw area left by removal of the obstructing bone. stent Portex Polyvinyl inserted and sutured to the membranous part of the septum, behind the columella, left in place for 6 weeks. Regular suction was done several times/day and antibiotics were administered until removal of the stent. All cases were seen once per week tell the stent removed in the 6th week post operative and in the same time second look under GA done then after that we saw the patient once per month.

Results

13 patients involved in this study 9 females and 4 males. Age ranged from first day of birth to 18 years. All cases undergone

endoscopic surgery. Second look procedure was performed in all cases after 6 weeks at the time of stent removal with following findings in our cases: granulation tissues at the edges of the neochoana in 3 cases (23%) they were removed, polyps in 1 case (7.7%) which was removed. narrow choanal opening 1 case (7.7%) in this case rewidening the choana done by removal of excess bone. Follow up of the patients after second look no patients developed restenosis or any other complications.

Discussion

Congenital choanal atresia is a rare abnormality characterized by unilateral or bilateral lack of patency of the posterior end of the nasal cavity[5].

Clinical presentation varies from acute airway obstruction to chronic recurrent sinusitis depending on whether CA is unilateral, bilateral, congenital choana atresia occurs in 1/1000-1/8000 births of these cases 45% bilateral[6].

It is important to investigate other possible associated anomalies with CA such as CHARGE syndrome[7].

Recent Ct scan and histopathological studies showed evidence of higher incidence of mixed bony and membranous anomalies(70%) and pure bony atresia 30% with no pure membranous anomalies[8].

With a modern workup of computer tomography, a retrospective study reviewing the CT and histologic specimens in 63 patients showed a 29% pure bone atresia, 71% mixed membranous and bone atresia with no pure membranous atresia present[8].

Nasal endoscopy and CT scan are the procedures of choice for the diagnosis of choanal atresia, whether bony or mixed, and facilitate surgical planning[9].

A recent survey of the American society of pediatric otolaryngology members revealed that endoscopic approaches are favored slightly over transnasal repair[10].

many approaches have been advocated, including transpalatal, transnasal, transseptal and transantral[4].

the rigid endoscope in choanal surgery provided an extremely sharp image ,with high resolution and bright illumination. it ensured greater precision in flap preservation. endoscopic approach allows for short hospitalization and early recovery.

The main complication of surgery is choanal atresia is restenosis. The rate of restenosis varies in the literature from 9% to 36%, with an average of four to six reoperations per patient. The highest rates of restenosis appear to be related to younger patient age at operation and if it is bilateral[11].

stent are useful in stabilizing the nasal airway in the postoperative period and to prevent the development of stenosis by maintaining alumen[8].

many types of stents have been suggested: Lazar and Younis, 1995 reported excellent results using Portex a polyvinyl stents(12), while Bartel,1988 recommended the use of a Foley catheter[13], in our cases we used portex tubes with good results.

The duration of stent is controversial: Most of authors agreed that the stent should stay in place for 6-12 weeks. Josephson et al, 1998 advised 3 weeks for unilateral cases and 6 weeks for bilateral cases[14], while Lazar and Younis, 1995 stated that the duration of the stent should be individualized and left in place tell the mucosa of the neochoana developed[12].

In all our cases we applied stent for 6 weeks, to ensure complete patency of the choana and the time of stent removal a second look done to evaluate the size of the new choana,

remove any excess bone if needed in order to decrease the incidence of restenosis, because most of revision cases were due to inadequate bone removal and to treat any complications like: granulations polyps.

Conclusion

The use of endoscope in choanal surgery is effective and excellent with good visualization of both the atretic plate and the tips of instruments working under illumination and also make a second look procedure more easy, which is mandatory especially in neonates and young children in order to assure complete patency of the neochoana, removal of any granulations and to drill excess bone in narrow choanae, thus decreasing the incidence of restenosis.

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