Background:

Choanal atresia is the developmental failure of the nasal cavity to communicate with the nasopharynx. Several approaches have been described for primary repair of choanal atresia including transpalatal, transnasal, as well as transseptal. A transnasal endoscopic approach has been fully developed and is now the preferred method of repair. The incidence of restenosis after surgical correction is 9% to 78%.

Case report:

We present a female with CHARGE association and unilateral choanal atresia that was repaired primarily with traditional methods that failed. She underwent serial endoscopic balloon dilation and has maintained choanal patency one year post-operatively.

Conclusion:

Dilation of choanal atresia restenosis with balloon catheter techniques may be an effective new application of this technology. The procedure is minimally invasive with low morbidity and can be easily repeated to increase long-term patency for these patients.

Introduction

• Congenital choanal atresia is a rare anomaly found in 1 in 5000 to 7000 newborns [1].
• The cause is unknown, but thought to result from a failure of rupture of the membrane separating the nasal cavities from the oral cavity by the seventh week of development [2-3].
• Unilateral choanal atresia is more common than bilateral choanal atresia.
• Choanal atresia is frequently associated with other developmental abnormalities such as Treacher-Collins and Down’s syndromes.
• Choanal atresia is present in 35 to 65% of children with CHARGE association (Coloboma, Heart defect, Atresia of choanae, Retarded growth and development, Genitourinary abnormalities and Ear defects with associated deafness) [4].
• Several surgical approaches have been described for primary repair of choanal atresia including transpalatal, transnasal, as well as transseptal.
• A transnasal endoscopic approach has been fully developed and is now the preferred method of repair.
• Restenosis is known to occur after surgical correction and rates have been reported to be 9% - 78% [1, 5-7].
• Several methods have been used to address restenosis, the most common being an endoscopic transnasal approach.

Technique and outcome

Nasal endoscopy in the operating room revealed complete restenosis of the left choana. Using navigational guidance, the membranous choana was identified. A ball probe was used to pierce the membrane, through which a guidewire was advanced. Proper position of the guidewire was confirmed using intraoperative fluoroscopy. The choana was then dilated using a 7mm Acclarent sinuplasty balloon (Figure 3). The balloon was inflated to a pressure of 16 cm water and left in place for 1 minute (Figures 4-7); this procedure was repeated. Mitomycin-C was applied topically. Intra-operative endoscopic examination one month post-operative revealed a patent, but narrowed choana. Redilation was performed in a similar fashion using a Boston Scientific CRE Pulmonary Balloon Dilator (Figure 8) with an outer diameter of 12 mm and length of 3 mm, and application of Mitomycin-C.

Seven months later, the patient complained of nasal obstruction and underwent a repeat intra-operative nasal endoscopy revealing again a narrowed, but patent, choana. Repeat dilation was performed using a larger 15mm Boston Scientific CRE Pulmonary Balloon. A third intra-operative nasal endoscopy two months later (ten months after the initial procedure) revealed an adequately patent choana; however, the decision was made to improve the opening in order to provide a better nasal airway. The 15mm and 18mm Boston Scientific CRE Pulmonary Balloon catheters were used to further dilate the choana, followed by the application of Mitomycin-C. No further dilations have been performed and the patient’s left choana remains patent on repeat examination over 12 months since the initial procedure.

Discussion

Restenosis of choanal atresia is a significant problem that occurs after both primary repair and revision surgery. Restenosis rates of 9% - 78% are reported [1, 5-7]. Several techniques have been used to establish patency of choanal atresia stenosis; the most common method is a transnasal endoscopic approach with the use of a microdrill and stent placement; other instruments such as the YAG laser have been employed as well [6, 8]. Scar formation is by far the most common cause of restenosis and it can occur at anytime after a procedure.

We present a patient with a history of CHARGE association and left choanal atresia who presented with symptomatic restenosis following traditional repair methods. We performed serial balloon dilation in order to minimize trauma to the surrounding nasal mucosa and prevent subsequent scar formation. Her choana remains patent over a year after our initial procedure and her symptoms have resolved.

While our patient was unable to tolerate nasal endoscopy in a clinic setting secondary to her developmental status, the balloon dilation procedure is simple and can be performed with local anesthesia in a clinic setting. Avoiding sedation or general anesthesia is an advantage of the balloon technique over more traditional methods. The procedure is simple to perform and repeatable, allowing improved long-term patency for patients with choanal atresia restenosis.

References