



Choanal Atresia Repair, A Comparison Between Transnasal Puncture With Dilatation And Stentless Endoscopic Transnasal Drilling

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Abstract

Background: in this study we present the outcome of surgical repair of choanal atresia of 33 patients underwent the surgery at Tripoli University hospital and Tripoli central hospital

Objectives: The aim of this study to compare between two procedures used to repair choanal atresia. The first procedure is perforation and dilatation with stenting and the second procedure is endoscopic drilling without stenting. The comparison looked at the main complication which is restenosis of the choana.

Method: A review the medical notes of 33 patients diagnosed with choanal atresia and subjected to surgical repair.

Results: 8 patients out of 13 developed restenosis after treatment with perforation and dilatation (61.5%), While 4 patients out of 20 treated with trans-nasal endoscopic drilling without stenting (20 %)

Conclusion: The study showed that the risk of restenosis is significantly less in trans-nasal endoscopic drilling technique and the result of this procedure is comparable to the published data

Keywords: Choanal atresia; endoscopic repair; perforation and dilatation; restenosis

Introduction

Choanal atresia is a rare congenital abnormality. It occurs in 1:5000 – 1:8000 births [1]. Bilateral choanal atresia is an emergency situation and the airway needs to be secured immediately to save the newborn baby+ life. Surgical repair should be planned as soon as possible [2]. Both genders are affected and male to female ratio is 1:2, with 29% of cases are bony and 71% are mixed bony and membranous [3]. Unilateral choanal atresia is more common than bilateral type (65-75% of patients have unilateral). Different approaches have been described in the literature. The trans-nasal approach (endoscopic, microscopic, or blind puncture). Curved and straight urethral sounds have been used for puncturing. Endoscopic technique (trans-nasal or trans-palatal) with or without powered instrument offers excellent visualization in removing bony choana [4]. Combined trans-oral trans-nasal is another technique that provides good alternative with easier four handed surgery to ensure adequate posterior choanal repair [5]. CO2 and KTP laser are quick and cause minimal discomfort for the patient and short hospitalization [6]. Vomer removal and use of mucoperiosteal flaps

are the main elements for reducing post-operative re-stenosis, as a result of that neither stenting nor Mitomycin C was considered necessary [7]. There is a controversy about use of stenting as stenting can be associated with granulation formation and longer hospitalization. Some surgeons consider placement of stent in all neonates to prevent postoperative obstruction [8]. Carter et al. found that topical Mitomycin C to be efficacious adjuvant therapy in endoscopic choanal atresia repair and associated with reduction in formation of granulation tissue and rate of stenosis and number of surgeries [8]. Near total endoscopic removal of the bony septum provides long-term nasal patency for revision CA/stenosis repairs. The endoscopic 'common choanae' technique is aided by trans-nasal and transoral telescopic visualization with precise microbrewer removal of the bony septum [9]. No significant difference in surgical outcome as the rate of restenosis was 42.9% with stent and 47.4% without stent [10]. In Tripoli and until the year 2005, trans-nasal perforation and dilatation with stenting was the standard approach to treat choanal atresia. With the introduction of endoscopic sinus

surgery by the end of 2005, the endoscopic approach started to take over. In this study we will review both approaches looking at the main complication which is restenosis of the choana after surgery.

Materials and Methods

A total of 33 patients with choanal atresia were included in the study. They were treated surgically by either trans-nasal perforation and dilatation with stenting or trans-nasal endoscopic drilling without stenting. The age of the study group ranges from 3 days to 18 years. 8 patients were males (24%), and 25 patients were females with ratio of 1:3 respectively. 24 cases diagnosed with bilateral choanal atresia and 9 with unilateral. Diagnosis of choanal atresia was confirmed endoscopically and radiologically. All patients had a bony component of the atresia. The group of patients who underwent trans-nasal perforation & dilatation using a metallic perforator and urethral sounds are stented and the stent left in place for 6 weeks. They treated with saline irrigation

and suction to keep them patent. In the trans-nasal endoscopic group. 2.7- and 4-mm kinescopes were used, and the nasal cavity was prepared with decongestant. The atretic plate is opened using a drill after elevating lateral based muco-periosteal flap. The posterior part of the septum was removed, and no stent inserted. Patients of both groups were discharged within 2-4 days. Follow up arranged every other day for one week, weekly for one month and monthly for one year. Bilateral choanal atresia patients were referred from paediatric department and underwent the surgical repair within few days after birth. Unilateral cases presented with nasal obstruction which is worse with upper respiratory tract infection. 10 years old boy presented with heavy snoring and obstructive sleep apnea confirmed by sleep study. The boy also developed cardiac symptoms, investigated and referred for surgery by paediatric cardiologist. He underwent a successful endoscopic repair of left choanal atresia and adenoidectomy. Postoperative sleep study showed normal result (Figures 1 & 2).



Figure 1: Endoscopic view of CA.



Figure 2: Endoscopic view showing a drill.

Complications

(Table 1) The aim of the surgery is to open the choana and keep it patent, hence restenosis is the most worrying complication. It occurred in 8 out of 13 patients underwent trans-nasal perforation and dilatation (62%). 4 out of 20 patients underwent trans-nasal endoscopic drilling. All patients with re-stenosis required revision surgery. In trans-nasal perforation and dilatation group, only one

patient (8%) had significant bleeding and treated conservatively. One patient (8%) developed septal perforation as a result of surgical repair (Figures 3-5). One patient (8%) had obstructed stent and treated conservatively. Two patients (16%) of this group had postoperative intranasal adhesion required surgical division. In the trans-nasal endoscopic drilling group, only one patient (5%) developed postoperative bleeding. No one had a perforated septum or intranasal adhesions.

Table 1:

| Complication | Perforation and dilatation with stenting Total : 13 | Endoscopic drilling without stenting Total: 20 |
|---------------------------|---|--|
| Re-stenosis | 8 62% | 4 20 % |
| bleeding | 1 8% | 1 5 % |
| Perforation of the septum | 1 8% | 0 0 |
| Stent obstruction | 1 8% | 0 0 |
| Intranasal adhesions | 2 16% | 0 0 |

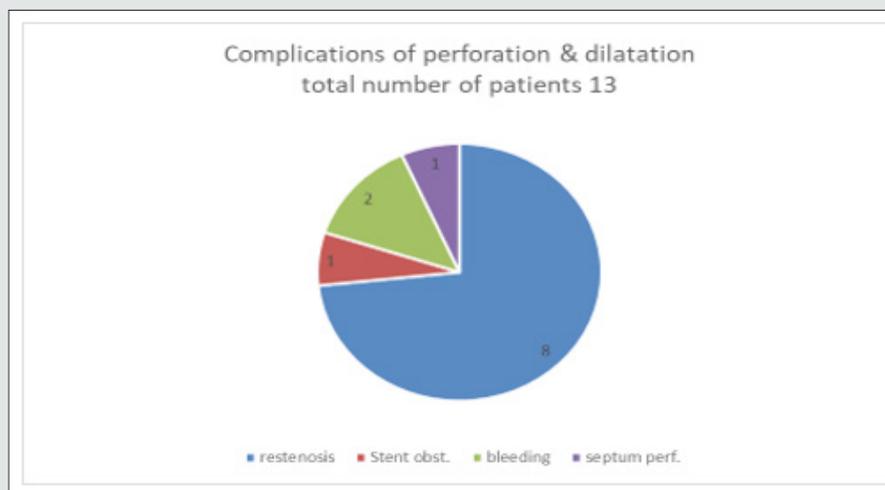


Figure 3:

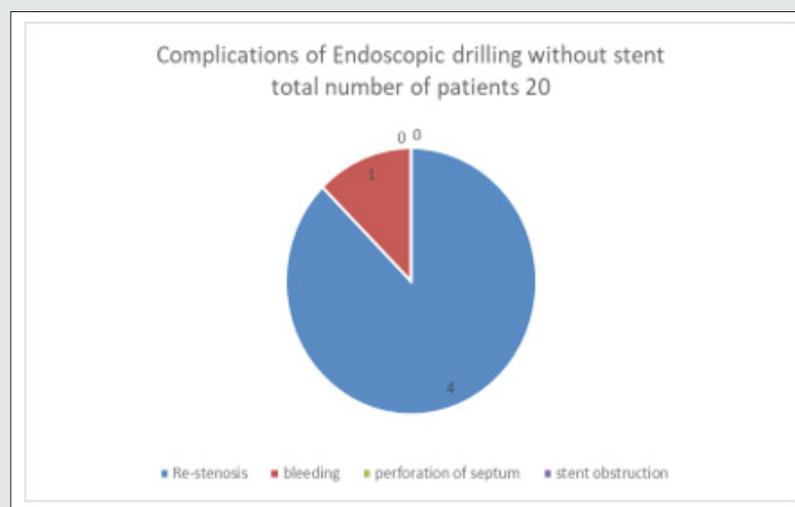


Figure 4:

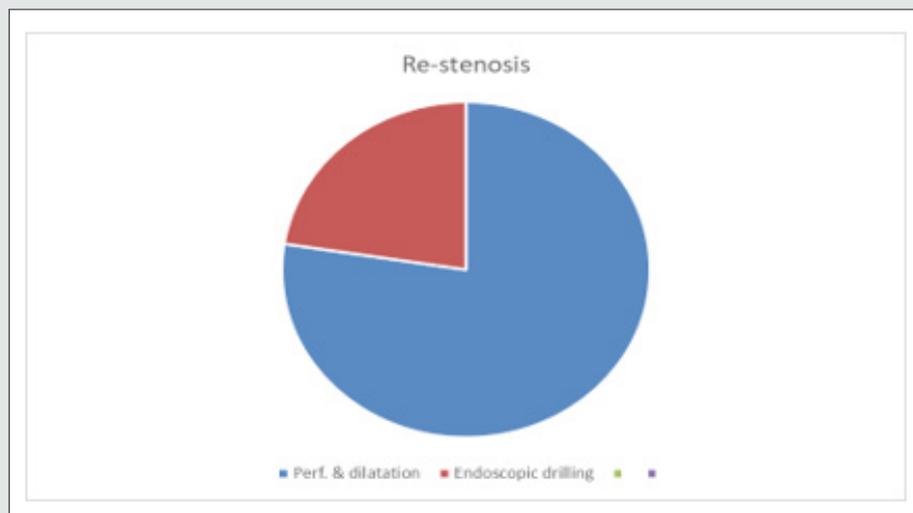


Figure 5:

Statistical analysis

Statistical analysis for restenosis as a complication of the two different procedures was carried out using Fisher exact test with a significant level of $P < .05$. The Fisher exact test statistic value: 0.0265. This indicates that there is a significant difference between

the two procedures in terms of postoperative restenosis of the choana.

Easy Fisher exact test

The Fisher exact test statistic value: 0.0265. The result is significant at $p < .05$ (Table 2).

Table 2:

| | No Stenosis | Stenosis | Marginal Row Totals |
|--|-------------|----------|---------------------|
| Perforation & dilatation with stenting | 5 | 8 | 13 |
| Endoscopic drilling without stenting | 16 | 4 | 20 |
| Marginal Column total | 21 | 12 | 33 |

Significant level 0.05.

Discussion

Although choanal atresia is a rare abnormality but surgical intervention is always required in neonates with bilateral atresia. Unilateral cases usually present later in life. The success of surgical intervention is mainly measured by minimal or absent postoperative complications, namely lower incidence of restenosis [11]. Different techniques of repair have been described in literature with different outcome. Transnasal surgery involves using drill which can be controlled endoscopically in different ways, either using 0-degree alongside the instrument within the nose or using 120-degree through the mouth and looking at the nasopharynx [11]. KTP laser can be used but it has no clear advantage [12]. Restenosis is the most challenging complication of the repair. Repeated dilatation after surgery and for few weeks may help to achieve good results. Use of

balloon for dilatation will give less shearing effect rather than use of urethral dilators [12]. Mithomycin C inhibits fibroblasts and may have a role in reducing fibrous tissue formation. The evidence of its efficacy is limited [12,13]. Whether stenting has any effect is still controversial [12]. Stents are very useful in providing guaranteed airway for infants during the obligate nasal breathing period, so it is reasonable to use them in infants with bilateral atresia for 6 – 8 weeks [14,15]. The transnasal perforation with stenting was the standard procedure in Tripoli hospitals until the year 2005 when endoscopic sinus surgery introduced. From that time transnasal endoscopic procedure started to take over. Now almost all the cases are carried out using transnasal Stentless endoscopic drilling with raising mucoperiosteal flap and excision of the posterior part of the nasal septum (Figure 6).

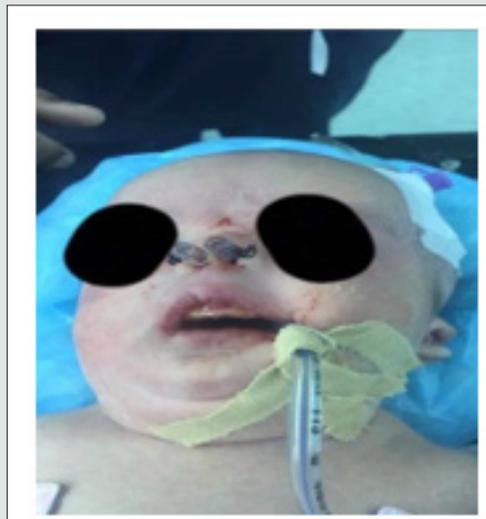


Figure 6: Stent after CA perforation.

Conclusion

Stentless transnasal endoscopic drilling combined with resection of the posterior part of the septum has proven to be more efficient procedure, gives better visualization of the surgical field and less incidence of complications. Statistically, it is proven to cause less restenosis compared to transnasal perforation & dilatation.

Acknowledgement

None

Conflict of Interest

The authors confirm no conflict of interest.

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