Endoscopic Turbinoplasty of Concha Bullosa: Long Term Results

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Abstract The aim of this study is to assess the long-term results of our endoscopic turbinoplasty technique for concha bullosa. Thirty-six patients of chronic or recurrent sinusitis who had concha bullosa on CT scan along with mucosal disease in sinuses and underwent turbinoplasty with functional endoscopic sinus surgery were studied. They were followed regularly with endoscopic examination for 7 years and were assessed for immediate or long-term complications of the procedure. Results of 36 patients revealed bilateral concha bullosa in 16 (44.4%) and unilateral concha bullosa in 20 (55.6%) patients. Out of 52 sides of turbinoplasties which were followed for average of 89 months, only 3 sides (5.76%) had synechia between middle turbinate and septum. Only 1 (1.92%) side had adhesions between lateral wall and middle turbinate. There were no other immediate or longterm complications. We conclude from our study that endoscopic turbinoplasty is safe and effective procedure for concha bullosa. It preserves middle turbinate anatomically and physiologically and treats the concha with negligible complications.

Keywords Concha bullosa · Turbinoplasty · Middle turbinate · Endoscopic

Introduction

Concha bullosa or pneumatized middle turbinate is a common anatomic variant of middle turbinate and is best diagnosed on CT scan [1]. This fact has become clearer in

recent years because CT has gained a major role in pre-operative radiologic evaluation of paranasal sinuses. Now every patient for endoscopic sinus surgery undergoes paranasal sinus CT scan. So we have intricate anatomic details of the paranasal sinuses of every patient before the surgery. With exact data of every patient in hand we have been able to assess incidence and significance of concha bullosa. Not only anatomy but also pathophysiology of concha bullosa has also been studied in detail. It has been shown that concha bullosa may grow to such an extent that it fills the space between septum and lateral nasal wall. This may block osteomeatal complex completely thus creating areas of mucosal contact potentially predisposing to sinus infection. Interior of concha bullosa is lined with ciliated respiratory epithelium and its ostium may drain into frontal recess, lateral sinus or hiatus. So obstruction of drainage of concha itself can lead to mucocoele formation [2]. Most importantly concha bullosa is centre of discussion because its presence has important implications on technique of endoscopic sinus surgery used in the management of sinus disease. Different techniques like lateral or medial marsupialization, crushing, and transverse resection has been described in literature for the management of concha bullosa [3]. The purpose of this study was to review our long-term results of turbinoplasty.

Materials and Methods

We studied 36 patients who underwent turbinoplasty and functional endoscopic sinus surgery from January to December 2003 in Tyrone County Hospital. All the patients had history of recurrent or chronic sinusitis not responding to medical line of treatment. On CT scan all had either bilateral or unilateral concha bullosa along with

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mucosal changes in sinuses. The surgery was done under general anaesthesia. A zero degree endoscope was used for turbinoplasty. Following topical anaesthesia with pledgets soaked in cocaine, 1% lignocaine with 1:80,000 adrenaline is injected over anterior end of the middle turbinate. Incision is taken with plane knife on the anterior surface of middle turbinate (Fig. 1). Mucous membrane of the turbinate is elevated with freer elevator (Fig. 2). Once mucous membrane is completely separated on medial and lateral sides, the bony lamellae are removed except in its upper part leaving mucous membrane intact (Fig. 3). This allows reconstruction of middle turbinate (Fig. 4). Once middle turbinate is reconstructed it enables easy access to the osteomeatal complex and rest of the procedure i.e. uncinectomy, ethmoidectomy etc. is carried out. Usually no packing is required. Patient is kept in the ward overnight and after the discharge from the hospital is advised to use nasal douche and steroid nasal spray for 6 weeks. Follow up is every week initially for 2 months and then every month for 6 months and every year after that. Careful endoscopic examination is done on every visit and middle turbinate in particular was assessed for instability, adhesions, and synechiae.

Results

Our study comprised of 36 patients. Out of which 20 (55.6%) were male and 16 (44.4%) female. Age range was 17–66 years. 20 (55.6%) of them had unilateral concha bullosa. Bilateral concha bullosa was present in 16 (44.4%) patients. So total number of sides of turbinoplasties studied was 52. Mean follow up was 89 months.

Fig. 1 Incision on anterior surface of concha bullosa

Fig. 2 Raising mucous membrane with freer's dissector

Fig. 3 Removing bony lamellae

Fig. 4 Reconstructed middle turbinate

There were no immediate complications like CSF rhinorrhoea, bleeding, excessive pain, and orbital damage. 4 sides had fibrous synechiae. Out of which 3 (5.76%) sides had adhesions between medial wall of the middle turbinate and septum. Only one side (1.92%) had synechia between lateral wall of middle turbinate and lateral wall of nose above middle meatal anastomosis. But in all of these patients there were no complaints of nasal obstruction and synechiae were not obstructing the middle meatal opening. Two patients (5.5%) underwent revision surgery. Both had recurrence of widespread mucosal disease but there was no synechia or lateralization of middle turbinate contributing to recurrence of disease. Except for this there were no long term complications like unstable turbinate or prolapse of middle turbinate into middle meatus, chronic crusting, or atrophic rhinitis. Although there was no formal quantitative assessment of olfaction, none of the patients complained of anosmia during post operative follow up.

Discussion

The incidence of concha bullosa has been reported to be between 8 and 53% [4–7]. Calhoun et al. have found that population with symptoms of sinus disease have significantly greater incidence of concha bullosa [8]. Lloyd in his study of 100 patients has shown that concha bullosa was associated with presence of increased infection in the sinuses [9]. So it is important to treat concha bullosa simultaneously during functional endoscopic sinus surgery. Not only because it contributes to osteomeatal and sinus disease but also because obstruction of its own drainage can lead to mucocoele formation. Different techniques have been described for management of concha bullosa. These range from radical excision of middle turbinate to minimal excision of medial or lateral lamella, or crushing of the concha. Cannon in his study has favoured lateral excision of the middle turbinate [3]. Braun and Stammberger preferred lateral lamella removal rather than excision of medial lamella or crushing of concha bullosa [10]. Several studies have compared these different techniques performed for concha bullosa. The synechiae rate observed

in different studies after middle turbinate resection or preservation surgeries is shown in Table 1.

With our technique the synechia rate is 7.6%, which is better than all the above cases of middle turbinate preservation but worse than resection cases. Resection causes loss of important landmark in the nose which was preserved in our technique at the cost of minimal asymptomatic synechia. Since thin reconstructed turbinate with preserved mucosa in our technique did not obstruct the key areas our revision surgery rate was low (5.5%) as compared to 14 and 7% respectively in MTP and MTR group of patients in Havas and Lowinger study [14]. Havas and Lowinger have shown slight smell outcome benefit in their middle turbinate resection group and no iatrogenic hyposmia. We cannot comment on any benefit as far smell is concerned since we did not measure smell quantitatively but none of our cases had anosmia or hyposmia postoperatively. We did not have any significant complications like epistaxis, orbital complications, CSF leak, chronic crusting or atrophic rhinitis which are occasionally encountered by extensive middle turbinate resections.

In short 7 year follow up of the patients has revealed good results with our technique. There were no immediate complications like bleeding, CSF rhinorrhoea due to damage to attachment of middle turbinate. Also only minimal number of patients had asymptomatic adhesions. This was due to the fact that whole mucous membrane of middle turbinate was preserved and there was no bare bone. Quicker healing, less crusting were other minor advantages. But the major advantage was preservation of normal anatomical landmark.

Conclusion

Endoscopic turbinoplasty with preservation of mucous membrane, superior attachment is simple and effective technique for the treatment of concha bullosa. It enables easy access to the osteomeatal complex. It causes minimal bleeding, no trauma and leaves normal middle turbinate both anatomically and physiologically. It exteriorises the disease from the concha and as mucous membrane is preserved it does not result in adhesions. Healing is quicker without usual postoperative crusting and morbidity.

Table 1 Synechiae rate (%)

	MTR (%)	MTP (%)
Dogru et al. [11]	27 (LatTurbinectomy)	9.7 (Turbinoplasty)
Shih et al. [12]	16	12.9
Ramadan and Allen [13]	5.3	9.3
Havas and Lowinger [14]	0	8.5

MTR Middle turbinate resection, *MTP* middle turbinate preservation

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