

INNOVATIVE TECHNIQUES

ENDOSCOPIC TREATMENT OF CONCHA BULLOSA IN CHILDREN

AYAL WILLNER, MD, RANDE H. LAZAR, MD, GEORGE H. ZALZAL, MD

Sinusitis complicates approximately 5% to 10% of upper respiratory tract infections in children.¹ As the importance of pediatric sinusitis has increased, increasing attention has focused on bony anatomic variations as etiologic factors. One of these is concha bullosa, which has an incidence of between 5% and 30%²⁻⁴ and is usually found bilaterally.^{5,6} It is considered to be pathogenic by two methods. First, it may directly, or by pushing the uncinate plate laterally, block the drainage of the anterior ethmoid, frontal, or maxillary sinuses.⁵ Second, bulbous enlargement of the middle turbinate may increase the likelihood of mucosal contact between the turbinate and lateral structures. This may lead to dysfunction of the mucociliary clearance mechanism⁷ and to the release of neuropeptides that cause local inflammation.⁸ However, the exact nature of the association between sinusitis and the presence of a concha bullosa has not been established. In adults, recent reports offer conflicting results on the correlation between the presence of a concha bullosa and the presence of sinus disease in various sinus areas. Nadas et al⁹ evaluated 308 patients with chronic sinusitis and concha bullosa. They did not find any significant association between these two entities. Bolger et al¹⁰ noted significantly more concha bullosa in chronic sinusitis patients than in controls. However, they did not relate this to the presence of disease in the surrounding sinus areas. Calhoun et al³ did find an association between the presence of a concha bullosa and the presence of anterior ethmoid sinus, but not ostiomeatal complex, disease. In children, recent studies showed that the prevalence of concha bullosa which impinged on the middle meatal structures was similar in patients with chronic sinusitis and controls.⁶ In addition, the presence of a concha bullosa did not significantly correlate with disease in any of the sinuses.⁶

Endoscopic sinus surgery (ESS) has been performed in children since 1987, and results were originally published in 1989.¹¹ Since then, many reports have been published supporting the usefulness of this procedure in the child with chronic sinusitis refractory to maximal and prolonged medical management. However, the endoscopic management of the concha bullosa in the pediatric patient has not been determined. Indications for treatment of the concha bullosa as part of the surgical procedure include (1) a concha bullosa that has diseased internal mucosa, (2) a

very large concha bullosa, which by itself obstructs the middle meatus and maxillary ostium, and (3) a concha bullosa that cannot be medialized and prevents adequate visualization of the middle meatus. The mere presence of a concha bullosa is not an indication for treatment.

In adults, routine partial middle turbinectomy during ESS has been advocated as a method to improve nasal airflow, increase the chance of prolonged middle meatal antrostomy patency, decrease likelihood of synechiae between the turbinate and the lateral wall, and improve visualization of the maxillary sinus ostium as well as the posterior ethmoid and sphenoid sinuses.^{12,13} Others recommend against turbinectomy because of the loss of an important surgical landmark, risk of atrophic rhinitis, or loss of olfactory acuity.^{7,14} In children who may need to undergo more than one intranasal procedure over their

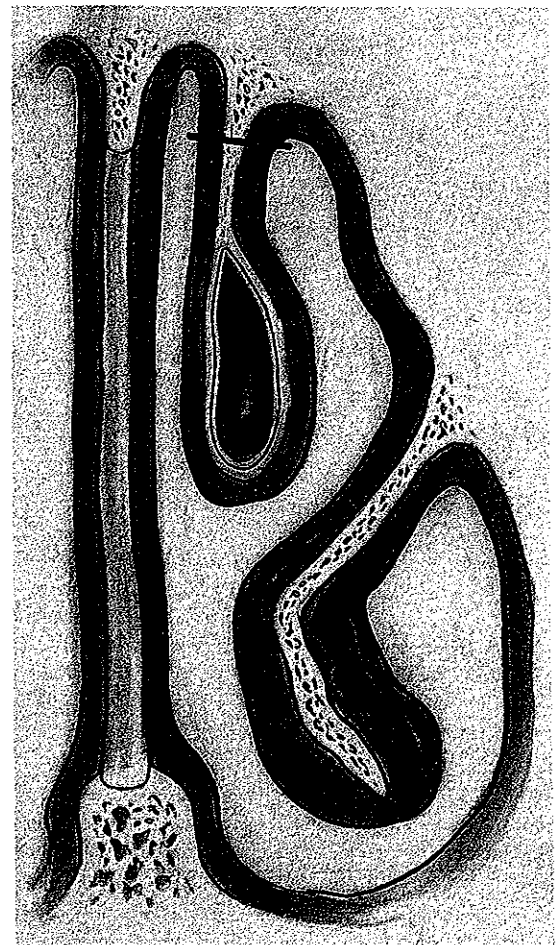


FIGURE 1. Excision of the anterior portion of the middle turbinate. The horizontal incision is made high up on the neck of the turbinate.

From the Department of Otolaryngology, Children's Hospital, Washington, DC and Otolaryngology Consultants of Memphis, TN.

Address reprint requests to Rande H. Lazar, MD, Otolaryngology Consultants of Memphis, 777 Washington, Suite P240, Memphis, TN 38105.

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FIGURE 2. A large concha bullosa is seen on the right, as is a small one on the left.

lifetime, and in whom growth changes may lead to distortion of the anatomy, we believe it is probably better to preserve the middle turbinate when possible. In some cases, such as the extremely flaccid middle turbinate that has been largely replaced by the chronic inflammatory process, some trimming of the turbinate may be indicated. Therefore, treatment of the concha bullosa should be directed at preserving as much of the preoperative anatomy as possible.

CRUSHING

In small concha bullosa, crushing the turbinate may be sufficient to relieve nasal obstruction and allow good visualization of the middle meatal contents. This method is the least destructive of the management options for the obstructive concha bullosa. However, it does not prevent the continued pneumatization of the turbinate. With time and growth of the patient, increased size of the turbinate may lead to recurrent infundibular obstruction. In this technique, the turbinate is grasped with a large pair of pituitary forceps and crushed. The turbinate may alternatively be crushed by inserting a Freer dissector between the septum and the turbinate and directing it laterally to crush the turbinate against the lateral wall, or inserting the Freer lateral to concha bullosa and crushing it against the septum.¹⁵ This method must be used with caution because rocking of the middle turbinate may cause fractures in the skull base.

PARTIAL TURBINECTOMY

For the management of large concha bullosa, partial turbinectomy may be necessary. Resection of the anterior portion of the turbinate is especially suited for concha that are pneumatized anteriorly without any posterior bulge. In this case, curved scissors are used to accomplish the resection. They should be placed at the neck of the middle turbinate just above the bulge of the area of pneumatization with the curve pointing inferiorly. As much turbinate as necessary may then be trimmed. An upward cut from the inferior border of the middle turbinate may also be used to limit the posterior extent of the resection (Fig 1). When this technique is used, effort should be made to preserve as much middle turbinate as possible.

LATERAL TURBINECTOMY

The goal of the lateral turbinectomy is to return the middle turbinate to a normal configuration of a plate of bone with nasal mucosa on its lateral and medial surfaces. It is very useful for the very large concha bullosa (Fig 2). The sickle knife is used to incise the inferior border of the turbinate. It is placed as far posteriorly as possible on the bulge of the turbinate and drawn forward once the air cell has been entered. The incision is carried superiorly up the head of the turbinate toward its anterior insertion. Care must be taken to stay lateral to the insertion and preserve the connection between the superior portion of the turbinate and the medial plate of the concha bullosa (Fig 3). Gentle lateral pressure on the lateral plate splays the concha open and allows careful inspection of the cavity to determine its boundaries. Using curved scissors, resection

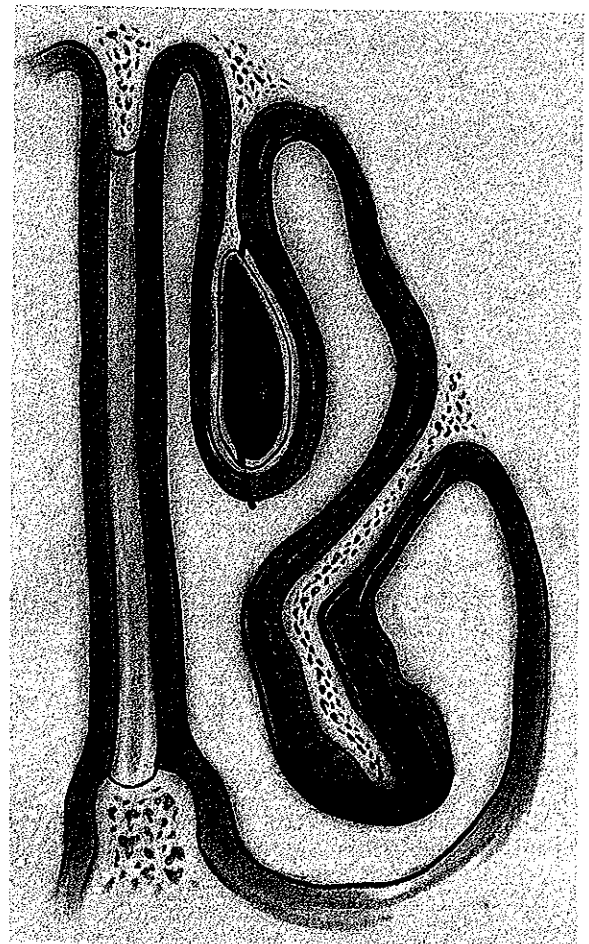


FIGURE 3. The lateral wall of the turbinate is removed.

of the lateral half of the turbinate is then completed. The result is a turbinate covered medially by the original nasal mucosa and laterally by the lining of the medial surface of the concha bullosa.

CONCHOPLASTY

This technique preserves the most of the preoperative anatomy. It slims a bulbous turbinate (Fig 4) by removing

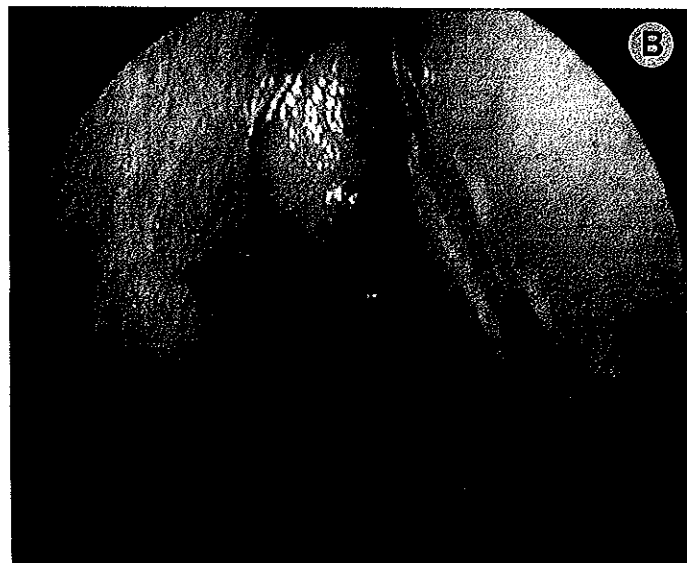
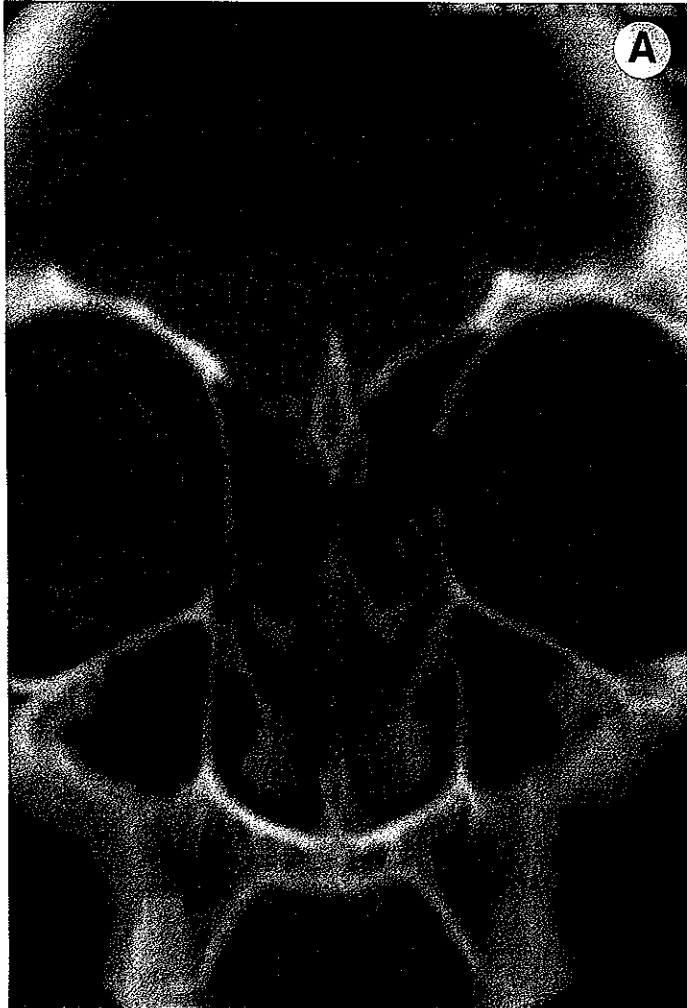


FIGURE 4. (A) This patient has bilateral concha bullosa that are symmetrical. (B) Endoscopic view of the same patient.

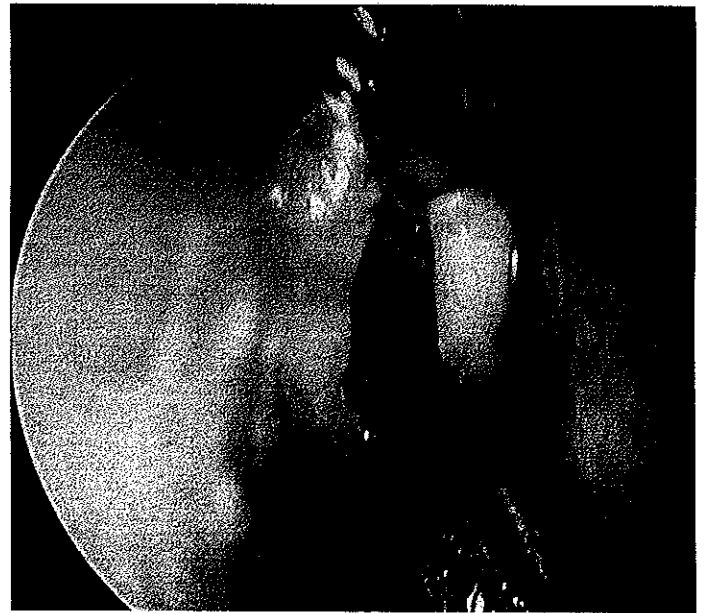


FIGURE 5. After incision, the concha bullosa has been splayed open.

the lateral plate of the concha bullosa and the lining of the concha, while leaving intact the medial mucosa. This is done to decrease the risk of synechia formation and preserve the normal nasal mucosa. Like the lateral turbinectomy, an initial incision of the inferior turbinate is followed anteriorly and then superiorly to splay open the turbinate (Fig 5). Using a Cottle elevator, the lining of the concha is stripped. The Cottle is then used to dissect the lateral mucosa off of the lateral bony plate, and this bony portion of the turbinate is then removed. The mucosa is then laid back on the bare bone of the medial plate of the middle turbinate (Fig 6). This allows good visualization of the uncinate process and the rest of the middle meatal structures. ESS can then proceed with unobstructed visualization.



FIGURE 6. After conchoplasty, the middle turbinate is slender, lined by its original mucosa, and allows free access to the rest of the ethmoid air cells.

CONCLUSION

Although in adults resection of the middle turbinate has been advocated in all cases of ESS, in children the potential risks seem to dictate that this structure be preserved when possible. Concha bullosa are common anatomic variants of the middle turbinate and may prevent effective use of endoscopic techniques for the treatment of chronic sinusitis. Successful management of the pneumatized middle turbinate will allow good visualization for ESS while maintaining as much of the preoperative anatomy.

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