Endoscopic septoplasty: Indications, technique, and results

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Endoscopic septoplasty is an attractive alternative to traditional "headlight" approaches to septoplasty. The primary advantage of the technique is the ability to reduce morbidity and postoperative swelling in isolated septal deviations by limiting the dissection to the area of the deviation. This ability to markedly reduce the extent of subperichondrial dissection is particularly valuable in patients who have undergone prior septal cartilage resection. Other advantages include improved visualization, particularly in posterior septal deformities; improved surgical transition between septoplasty and sinus surgery; and its use as an effective teaching tool. We present our experience with endoscopic septoplasty in a series of 111 patients. Surgical indications, technique, and complications are discussed. (Otolaryngol Head Neck Surg 1999;120:678-82.)

Endoscopic septoplasty is a minimally invasive technique that enables correction of septal deformities under excellent visualization with minimal trauma. The application of endoscopic techniques to the correction of septal deformities was initially described in 1991 by Lanza et al[1] and by Stammberger.[2] In 1993 Lanza et al[3] described a detailed endoscopic approach to the treatment of isolated septal spurs. Since that time, we have successfully applied endoscopic techniques to the treatment of more complex septal deformities. We have used endoscopic septoplasty not only for treating symptomatic nasal obstruction but also for improving surgical access to the middle meatus as an adjunct to endoscopic sinus surgery (ESS).

When compared with standard headlight septoplasty, the endoscopic technique provides several important advantages. Visualization with the endoscope enables improved evaluation of septal deformities in the nasal valve region and is particularly helpful in diagnosis and correction of posterior septal deformities. In addition, the improved visualization permits limited, minimally invasive surgery for isolated deviations or for revision cases. Furthermore, a more natural transition between septoplasty and ESS is possible when the 2 procedures are performed jointly with the endoscope. Finally, endoscopic septoplasty provides an excellent teaching tool. We review our clinical experience in 111 consecutive patients undergoing endoscopic septoplasty.

METHODS

A retrospective review was performed to identify all patients who had undergone septoplasty by the senior authors (D.W.K., D.C.L.) between January 1993 and December 1996 at the Hospital of the University of Pennsylvania. In total, 135 consecutive septoplasty patients were identified. Of these, 111 septoplasties (82%) were performed with the endoscopic technique.

The medical records of the 111 endoscopic septoplasty patients were reviewed for surgical indications, intraoperative technique and findings, and postoperative complications.

TECHNIQUE

If septoplasty is planned as a concurrent procedure with ESS, sinus surgery is performed first on the nonobstructed side. Septoplasty follows, with the septoplasty incision typically placed on the side on which sinus surgery has already been completed. After correction of the septal deviation, sinus surgery can then be performed in an unobstructed field on the previously narrowed side. Because the septoplasty incision has been made contralaterally, contamination of the endoscopes during the second sinus procedure by any bleeding from the septoplasty can be avoided. Great care is taken during the septoplasty not to create a mucosal laceration on the side on which ESS is still to be performed.

The patient is positioned, prepared, and draped for septoplasty as for standard ESS. Topical oxymetazoline is applied for decongestion; 1% lidocaine with 1:100,000 epinephrine is injected subperichondrially along the septum and at the greater palatine foramina bilaterally. As described above, the incision for septoplasty is best made contralateral to the side of maximal

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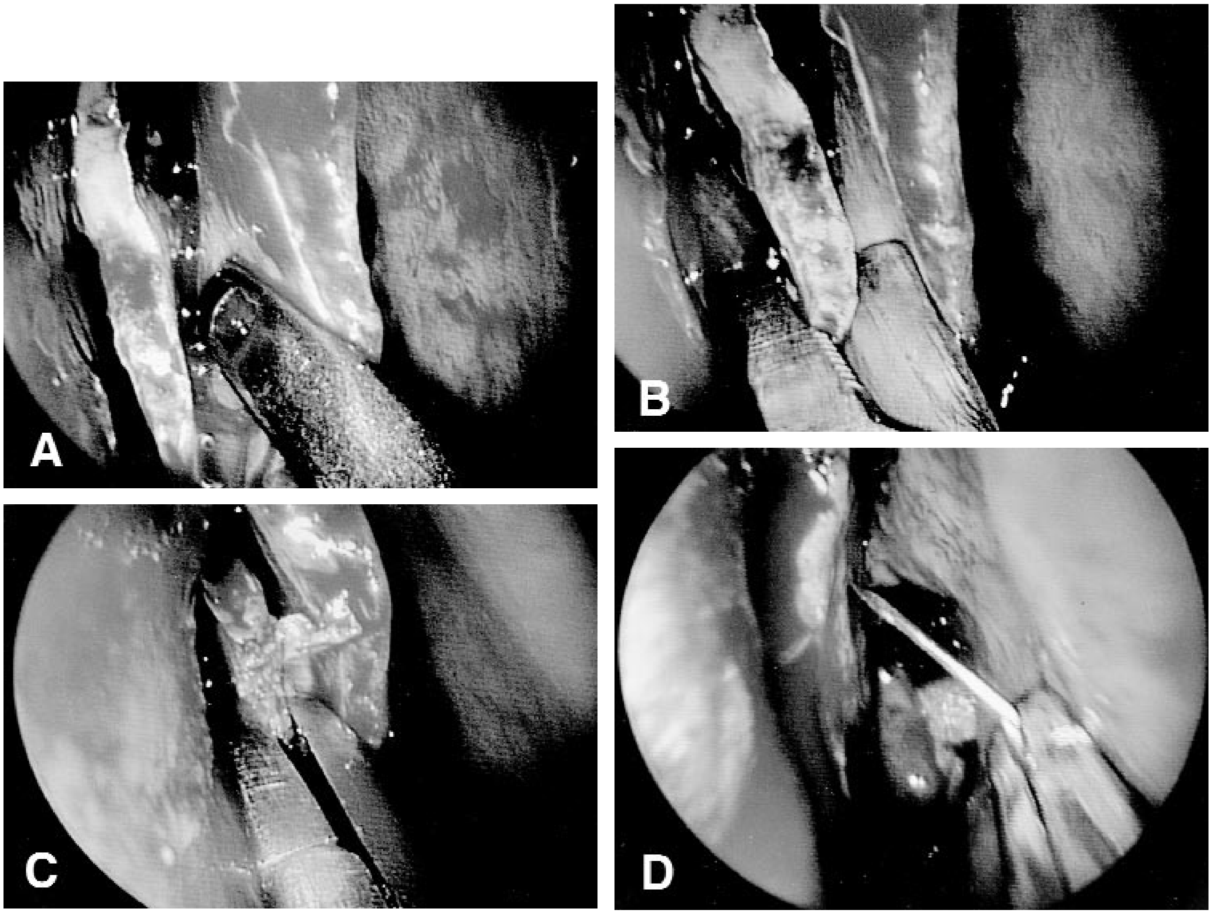

Fig 1. Intraoperative endoscopic photographs (0-degree endoscope). **A,** Suction elevator retracting ipsilateral mucoperichondrial flap to demonstrate stair-stepped septal cartilage incision and contralateral flap elevation. **B,** Endoscopic septal scissors are used to free the septal deformity. **C,** In this case, the septal deformity is removed with a grasping instrument. **D,** Morselized cartilage is replaced before reapposition of the septal flaps and placement of a running quilting suture.

deviation. For a broadly deviated septum, a standard Killian or hemitransfixion incision is used. For more posterior isolated deformities, the incision may be placed more posteriorly in the immediate vicinity of the deformity, obviating extraneous flap elevation.

After the mucosal incision, mucoperichondrial flap elevation is performed with a Cottle elevator under direct endoscopic visualization with a 0-degree endoscope (Fig 1). A suction elevator (Fig 2) may be used as an alternative dissecting instrument to simultaneously clear any blood from the field of view during flap elevation. The septal cartilage is then incised and stair-stepped several millimeters posterior to the mucosal incision. The contralateral mucoperichondrial flap elevation is then performed. Flap elevation is continued bilaterally until the complete extent of the septal deformity has been dissected. At this point the deviated cartilage is excised or scored with endoscopic scissors, punches, or forceps. We have found small, strong, through-cutting punches, such as 1-mm orthopedic cartilage cutting punches, particularly helpful for the cartilage and septal bone resection. Deviated portions of bone from the vomer or perpendicular plate of the ethmoid are removed as necessary. Larger pieces of excised bone and cartilage are saved in saline solution for possible replacement later in the procedure.

When septoplasty is being performed for impaired surgical access to the middle meatus, progress toward achieving adequate surgical exposure can be readily gauged throughout the course of the septoplasty by viewing the middle meatal region endoscopically. The use of an endoscope is advantageous in this regard because the potentially awkward transition back and forth between headlight and endoscope is thus avoided.

Typically, reconstruction of the septum and suturing of the flaps is delayed until after completion of the sinus

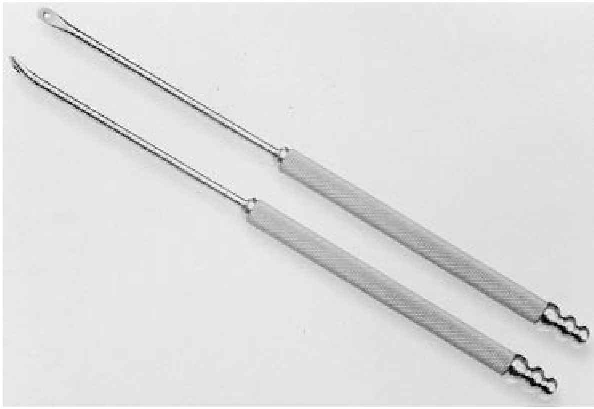

Fig 2. Suction elevator used to improve visualization by removing blood from the endoscopic field of view during mucoperichondrial flap elevation.

surgery on the previously narrowed side. At this time, morselized cartilage is replaced as needed. The septal flaps are then reapposed, and a running quilting suture is placed across the septal flaps with a 4-0 plain gut suture on a small Keith needle on a Sofferman needle holder (Karl Storz Endoscopy, Culver City, CA). In most cases, placement of splints and packing of the nasal cavity are unnecessary.

Septal spurs typically do not interfere with visualization of the middle meatus for ESS, and therefore spur resection is most typically performed after any sinus surgery has been completed. In this instance, a modified technique, previously described by Lanza et al,[3] may be applied (Fig 3). An ipsilateral incision is placed parallel to the floor of the nose on the apex of the spur. Flaps are then elevated superiorly and inferiorly with a Cottle elevator to expose the underlying bony or cartilaginous spur. An osteotome is then seated against the base of the spur and is used to remove the bone protrusion. Additional remnants of spur can be trimmed back with through-cutting endoscopic forceps. Alternatively, powered instrumentation can also be used, although care must be taken not to traumatize the adjacent mucosal flaps. After complete removal of the spur, the mucoperiosteal flaps are restored to their native position. If the flaps are well apposed, no suturing is required. In this case, the incision line may be covered with a small segment of Gelfilm (Upjohn) coated with mupirocin ointment.

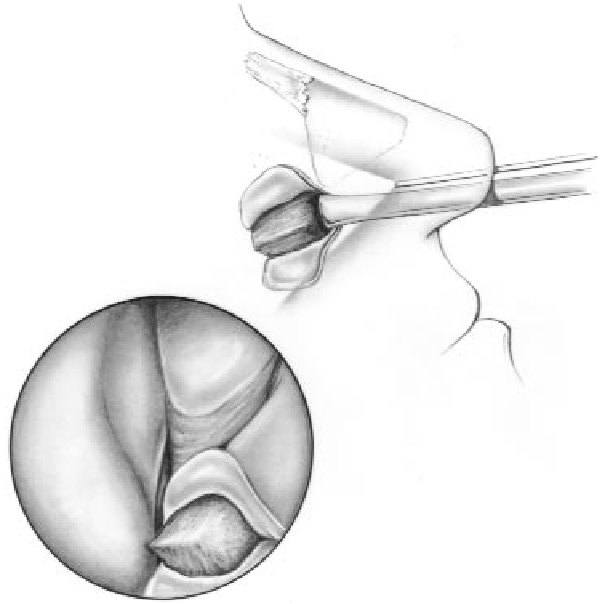

Fig 3. Endonasal view of a septal spur. In this situation, an ipsilateral incision was placed parallel to the floor of the nose on the apex of the spur. As depicted, superior and inferior flaps were elevated to expose the underlying septal spur. *Upper illustration* depicts a parasagittal view of the exposed septal spur with an osteotome seated at the base of the spur.

RESULTS

We reviewed 111 consecutive endoscopic septoplasties, and 108 of the 111 cases were performed in conjunction with ESS. In 3 cases, endoscopic septoplasty was performed alone as the primary procedure. Seventeen of the 111 cases (15%) were revision septoplasties. Fifty-one of the deviations were broadly based deflections (46%), whereas 39 of the septal deformities were spurs (35%). In 21 patients (19%) more than 1 type of septal deformity was encountered.

Complications in our series were rare. Minor sequelae included early postoperative synechiae in 5 patients; all were addressed promptly in the office setting and resolved uneventfully. One patient had a septal hematoma on the first postoperative day. The patient later disclosed that he had been taking gingko biloba, an herbal medication with documented rheologic properties.[4] The hematoma was promptly evacuated, and the septal flaps healed uneventfully. A second patient had a small posterior inferior septal perforation that was asymptomatic and required no additional treatment.

DISCUSSION

In addition to its indications for nasal obstruction, septoplasty is often a necessary complement to ESS for both intraoperative and postoperative concerns.[5] During surgery, endoscopic access to the middle meatus can be impaired by otherwise asymptomatic deflections of the septum. Postoperatively, examination and debridement of the sinus cavities can be more difficult if obstructive septal deflections are left uncorrected. Often, a seemingly mild septal deformity can be overcome at the time of surgery by aggressive decongestion and vasoconstriction, only to later prove problematic in obstructing endoscopic access during postoperative care.

The traditional approach to septoplasty involves headlight illumination, visualization through a nasal speculum, and surgical instruments that are typically disparate from those used during standard endoscopic sinus procedures. These circumstances can be suboptimal when treating a narrow nose, approaching posterior deformities, or requiring frequent exchanges between headlight and endoscope. In addition, impaired visualization may predispose to nasal mucosal trauma, which can compromise endoscopic visualization during sinus surgery.

The endoscopic approach to septoplasty provides several advantages over the standard headlight technique. First, the endoscope provides a significantly improved field of view, particularly in more posterior dissections. Because the endoscope can be passed easily under the septal mucosal flaps, minimal retraction of the flaps is required to gain excellent visualization. In addition, because the incision can be performed more posteriorly in the nose, immediately anterior to the area of deviation, the extent of mucosal elevation anteriorly in the nose is minimized. Postoperative edema is therefore reduced. Furthermore, unlike nasal examination with a speculum, endoscopic evaluation of the nasal airway permits visualization without physical distortion of the nasal anatomy. Thus improvements in critical areas of obstruction, such as the nasal valve region, can be better assessed during surgery.

Second, the instruments used in endoscopic septoplasty are similar to those used for ESS, and thus few additional instruments are required. This allows for the smooth integration of the septoplasty into the sinus portions of the procedure. For example, throughout the course of the septoplasty, the endoscope can be readily passed into the nasal cavity to instantly assess improvements in access to the middle meatus. Awkward exchanges between headlight and endoscope are thereby avoided. Because surgical instruments can be more precisely placed and manipulated, surgical maneuvers such as placement of the closure quilting suture are also facilitated.

The ability to reduce mucosal elevation by placing the incision in the immediate vicinity of an isolated septal deflection becomes a very important advantage in revision septoplasties. In this situation the flaps are frequently adherent from extensive prior submucosal dissection and cartilage resection. Elevation in these areas is difficult at best and may compromise flap viability or result in inadvertent septal mucosal tears. By endoscopically placing the incision immediately anterior to the area of residual deviation, the need to elevate flaps in an area with no underlying cartilage is minimized or eliminated. This becomes a crucial advantage in the patient with preexisting septal perforations.

Finally, endoscopic septoplasty can be a valuable teaching tool. The use of video monitors to demonstrate surgical anatomy and technique offers significantly greater learning opportunities for surgical assistants, students, and operating room staff than does the headlight approach.

Although endoscopic septoplasty has proved particularly useful when performed in conjunction with ESS,[6] we have also had favorable early results applying endoscopic techniques to primary septoplasty. Although the number of primary septoplasties in this series is small, at this time most of our primary septoplasties are being performed endoscopically. The major relative contraindications for endoscopic septoplasty are 2-fold: when the deformity involves a significant caudal deflection, and when significant associated external deformities are present, for which a septorhinoplasty approach would be indicated.

The complications in our series were rare and were identified and addressed promptly through a careful postoperative care regimen that includes serial nasal endoscopies in the clinic. Our most significant complication, a septal hematoma, was identified on routine examination on postoperative day 1 and was drained without further sequelae. Although the patient first denied being on any medications, he later admitted to having taken a previously undisclosed herbal medication, gingko biloba. Although the mechanism of action of gingko biloba has not been fully elucidated, it is believed to alter rheologic properties of blood[4] and induce vasodilatory effects.[7]

CONCLUSIONS

Septoplasty is an important adjunct to ESS, not only for addressing functional symptoms of obstruction but also for ensuring adequate exposure for intraoperative and postoperative access to the sinuses. The endoscopic approach offers a viable alternative to the traditional headlight technique with superior visualization and better integration into endoscopic sinus procedures. A minimally invasive surgical strategy can be applied to more limited septal deformities, minimizing the extent of flap dissection and postoperative edema. These advantages are particularly useful in patients requiring limited revisions after septoplasty or submucosal resection and in patients with preexisting septal perforations. Finally, endoscopic septoplasty is an excellent teaching tool when used in conjunction with video monitors.

REFERENCES

1. Lanza DC, Kennedy DW, Zinreich SJ. Nasal endoscopy and its surgical applications. In: Lee KJ, editor. Essential otolaryngology: head and neck surgery. 5th ed. New York: Medical Examination; 1991. p. 373-87.
2. Stammberger H. Functional endoscopic sinus surgery: the Messerklinger technique. Philadelphia: BC Decker; 1991. p. 432-3.
3. Lanza DC, Rosin DF, Kennedy DW. Endoscopic septal spur resection. Am J Rhinol 1993;7:213-6.
4. Letzel H, Schoop W. Gingko biloba extract Egb761 and pentoxifylline in intermittent claudication: secondary analysis of the clinical effectiveness. Vasa 1992;21:403-10.
5. Cantrell H. Limited septoplasty for endoscopic sinus surgery. Otolaryngol Head Neck Surg 1997;116:274-7.
6. Giles WC, Gross CW, Abram AC, et al. Endoscopic septoplasty. Laryngoscope 1994;104:1507-9.
7. Gautherie M, Bourjat P, Grosshans E, et al. Vasodilator effect of gingko biloba extract determined by skin thermometry and thermography. Therapie 1972;27:881-92.