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Simultaneous Septal Perforation and Deviation Repair with a Chondromucosal Transposition Flap

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Abstract

Nasal septal perforations can cause issues of epistaxis, whistling, crusting, saddle deformity, and obstruction, which motivate patients to seek surgical repair. Numerous methods of septal perforation repair have been described, with surgical success rates ranging from 52% to 100%, but few studies address situations with concomitant septal deviation. In treating patients with septal perforation and deviation, both issues should be addressed for optimal outcomes. While routine septoplasty involves the removal of septal cartilage, septal perforation repair involves the addition of interposition grafts. The composite chondromucosal septal rotation flap harmoniously combines these seemingly conflicting goals as an effective and efficient technique for septal perforation repair. We present 3 patients successfully treated for their septal perforation and septal deviation concurrently with this technique.

Keywords

septal deviation, septal perforation, chondromucosal flap, transposition flap

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Nasal septal perforations can cause issues of epistaxis, whistling, crusting, saddle deformity, and obstruction, which motivate patients to seek surgical repair. Careful endoscopic examination may reveal a concomitant nasal septal deviation in a subset of patients. Numerous methods of septal perforation repair have been described, with surgical success rates ranging from 52% to 100%, but few studies address situations with concomitant septal deviation.[1] In treating patients with septal perforation and deviation, both issues should be addressed for optimal outcomes. While routine septoplasty involves the removal of septal cartilage, septal perforation repair involves the addition of interposition grafts. The composite chondromucosal septal rotation flap harmoniously combines these seemingly conflicting goals as an effective and efficient technique for septal perforation repair.

Methods

This study was exempt by the institutional review board at Johns Hopkins Hospital. A retrospective chart review was performed, and written consent was collected for all procedures and use of photography. Indications for septal perforation repair with the chondromucosal flap included patients with septal perforations <1.5 cm who, on physical examination, had enough cartilage to spare for removal without disruption of the caudal L-strut of 1-cm width. Patients with or without septal deviation can undergo repair with this technique. Patient characteristics are described in **Table 1**.

Surgical Technique

An open septorhinoplasty approach is utilized for visualization. A transcolumellar incision is made. The skin–soft tissue envelope is elevated to the caudal border of the nasal bones and the anterior septal angle identified. The mucoperichondrial flap is elevated widely on the right side around the septal perforation and extending along the inferior nasal floor. The senior surgeon prefers raising the chondromucosal flap on the left side for ease of access (ie, for a right hand–dominant surgeon). The perforation is measured, and the adjacent posterosuperior septal cartilage island is designed to the equivalent size. The cartilage island is designed within the central septum to preserve a >1.0-cm-wide septal L-strut, with the deviated portion of the cartilage included into the composite flap design. The cartilage is incised from the right side with a cottle elevator or freer, with care taken to preserve the contralateral mucoperichondrium (**Figure 1**). A curvilinear mucoperichondrial incision is then made on the left side. The incision is pedicled

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Table 1. Patient Characteristics.

Patient	Examination findings	Flap used	Follow-up, mo	Closure
1: 46-y-old man	1.5 × 1.0–cm perforation, posterior deviation to left	Inferiorly based	24	Yes
2: 48-y-old woman	1.0 × 1.0–cm perforation, midanterior septum, deviation to left	Superiorly based	17	Yes
3: 24-y-old woman	1.0 × 0.7–cm perforation, midanterior septum, posterior deviation to left	Inferiorly based	11	Yes

inferiorly to utilize the posterior septal artery system or superiorly to utilize the anterior ethmoid artery system, depending on the location of the deviation (**Figure 2**). The base of the flap is maintained at ≥1.5 times the diameter of the cartilage component to preserve vascularity. The composite cartilage and mucoperichondrial flap are transposed either inferiorly or superiorly to close the perforation (**Figure 3**). The cartilaginous component of the flap is secured to the caudal septal cartilage with 5-0 PDS, and mucosa is closed with 5-0 chromic along the margin. The secondary defects created superiorly on the cartilaginous septum and along the left nasal floor are left to heal via secondary intention. On the right side, a relaxing incision is made on the lateral nasal floor to allow for bipedicled mucosal advancement and primary closure. Bacitracin-coated Doyle splints are sutured in place bilaterally.

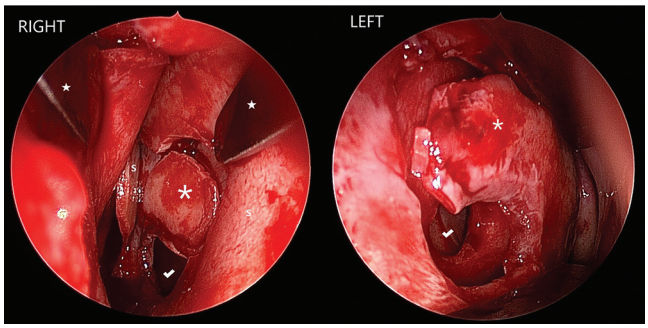

Figure 1. Intraoperative endoscopic view of the elevated composite septal flap. *, septal composite flap; √, perforation site; ★, nasal speculum; s, septal cartilage.

Results

All patients underwent successful repair via the described technique. There were no failures with this technique in the retrospective chart review of all patients who underwent it. Their postoperative courses were uncomplicated. Each returned for postoperative visits at 1 week and again at 6 weeks, at which point the Doyle splints were removed. The patients continued to follow up at 6-month and 1- and 2-year visits. Rigid endoscopy at subsequent follow-ups revealed well-healed repairs. At 2 years, 17 months, and 11 months postoperatively, septal perforation repair sites remained well healed, with septal deviation resolved and preoperative symptoms eliminated (**Figure 4**). Two patients had an inferiorly based flap, while 1 had a superiorly based flap. The determination of whether to do a superiorly or inferiorly based flap depended on several factors, including the presence of a septal deviation, the availability of donor cartilage in relation to the caudal L-strut, the presence of previous scars or incisions, and the overall quality of the septal mucosa.

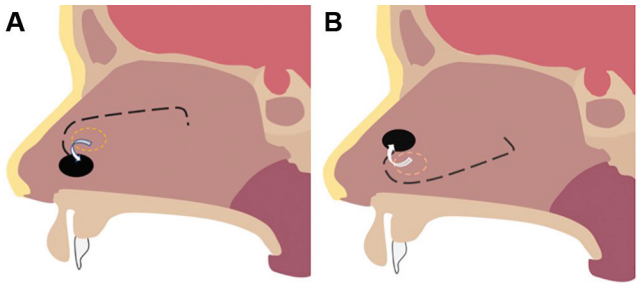

Figure 2. Schematic design illustrating (A) superior and (B) inferior flap designs. Dashed black lines indicate mucosal incision, including small back cut. Dashed tan lines indicate cartilage cuts on contralateral side. White arrow indicates direction of flap rotation.

Discussion

Tension-free, opposing mucosal advancement flaps with interposition grafting with materials such as acellular dermis, cartilage, temporalis fascia, or polydioxanone plates have shown the best long-term outcomes in septal perforation repair.[1,2] These grafts are utilized in combination with a variety of mucosal flaps, from adjacent septum to nasal floor, inferior turbinate, and oral mucosa.[3] Some success has been reported with composite free grafts in small series, but bilateral vascularized

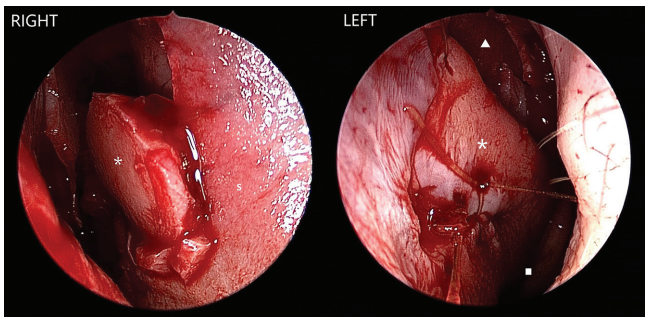

Figure 3. Intraoperative endoscopic view of the rotated composite flap. mucoperichondrial flap superiorly. ▲, contralateral mucoperichondrial flap; *, septal composite flap; □, left nasal cavity; s, septal cartilage.

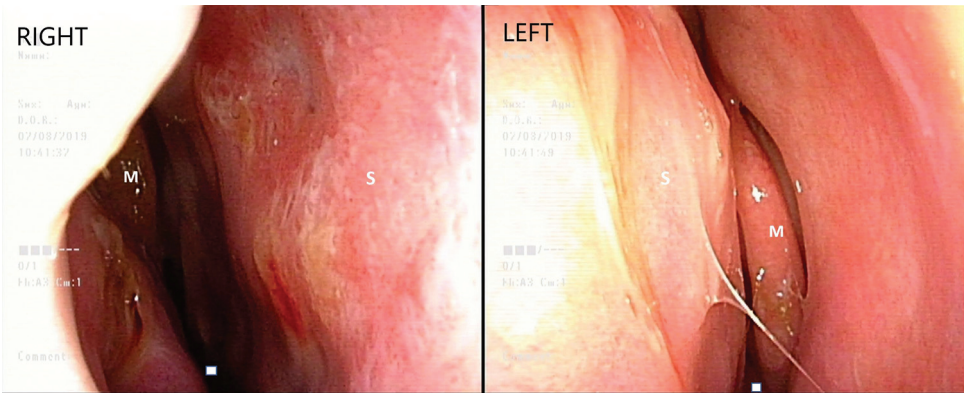

Figure 4. Endoscopic view at 6 months postoperatively of the septum from the right and left sides revealing healed perforation site. □, nasal cavity; M, middle turbinate; S, septum.

flaps are preferred.[2,4] The composite chondromucosal septal flap technique is not discussed in contemporary literature but represents an efficient and effective technique for septal perforation repair in patients with an associated septal deviation and intact adjacent septal cartilage.[5]

We find this technique most successful in small- to medium-sized perforations (<1.5 cm). The main reason for this limitation is the amount of donor cartilage available for grafting without compromising the 1-cm width of the caudal L-strut of the septum. Inferiorly or superiorly based flaps can be selected depending on perforation location as well as concomitant septal deviation relative to the dorsum. Patients with concomitant septal deviation are particularly suited to this technique when deviated cartilage is incorporated into the flap; however, it is easily applied to repairs without the need for septal deviation correction as well. The chondromucosal flap holds several advantages over traditional mucosal advancement and interposition grafting techniques. By utilizing adjacent cartilage, 3-layered closure is achieved, precluding the need for a secondary donor site. The intact perichondrial attachment preserves vascularity to the cartilage component. The strength and support of the cartilage-mucosa interface combat primary contracture seen in single-layered mucosal flaps and facilitate closure. Securing the cartilaginous component to the caudal septum reduces tension on the mucosal closure. This technique is not ideal for saddle nose deformities or patients lacking adjacent septal cartilage. Perforations >1.5 cm have not been well studied, and additional studies are needed.

Conclusions

In the appropriately selected patient, the chondromucosal septal transposition flap can achieve successful 3-layered septal perforation repair, obviating the need for a secondary donor site. This technique is especially useful in those patients necessitating simultaneous septal deviation correction.

Author Contributions

G. Nina Lu, design, data acquisition, drafting, revising, final approval, accountability; **Danielle F. Eytan**, design, data acquisition, drafting, revising, final approval, accountability; **Shaun C. Desai**, conception, design, revising, final approval, accountability

Disclosures

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