Original Investigation

Posterior Septal Resection
A Simple Surgical Option for Management of Nasal Septal Perforation

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IMPORTANCE Large and complex nasal septal perforations may cause considerable patient discomfort and are challenging to repair. Posterior septal resection (PSR) is a simple procedure and can be incorporated into the surgical management algorithm for this patient population.

OBJECTIVE To evaluate PSR for the treatment of symptomatic complex and large nasal septal perforations.

DESIGN, SETTING, AND PARTICIPANTS Retrospective medical chart review from 1995 through 2007 of patients who underwent PSR. Medical charts were reviewed, and a follow-up telephone questionnaire was performed.

INTERVENTIONS Posterior septal resection.

MAIN OUTCOMES AND MEASURES Improvement of selected symptoms after PSR.

RESULTS Twenty-one patients were identified, 16 patients had thorough documentation of perioperative information contained in their medical charts, and 12 patients were available for follow-up survey. All patients tolerated the procedure well without long-term sequelae from surgery. Overall nasal discomfort was significantly improved in 12 of 12 patients (P < .001). All nasal symptom scores of obstruction, pain, whistling, drainage, crusting, and epistaxis showed statistically significant (P < .05) improvement from preoperative values. Nasal obstruction and crusting were symptoms that improved with high statistical significance (P < .001). Patients reported on average a 79% improvement (range, 45%-100% improvement) in nasal airway, with only 1 patient reporting no improvement. All patients were satisfied with their surgery and would undergo the procedure again and recommend it to others.

CONCLUSIONS AND RELEVANCE Posterior septal resection provides overall patient satisfaction and improvement in subjective nasal symptom scores when used for large and complex septal perforations. This simple procedure may be included in the treatment algorithm of large and complex symptomatic septal perforations.
Nasal septal perforations have a prevalence of up to 0.9%. Not all perforations are symptomatic, but often they are associated with bothersome complaints, such as epistaxis, crusting, whistling, airflow obstruction, and pain. The investigation into the etiology of the perforation is the first step, and after this has been performed, symptomatic perforations nearly universally require treatment. These are generally initially treated conservatively with use of topical emollients, avoidance of digital trauma, and possibly the placement of a septal button; but, when these conservative options fail, surgical repair may be considered.

Surgical repair of nasal septal perforations poses a technical challenge for otolaryngologists. High rates of failure with surgical repair of up to 30% to 70%, have been shown in some studies. Other studies show higher rates of success, especially with interposition connective tissue autografts, with failure rates from 0% to 33% reported. The wide array of reparative techniques described in the literature reflects the limited success that any particular method provides. Prosthetic obturators, local intranasal mucosal flaps, connective tissue autografts (temporalis fascia, mastoid peristeum, cranial periosteum), acellular human dermal allografts or xenografts, labiobuccal flaps, nasolabial flaps, inferior turbinate flaps, and 2-stage intranasal tissue expanders techniques have been described in the literature combined with approaches that include closed endonasal (with or without endoscopy), open rhinoplasty, and sublabial facial degloving techniques.

Anecdotally, we noted that patients who underwent septal resection as part of a craniofacial resection for sinonasal neoplasms, or endoscopic skull base approaches, often had milder nasal dysfunction than patients presenting with septal perforations. Nasal dysfunction from perforations is believed to be due to alteration of nasal airflow, as well dryness and crusting of the posterior edge. Previous authors have demonstrated improved nasal symptoms with enlargement of large septal perforations by reducing turbulent airflow and preventing irritation of the posterior edge of the perforation. We propose a simple technique for treating symptomatic nasal septal perforations that are large or complex and expected to have a high rate of failure. “Large perforation” was defined as any perforation greater than 2 cm. “Complex perforation” was defined as any perforation in a patient who had a previous failed closure attempt, a patient with granulomatous or autoimmune disease, or a patient who had radiation therapy to the area. The technique involves endoscopic removal of the posterior septal keel. In this study, we describe the procedure and report symptomatic outcomes from a series of patients who underwent posterior septal resection (PSR).

Methods

A retrospective medical chart review was performed from December 1995 to January 2007 and included any patients who underwent PSR for symptomatic large or complex nasal septal perforations. Medical charts were analyzed for demographic data, operative information, postoperative course, and complications. A follow-up telephone questionnaire was then performed to address subjective changes in nasal symptoms using a numerical scale adapted from the 20-item Sino-Nasal Outcome Test (SNOT-20) and adding specific questions relevant for nasal septal perforations, since there is no established validated scale specifically for septal perforation. Telephone survey participants provided informed consent. Specific nasal symptoms assessed were obstruction, pain, whistling, drainage, crusting, epistaxis, and overall nasal discomfort. These were rated subjectively from 0 to 5 with 5 being “as bad as can be.” Patients were assessed for the amount of airway improvement and whether they would repeat or recommend the procedure to others. The 2-tailed paired t test was used for statistical analysis, and α = .05 was used for statistical significance.

The endoscopic resection of the posterior nasal septum is technically straightforward and requires no specialized equipment (Figure 1). With the patient under general anesthesia, the inferior turbinates are decongested with oxymetazoline, reduced with submucosal techniques as needed, and then lateralized. Suction monopolar electrocautery is used to cauterize the mucosa at the upper and lower margins of the resection from the posterior edge of the perforation to the nasal choana (Figure 2). Heavy endonasal scissors, through-cutting instruments, and osteotomes were used to cut along the cautery lines from the posterior edge of the perforation to the nasal choana.

Figure 1. Model Posterior Septal Resection (PSR)

A, Large anterior septal perforation with illustrated surgical resection shown by solid red lines. Dotted black lines represent the outline of the septal cartilage and bones.
B, Schematic illustration of completed PSR from the posterior edge of the perforation to the choana.
The posterior septum is removed, and hemostasis is achieved with suction electrocautery. The excised tissue is sent to the pathology department for examination to rule out granulomatous disease and neoplasm. Care is taken to debride all free edges and smooth out any bony or cartilaginous spurs to prevent any problem areas for crusting and exposure of bone or cartilage postoperatively. No attempt is made at raising or rotating mucosal flaps to cover small amounts of cauterized or exposed bone. The dorsal and caudal cartilaginous struts are not altered to maintain structural support of the nasal tip and dorsum.

Results

Twenty-one patients underwent PSR from 1995 to 2007. Complete hospital records were available for 16 patients, and 12 patients were available for telephone follow-up survey. Their mean age was 45 years (range, 21-75 years) with a 4:3 male to female ratio. Posterior septal resection was performed in isolation in 5 cases; in the remaining patients it was performed in addition to endoscopic sinus surgery (n = 5) or sleep apnea surgery (n = 7). All cases were performed on an outpatient basis except for obstructive sleep-related apnea surgery in which they stayed overnight. Septal perforations were attributed to idiopathic or unknown causes (n = 12) or iatrogenic causes (n = 8); results from the histological evaluation were negative for granulomatous disease and typically revealed only acute or chronic inflammation in the 10 cases with available pathology reports. Septal perforations were most frequently located in the anterior cartilaginous septum and ranged in size from 1.5 to 4.5 cm in the largest dimension. The average perforation size was 2.7 cm, and nearly all were associated with crusting or ulceration of the posterior edge. Operative time for the procedure ranged from 25 to 40 minutes when performed independently. Estimated blood loss was typically less than 50 mL unless other procedures were performed. Nasal packing was not routinely used.

The postoperative medical regimen was similar to those of routine endoscopic sinonasal procedures and included narcotic pain medication, antibiotics, and steroids if indicated for other adjunct procedures. Patients were started on aggressive nasal saline irrigation on postoperative day 1. Routine follow-up was performed at weekly intervals until adequate healing and remucosalization occurred at an average of 6 to 8 weeks. Within 10 days postoperatively, 3 patients had epistaxis requiring acute evaluation and nasal packing in 2 of those cases. No other perioperative or delayed complications were re-

Figure 2. Intraoperative Posterior Septal Resection (PSR)
reported. Most patients had considerable crusting during the immediate postoperative period requiring aggressive saline irrigation and weekly outpatient debridement until healed. At the time of each patient’s final follow-up no new external deformity was noted.

Delayed telephone survey results, with a minimum follow-up of 6 months, for 12 patients who could be contacted are reported in Figure 3. The 2 predominant symptoms were nasal obstruction and crusting, which showed improvements of 75% and 47%, respectively (P < .001). The remainder of the symptoms—pain, epistaxis, whistling, and drainage—were also statistically improved at P < .05. Overall nasal discomfort was reduced from an average rating of 3.9 to 0.9 (78% improvement) (P < .01). Patients reported on average 79% improvement (range, 45%-100% improvement) in nasal airway, with only 1 patient reporting no improvement. One patient reported worsening of nasal crusting after the surgery. All 12 patients were satisfied with their surgery and would undergo the procedure again, and all 12 patients would also recommend it to others who have a similar problem.

Discussion

Septal perforations are a common problem for otolaryngologists. In our series, 13 of 21 patients (62%) were idiopathic, and 8 of 21 (38%) were iatrogenic. Unique medical diagnoses or drug abuse does not cause most of the perforations that we see. We also noted a significant number of iatrogenic perforations. This is a slightly different breakdown than what is commonly reported, and we believe the dry climate in Colorado is probably the most significant causative factor in our population. Chronic dryness can cause nasal crusting, obstruction, and bleeding. These patients attempt to keep their noses clear by picking and blowing the debris out of their nose aggressively. This can set up a cycle of further bleeding, crusting, and obstruction, and attempts at mechanically clearing their noses. Many of these patients are also tried on therapy with nasal steroids in an effort to improve their symptoms; however, nasal steroids can then worsen dryness and crusting. These factors lead to an increased rate of perforations in our population that are considered idiopathic or unknown. Luff et al9 reported less than a 50% compliance rate with the use of prosthetic obturators in the more humid United Kingdom. In our dry climate, it has been our impression that the compliance rate with obturators is even lower. In looking for other etiologies, perforation rates of up to 5% after septraphyplasty and up to 25% following submucous resection have been reported.9 Other trauma, including cautery and packing for nose bleeds, rhinitis larvae (compulsive nose picking), nasal piercing, inflammatory conditions, autoimmune conditions (eg, sarcoidosis, Wegener granulomatosis, and reductive granuloma), cocaine abuse, nasal decongestant abuse, intranasal steroid use, infection, and benign and malignant neoplastic processes, can also lead to septal perforations. If the lesion is stable and symptomatic, we would proceed with intervention.

Septal perforation repair is a challenging surgical procedure and is prone to failure. In larger perforations, those who have previously failed surgical repair, or patients who have wound healing concerns, PSR should be considered. The goal of this procedure is not to close the perforation but to relieve the symptoms. This procedure has a high degree of symptomatic improvement. Potentially, this procedure could be performed under local anesthesia or sedation. If a septal perforation is symptomatic, we recommend the following treatment hierarchy:

1. Conservative management should be tried first. This includes intranasal saline irrigation, water-based intranasal emollients, room humidification, and consideration of a nasal obturator, such as a Silastic septal button.
2. If the perforation is small (<2 cm) and there have not been previous attempts at closure, we would consider an attempt at closure by any approach with local flaps and interposition autografts or allografts.3,4
3. For large perforations (>2 cm), perforations that have failed previous attempts at closure, or if there is a unique comorbidity (eg, granulomatous disease, autoimmune disease, radiation to the area) consideration of posterior septal resection is reasonable.

We acknowledge a number of limitations in the current study. This was a retrospective study with telephone questionnaires. As such, we examined subjective patient-reported data.
without a corresponding objective measurement. We elected
to use relevant symptom-directed questions, since a vali-
dated septal perforation questionnaire does not exist. Ulti-
mately, we desired to assess the patient’s satisfaction and symp-
tomatic benefit, as patient symptoms and happiness do not
always correlate with objective measurements.10 We report our
experience with a moderate-size cohort, but it would seem that
the results are consistent and can certainly be applied to a larger
group. Following this algorithm, patients who qualify for this
procedure can frequently be identified. This simple tech-
nique should be part of the armamentarium for the otolaryn-
gologist or plastic surgeon for complex or large perforations.
A prospective multi-institutional study with defined out-
comes is planned.

Conclusions

Posterior septal resection is an alternative method to relieve
symptoms of complex or large nasal septal perforations. It is
a relatively simple, technically straightforward surgical solu-
tion for a challenging nasal problem.

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to all of the data in the study and takes
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Study concept and design: Ponnappan, Campana.
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REFERENCES

1. Oberg D, Akerlund A, Johansson L, Bende M.
Prevalence of nasal septal perforation: the Skövde
2. Kridel RW. Considerations in the etiology,
treatment, and repair of septal perforations.
3. Goh AY, Hussain SSM. Different surgical
treatments for nasal septal perforation and their
4. Kim SW, Rhee CS. Nasal septal perforation
repair: predictive factors and systematic review of the
5. Grützenmacher S, Mlynski R, Lang C, Scholz S,
Saadi R, Mlynski G. The nasal airflow in noses with
septal perforation: a model study. ORL J
6. Eng SP, Nilsson EL, Ranta M, White PS. Surgical
management of septal perforation: an alternative to
closure of perforation. J Laryngol Otol.
7. De Gabory L, Stoll D. Treatment by enlargement
of septal perforations [in French]. Rev Laryngol Otol
8. Luff DA, Kam A, Bruce IA, Willatt DJ. Nasal
septum buttons: symptom scores and satisfaction.
9. Dommerby H, Rasmussen OR, Rosborg J.
Long-term results of septoplastic operations. ORL J
10. Hwang PH, Irwin SB, Griest SE, Caro JE, Nesbit
GM. Radiologic correlates of symptom-based
diagnostic criteria for chronic rhinosinusitis.