

Nasal Septal Perforation Repair Using Oral Mucosal Flaps

Leonid Kogan MD PhD¹, Peter Gilbey MD², Alvin Samet MD² and Yoav Talmon MD²

¹Plastic & Reconstructive Surgery Unit and ²Department of Otolaryngology, Head & Neck Surgery, Western Galilee Hospital, Nahariya, Israel

Key words: nasal septum, fistula, perforation

Abstract

Background: Surgery for the closure of nasal septal perforations is challenging. Numerous techniques have been described.

Objectives: To assess whether nasal septal perforations heal less consistently if a connective tissue scaffold is not placed between the repaired septal flaps.

Methods: We performed closure of a septal perforation via a closed approach using oral mucosal flaps without the interposition of a connective tissue graft in seven patients.

Results: Complete perforation closure was achieved in 5 cases (71.4%). There was no significant donor site morbidity.

Conclusions: These initial results suggest that this is an effective technique for closing nasal septal perforations; it obviates the morbidity of the open approach and the added operating time and morbidity associated with the harvesting of a connective tissue graft.

IMAJ 2007;9:373–375

Nasal septal perforations are caused most commonly by surgery. Other iatrogenic causes include nasal cauterization and/or packing for epistaxis, nasogastric tube placement and prolonged nasal intubation. Among the traumatic causes are nasal/septal fractures, untreated septal hematomas, nasal foreign bodies, rhinoliths, and nose picking [1]. Other causes include substance abuse, and infectious and neoplastic diseases. A thorough history is necessary in all patients, including acute, chronic or previous systemic disease. It is also essential to determine whether the patient has a history of any previous nasal surgery or instrumentation, any previously treated epistaxis, nose picking, internal and external nasal trauma, use of over-the-counter or prescription nasal sprays, illicit drug abuse, and hazardous aerosol exposures.

About 62% of patients with septal perforations are asymptomatic [2]. Asymptomatic perforations, such as those located posteriorly and with well-healed edges, rarely require any treatment at all. The more anterior the perforation is, the more likely the patient will seek evaluation and treatment.

The major symptoms of a septal perforation are crusting, bleeding, whistling, nasal obstruction, pain and rhinorrhea. The presence of septal cartilage right up to the edge of the perforation usually indicates a low grade chondritis leading to crusting and bleeding in this non-healing area. Overall crusting not only around the edge of the perforation but all over the nasal septal and turbinate mucosa occurs more often in patients with a granulomatous or vasculitis process. In these cases the prognosis for long-term operative success is more guarded. Whistling is

noted usually in smaller perforations because of the noise created by flow through a small opening.

Dried blood and crusts may lead to obstruction, but even in a clean nasal perforation turbulence may produce a definite sense of nasal obstruction. Patients with sleep apnea who also have a septal perforation are often unable to use a continuous positive airway pressure mask, which is commonly used in the non-invasive treatment of patients with sleep apnea [3].

The options for closure of a symptomatic perforation consist of closure using an obturator or surgical closure using flaps and grafts. In the past, obturators were made from acrylic and silicone, but these are rarely tolerated over a long period and are no longer routinely used as a first-line modality [4]. Only 50% of patients with nasal obturation report long-term compliance and satisfaction [1]. Obturators should be used in patients who, for other medical reasons, are not good surgical candidates or have chronic or recurrent disease processes, or in patients with continued cocaine usage [5].

Surgical repair of nasal septal perforations presents a complex technical challenge. Numerous surgical techniques have been described in recent years and the variety of techniques is evidence that no single technique is recognized as being uniformly reliable in closing all perforations [6]. Reconstruction of even small or medium defects of nasal tissue often requires the use of local or distant grafts and flaps.

It has been stated that nasal septal perforations heal more consistently if a connective tissue scaffold is placed between the repaired septal flaps [1,3,5]. Previously described methods for the closure of septal perforations include an extended external rhinoplasty approach and bilateral posteriorly based mucosal flaps, a two-staged technique using a mid-facial degloving approach to medially advance posteriorly based expanded mucosal flaps [7]; an endoscopic approach using an inferior turbinate composite flap [6]; an open septoplasty approach with an autologous connective tissue graft and unilateral bipediced mucosal flaps [2]; and transpositioning of intranasal mucosal flaps with interposition of other graft material including human dermal allografts, bioactive glass [3] and porcine small intestine submucosa [8].

The use of mucosal flaps from the oral cavity for the closure of nasal septal perforations has been described in the past [9-12]. Tardy in 1973 [10] and Feldman and Jabourian in 1998 [9] describe closure of larger perforations (> 1.5 cm) with a sub-labial oral mucosal flap brought through the gingivolabial sulcus into the nose and left attached to its pedicle. Meyer [11] describes

a three-stage procedure involving the elevation of a buccal flap, backing of the flap with a conchal cartilage graft, delivery into the nasal cavity and transection of the pedicle. Heller et al. [12] report the use of Doppler to identify the location and course of the facial artery on the buccal mucosal surface. A mucosal and buccinator muscle flap is then raised and a full-thickness skin graft is used to line the raw surface of the distal flap. The flap is then tunneled into the nasal cavity and sutured into place. We describe our results using a modified technique.

Patients and Methods

Patients

Seven patients underwent repair of a nasal septal perforation and were retrospectively reviewed. The age of the patients was 36–73 years (average 54 years). Septal perforations were due to septal surgery [Figure 1] or tumor ablation. All procedures were performed in one stage using a closed technique.

Surgical technique

Surgery is performed under general anesthesia. A lateral alotomy may be necessary for posterior or larger perforations. The edges of the perforation are excised and the surrounding mucoperichondrium and periosteum are elevated about the periphery for approximately 5 mm. A medially based flap is outlined intraorally just adjacent to the superior labial frenulum. The dimensions of the flap are tailored according to the size and location of the perforation. The donor site is closed with absorbable sutures. A tunnel is made through a sub-labial incision just cephalad to the flap base into the floor of the nasal vestibule. The flap is rotated and brought through the tunnel into the nasal cavity [Figure 2]. The edges of the flap are inserted under the elevated mucoperichondrium around the perforation. The flap is secured without tension to the septum with a minimum number of sutures. The nasal cavities are packed with Merocel® (Medtronic Xomed, Jacksonville, FL, USA). The alotomy incision, if performed, is closed in two layers. The flap is left attached at its base.

Results

Patients were followed for 1 month to 4 years. The average follow-up was 24 months. Five of the seven cases resulted in complete closure of the perforation (71.4%). In two patients total loss of the flap was seen. There were no cases of persistent nasal obstruction or oronasal fistula. In one patient two flaps were used simultaneously due to an exceptionally large perforation. This patient had trouble fitting his dentures, which lasted for 2–3 months and subsequently resolved spontaneously.

The previously described technique involves performing a lateral alotomy in some cases in order to improve access. We found that in most cases, and especially when the defect is small or situated anteriorly, there is no need for lateral alotomy and the access is satisfactory. We performed lateral alotomy in two cases only.

In cases where access to the superior margin of the perforation is difficult due to a highly located defect or a narrow nasal valve, we found a transcutaneous bolster suture to be very useful.



Figure 1. Septal perforation due to septal surgery.



Figure 2. Mucosal flap transferred to the nasal cavity. A lateral alotomy can be seen.

This suture is passed through the anterosuperior margin of the flap and defect and then through the skin of the dorsum of the nose and tied over a small bolster bandage.

Discussion

The technique for the closure of nasal septal perforation described above is one of several surgical procedures involving the advancement of mucosal flaps. The use of oral mucosal flaps obviates the need for intranasal tissue that may result in excessive tension with flap ischemia and reperforation [4]. It has been claimed that only with intranasal advancement flaps can normal physiology be obtained since normal respiratory epithelium is used for closure [5]. We found no symptoms of impaired nasal function in our patients after closure of septal perforation using oral mucosa.

The technique for surgical closure of perforations described here is a closed technique, requiring at the most a lateral alotomy incision for greater exposure. We find that with this

technique, satisfactory exposure is obtained and the increased morbidity associated with an open approach is avoided.

Many authors have described surgical techniques for the closure of nasal septal perforations involving the interposition of various graft materials. According to Stoor and Grenman [3], graft interposition is required to achieve a greater success rate in the repair of septal perforations. Kridel [5] claims that it is absolutely crucial that a connective tissue interposition graft be placed between the corresponding perforation repairs in order to prevent recommunication and perforation and to act as a template on which the edges of the sewn perforation can migrate and mucosalize closed.

In this study we achieved a 71.4% complete closure rate without the use of an interposition graft of any kind, thus reducing operating time and potential morbidity associated with the harvesting of grafts. Heller et al. [12] achieved a 100% closure rate in all six patients using the facial artery musculomucosal flap. This technique involves the use of Doppler to identify the location and course of the facial artery, and lining the raw surface of the distal flap with a full-thickness skin graft. We used a simpler, less time-consuming technique without the use of Doppler and without harvesting a skin graft with its associated morbidity. Our closure rate was 71.49% (5/7) compared to 100% (6/6) in Heller's study.

The incomplete closure rate in this study could be explained by the lack of experience with this technique, and it is likely that in time 100% closure rates can be achieved with this method. This of course remains to be proved by further studies involving a larger number of cases.

References

1. Metzinger SE, Guerra AB. Diagnosing and treating nasal septal perforations. *Aesthetic Surg J* 2005;25:524-9.
2. Newton JR, White PS, Lee MSW. Nasal septal perforation repair using open septoplasty and unilateral bipediced flaps. *J Laryngol Otol* 2003;117:52-5.
3. Stoor P, Grenman R. Bioactive glass and turbinate flaps in the repair of nasal septal perforations. *Ann Otol Rhinol Laryngol* 2004;113(8):655-61.
4. Woolford TJ, Jones NS. Repair of nasal septal perforations using local mucosal flaps and a composite cartilage graft. *J Laryngol Otol* 2001;115:22-5.
5. Kridel RW. Septal perforation repair. *Otolaryngol Clin North Am* 1999;32(4):695-724.
6. Friedman M, Ibrahim H, Ramakrishnan V. Inferior turbinate flap for repair of nasal septal perforation. *Laryngoscope* 2003;113:1425-8.
7. Romo T 3rd, Scalfani AP, Falk AN, Toffel PH. A graduated approach to the repair of nasal septal perforations. *Plast Reconstr Surg* 1999;103(1):66-75.
8. Ambro BT, Zimmerman J, Rosenthal M, Pribitkin EA. Nasal septal perforation repair with porcine small intestinal submucosa. *Arch Fac Plast Surg* 2003;5:528-9.
9. Feldman M, Jabourian Z. Oral mucosal flaps for septal reconstruction. In: Grabb's Encyclopedia of Flaps. 2nd edn. Vol 1: Head & Neck. Philadelphia-New York: Lippincott-Raven, 1998:287-9.
10. Tardy ME Jr. Alternatives in nasal reconstruction ("five flaps and a graft"). *Laryngoscope* 1976;86:1824-7.
11. Meyer R. Nasal septal perforations must and can be closed. *Aesthetic Plast Surg* 1994;18:345-55.
12. Heller JB, Gabbay JS, Trussler A, Heller MM, Bradley JP. Repair of large nasal septal perforations using facial artery musculomucosal (FAMM) flap. *Ann Plast Surg* 2005;55:456-9.

Correspondence: Dr. P. Gilbey, Dept. of Otolaryngology, Head & Neck Surgery, Western Galilee Hospital, P.O. Box 21, Nahariya 22100, Israel.
Phone: (972-4) 910-7568
Fax: (972-4) 910-7671
email: pgilbey@bezeqint.net

Take long walks in stormy weather or through deep snows in the fields and wood, if you wish to keep your spirits up. Deal with brute nature. Be cold and hungry and weary

Henry David Thoreau (1817-1862), U.S. author and naturalist

Capsule

FDA approves Israeli start-up's birth monitor

A computerized labor-monitoring system, the flagship product of Barnev Ltd., an Israeli start-up company, has obtained FDA approval. This monitoring system uses proprietary ultrasound technology to provide safe, continuous and accurate measurement of cervix dilatation and fetal head descent. Until now, these measurements are done manually every 1 to 4 hours by a midwife, and are considered inaccurate, uncomfortable and put the mother and fetus at risk for infection. In addition, the computerized method also continuously and accurately monitors contractions and the fetus's heartbeat.

The system works by means of electrodes attached to the two sides of the cervix and to the head of the fetus, three transmitters/receptors attached to the mother's abdomen, and an amplifier attached to the mother's hip. All these devices were developed by the company. The continuous monitoring gives early warning of any problem during birth and greater precision in understanding any changes, enabling the team to prepare necessary medical procedures and avoid unnecessary ones.

Israel High-Tech & Investment Report, March 2007

