Nasal Septal Perforation Repair With Porcine Small Intestinal Submucosa

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Repair of nasal septal perforations presents a difficult challenge to the otolaryngologist. Successful closure rates of greater than 90% have been published by several authors using bipedicled mucoperichondrial advancement flaps and interpositional grafts. A number of different materials, both autografts and allografts, have been used as interpositional grafts. We report a 100% closure rate (10 of 10) using an open rhinoplasty technique with bipedicled advancement flaps and porcine small intestinal submucosa (SurgiSIS; Cook Biotech Inc, West Lafayette, Ind) as an interpositional graft. We submit that SurgiSIS is an ideal material for use in the repair of nasal septal perforations because it is easy to work with, demonstrates the ability to support the regeneration of adjacent tissue, and avoids the increased operative time and morbidity associated with harvesting autografts.

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Successful closure of nasal septal perforations remains a surgical challenge. Numerous authors have published results using interposition grafts of native cartilage, fascia, pericranium, and, most recently, acellular human dermis. SurgiSIS (Cook Biotech Inc, West Lafayette, Ind) is an acellular, freeze-dried soft tissue graft derived from porcine small intestinal submucosa. The tissue retains glycosaminoglycans and growth factors, yet elicits no immunologic response from host tissue. SurgiSIS acts as a scaffold for the regeneration of adjacent tissue. SurgiSIS is terminally sterilized to eliminate cell-borne pathogens. Animal studies have demonstrated regeneration of native tissues in areas of grafting including urinary bladder smooth muscle, ligament, and dura mater. SurgiSIS is indicated for use as an implantable surgical mesh to reinforce soft tissue.

SurgiSIS is available in 2 forms: single layer and enhanced strength (ES). Both forms are thin and pliable, allowing for ease of manipulation during surgical procedures.

Methods

Patients
Ten patients (7 women and 3 men; ages, 30-60 years [mean, 43 years]) with nasal septal perforations who received porcine small intestinal submucosa comprised the study population. The causes of the septal perforations were previous nasal surgery (n=6), prior septal cautery (n=3), and cocaine abuse (n=1). All patients underwent perioperative biopsy and laboratory evaluation to rule out neoplastic and granulomatous disease. Perforation sizes ranged from 4 mm to 20 mm in diameter (mean, 10 mm). All perforations were located in the cartilaginous septum.

Surgical Technique
All 10 septal perforation closures were performed via an open rhinoplasty approach followed by bilateral mucoperichondrial advancement flaps with interposed SurgiSIS ES grafts (Figure 1 and Figure 2). Patients had 0.25-mm thick silicone splints secured on either side of the repair. These splints were removed 3 weeks after the operation. All patients received perioperative corticosteroids and were treated with oral antibiotics until the splints were removed. Follow-up period ranged from 3 to 12 months.

Results
All 10 patients achieved complete closure of their nasal septal perforations us-
Using bipedicled mucoperichondrial advancement flaps with an interposition graft, numerous authors have reported septal perforation closure rates greater than 90%.

In the present study, we report a 100% closure rate using SurgiSIS as an interposition graft. Advantages of using the SurgiSIS xenograft include decreased operative time and the absence of donor site morbidity. SurgiSIS can be cut, rolled, or folded to accommodate the physical requirements for effective tissue repair. It is supplied sterile and has a shelf life of 1 year. No harmful immunologic response indicating rejection or sensitization has been documented in any species, including humans. However, SurgiSIS should not be used in patients with known sensitivity to porcine products. Another potential advantage is the ability of SurgiSIS to support regeneration of adjacent tissue. Cartilage regeneration from existing chondrocytes, although not yet proven (animal studies in progress), would be a significant advance in the surgical management of septal perforations. Indeed, if SurgiSIS xenograft reproducibly yields rigid hyaline cartilage in vivo, surgeons could consider its use during septoplasty and submucous resection of the cartilaginous septum as a means of ensuring long-term structural support of the nose.

**CONCLUSIONS**

SurgiSIS can be successfully used as an interpositional graft in the repair of nasal septal perforations. We submit that SurgiSIS is an ideal material for use in these cases. It is easy to work with, demonstrates the ability to support regeneration of adjacent tissue, and avoids the increased operative time and morbidity associated with the harvesting of autografts.

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**REFERENCES**