ORIGINAL ARTICLE

Autografts in nasal septal surgeries; Our experience

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Abstract

Importance: Numerous techniques are used for septal perforation repair, yet success rates remain variable. Few studies have evaluated the effectiveness of interposition grafts of polydioxanone plates combined with a temporoparietal fascia graft for septal perforation repair. It is a study in which septal autograft was used in routine cases to prevent septal perforations.

Objectives: To investigate and describe the use of auto septal cartilage graft for septal perforation prevention.

Design, setting and participants: This was a retrospective study performed in the department of ENT, Kuwait Teaching Hospital, Peshawar, Pakistan. The records of those patients who underwent nasal septal surgeries using septal cartilage as autograft were studied for the presence of septal perforation post-opratively. The study was conducted from October 2022 to December 2022. A total of 80 participants were included in the study.

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Introduction:
Septal perforations have numerous causes and are a significant source of morbidity for the patients affected. Symptoms include epistaxis, nasal crusting, whistling, nasal obstruction, and saddle nose deformity, which commonly leads these patients to present to facial plastic surgeons seeking repair. The cause can be trauma, inhalation medications, systemic vasculitis (such as granulomatosis with polyangiitis), or iatrogenic. Numerous techniques have been developed for repair, including the use of local intranasal flaps with closure of the mucoperichondrium,[1,2] alloplasts,[3] pericranial flaps,[4] grafting with acellular human dermal allograft,[5] interposition grafting using both synthetic[6,7] and, more recently, autologous grafting material.[8] Many of these techniques are technically challenging and may also serve to obstruct or functionally distort the nasal airway.[9] In addition, success rates of effective closure and resolution of symptoms remain variable, with reported success rates of 30% to 100% in small case series.[10] Of all the techniques reported, Nasal septal autografts have demonstrated the highest success rates, ranging from 90% to 100%. This approach does not attempt to close or approximate the mucosal edges across the perforation but instead provides an ideal scaffold of mesenchymal origin to revascularize and promote mucosal regrowth.

Temporoparietal fascia grafts have a proven success rate in the repair of anterior skull base defects[12] and have been used with success for other

reconstructive procedures, including pharyngeal repair[13] and microtia reconstruction.[14] In addition to reporting the rate of septal perforation closures, we think that symptom resolution constitutes a clinically meaningful outcome measure and therefore report the resolution of presenting symptoms substantiated through pre-operative and post-operative Nasal Obstruction Symptom Evaluation (NOSE) scores (where higher scores indicate greater nasal obstruction).[16,17]

Material and Methods:

Study design: This was a retrospective study in which the records of those patients who underwent nasal septal surgeries using septal cartilage as autograft were studied for the presence of septal perforation post-opratively. The study was conducted from October 2023 to December 2023. The ethical approval of the project was taken from Institutional Review board (IRB) of prime foundation. A total of 80 participants were included in the study. All patients were included in the study. There were no exclusion criteria. The primary end point was the prevention of septal perforation.

Surgical Technique: After completing all the pre-requisites for the septal surgery, all the patients were admitted one day before the operation day. Informed written consent was taken from the participants and explained the outcome and benefits of the operation. All the patients were operated under General anesthesia. Incision was given at mucoperiosteal junction in the right nostril, flaps were elevated on both the sides.

Using Killians nasal speculum the nasal septum was exposed and a big central piece of the septum which was straight was cut by Ballenger knife and kept in saline to be used at the end of the surgery. All the remaining curved septum was removed in piecemeal, the septal spur if found was removed by using hammer and gouge. Before replacing the mucoperiuosteal flaps the piece of septal cartilage which was preserved in the saline was refashioned and placed in the centre, the flaps realigned. In both the nostrils plastic splints were kept to reduce adhesion formations and anterior nasal packing was done for 24-48 hours. All the patients were followed up on 7th, 14th, 30th post-op day for the assessments of any septal perforations.

Main outcomes and measures: Assessing the presence of septal perforation was the primary outcome. Secondary outcomes were finding any residual deviated nasal septum, and nasal adhesions.

Results:

A total of 80 patients (42 women and 38 men; mean [SD] age, 45 [15] years) were included. The age range was from 15 to 40 years. These patients typically have thin, attenuated septal mucoperichondrial layers, making elevation of mucosal flaps particularly challenging; our technique avoids that problem because the nose remucosalizes the Septal cartilage piece with covering with a mucosal flap. Only 2 patients in this series had active rheumatologic disease (i.e., granulomatosis with polyangiitis), this is the first use of a technique to prevent perforations in this subgroup of patients.

Among the women the age range was from 20 to 35 years while the age range in males was from 18 to 40 years. The indications of surgery was deflected nasal septum without enlargement of inferior turbinates. Out of 80 patients only 02 patients in females had a very small septal perforation at the junction of septal spur area probably the cause would be damage to mucoperichondrial flap by gouge during the removal of spur. In 78(98%) there was no septal perforations at 30th post-operative day.

Discussion:

To our knowledge, this study is the first study in our country in which nasal septal autograft was taken and kept in between the mucoperiosteal flaps. The results are similar to those presented by both Epprecht et al[6] and Flavill and Gilmore.[18] In contrast to the case series by Epprecht et al,[6] all patients in this cohort underwent a repair using an open septoplasty technique combined with endonasal visualization during closure. In addition, this study is the first, to our knowledge,

to evaluate the outcome of symptom resolution validated with pre-operative and post-operative NOSE survey evaluation. Although perforation closure is a key objective outcome measurement, resolution of presenting symptoms, in our opinion, represents a clinically meaningful end point because patients with asymptomatic nasal septal perforations do not undergo repair at either institution. Finally, to our knowledge, no prior case series has expanded this technique to include patients with rheumatologic causes, and although only 2 patients in this series had active rheumatologic disease (ie, granulomatosis with polyangiitis), this is the first use of a technique to prevent perforations in this subgroup of patients. These patients typically have thin, attenuated septal mucoperichondrial layers, making elevation of mucosal flaps particularly challenging; our technique avoids that problem because the nose remucosalizes the Septal cartilage piece with covering with a mucosal flap.

The limited success rate of closures of septal perforations has led to a wide variety of closure techniques.[20-23] Temporoparietal fascia grafts are used in several head and neck procedures[24] and have long been an established source of grafting material in otologic surgery,[19] skull base repair,[25] and ear reconstruction.[26] The histologic structure of TPF makes it an excellent scaffolding material that likely enhances cellular migration and subsequent remucosalization.[15] Although no studies, to our knowledge, have evaluated the role of growth factor networks or the architecture of this Cartilage piece used for septal perforation repair, numerous studies have demonstrated the benefits of site-specific tissue when designing a scaffold for tissue regeneration, for which TPF serves as an example.[27,28] Furthermore, it is well known that the growth factor networks of grafting materials, particularly the extra cellular matrix, are instrumental in enhancing cellular attachment, migration, and proliferation as well as inducing neovascularization. We suspect that Auto septal cartilage graft provides this micro-environment that supports remucosalization.[24] However, further investigation is necessary to prove this theory.

Although harvesting auto septal cartilage graft is a straight forward technique, one disadvantage that we have encountered is mediating the balance between adequate tissue for coverage and maintaining a thin graft so as to not create further nasal obstruction after the repair. Two patients (patient 3 and patient 10) ultimately had no resolution of their nasal obstruction in addition to crusting. Nasal endoscopic examinations of these patients demonstrated a modest increase in thickness at the site of perforation repair compared with the other patients evaluated, which suggests that excessive graft thickness may have been associated with this outcome. Alternatively, this bulging of the perforation site in these 2 patients may have been due to a technical error of omission by one of us (S.S.) early in the series, or it may be due to a heightened inflammatory reaction in these 2 patients, which may have led to increased thickness of the construct. Mattress suturing of the Auto septal cartilage graft construct through and through was initially performed along the periphery only; however, bulging in the central portion through the perforation was noted in the healing phase, and more centralized mattress suturing through the entire construct corrected this problem. In mediating the balance between the adequateness of the graft and the thickness of the graft, it is of critical importance to be meticulous in the harvesting of the graft by only using the true while leaving loose areolar tissue.

Our experience in the prevention of these perforations notably went through a transition. Initially, mucosal coverage on at least a single side of the perforation was attempted. Further experience showed that this coverage was unnecessary, coinciding with the use of a cross-stealing technique of perforation closure[29] and the experience of Flavill et al.[30] Although endonasal techniques for septal perforation repair have been reported,[6] we argue that an open approach is far superior. The open technique allows for enhanced exposure with the improved ability to place and suture the graft construct, and it does not truncate the anterior blood supply to 1 septal flap by making a hemitransfixion or Killian incision. It further allows for the simultaneous

correction of nasal valve collapse. In our conservative, gradual approach to developing this technique, emphasis was placed on providing more overlap between the graft and the vascularized septal flap.

In all patients at our University Medical Center were treated with only sialistc sheet splints per operatively. Splints were removed per our institutions' typical external septoplasty or rhinoplasty protocol of removal at approximately 7-days after the procedure. Furthermore, the silastic sheet appears to protect the graft from toxic local conditions, such as active smoking, use of a continuous positive airway pressure device, or nasal sprays.

Limitations: The small sample size and short follow-up limit the precision of these results.

Conclusions:
Using the autograft of septal cartilage is a new concept in prevention of septal perforations. It is safe, procedure and does not require special expertise. Placement of Septal Cartilage graft during septal surgery is a safe, cost less and effective method in prevention of nasal septal perforations.

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Role and contribution of authors:
Habib khattak, main idea

Farhan Salam, collection of data.

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Shafi Ullah, overall approval.

Arif Raza Khan, critical approval

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