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Technical Note
Reconstructive Surgery

Endoscopic pericranial flap design for the restoration of nasal mid-vault lining defects

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Abstract. Despite progress made in nasal reconstruction, the restoration of a large defect, including the whole septum and mid-nasal vault structures, remains a challenge. The pericranial flap (PCF) is used widely for the reconstruction of anterior cranial fossa defects. This article presents a surgical technique for nasal lining restoration with an endoscopic PCF design. This technique was used in patients with huge intranasal tumours. Two patients with nasal eosinophilic angiocentric fibrosis were treated. The structural involvement was similar in each case. The tumour was resected completely by combined endoscopic and external methods through an open rhinoplasty approach. The resulting defect included the whole nasal septum, bilateral upper lateral cartilage, and the entire mid-nasal vault mucosal lining. Reconstruction was achieved by endoscopic PCF design for internal lining reconstruction and rib cartilage for framework repair. The first patient was followed up for 18 months and the second for 8 months. No infection occurred in the postoperative period. Framework stability and texture were good, and both nasal shapes were acceptable. In conclusion, this endoscopic PCF approach for restoring the internal nasal lining appears to be a good choice in selected cases.

Key words: angiocentric fibrosis; pericranial flap; nasal reconstruction; nasal lining defect.

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Many massive intranasal tumours cause nasal septum and vault destruction in a way that makes reconstruction with a pedicled mucosal flap impossible[1,2]. One option is to use regional flaps in these circumstances[3]. Different local and regional flaps are used to restore the internal lining of the nasal cavity. Local flaps include the nasal septal flap and inferior turbinate flap, and regional flaps include the buccal flap, facial artery musculomucosal flap (FAMM), and island forehead flap[2–9].

Despite the progress made, the reconstruction of large defects of the intranasal structures remains a challenge. The defect size and presence of a reliable donor site are important in determining which flap to use[1,2,6,8]. In some large defects of the nasal vault, a FAMM flap or nasal septal flap is adequate for nasal mucosal lining repairs.

The pericranial flap (PCF) is used widely for the restoration of anterior cranial fossa defects[1,4,5]. A method for the restoration of the internal nasal lining through the design of an endoscopic PCF is described herein. The cases of two patients with huge intranasal tumours in whom this technique was applied are also presented.

Patients and methods

Two patients with nasal eosinophilic angiocentric fibrosis were included in this study. The structural involvement was similar in both cases. Case 1 was a 62-year-old man and case 2 was a 25-year-old woman

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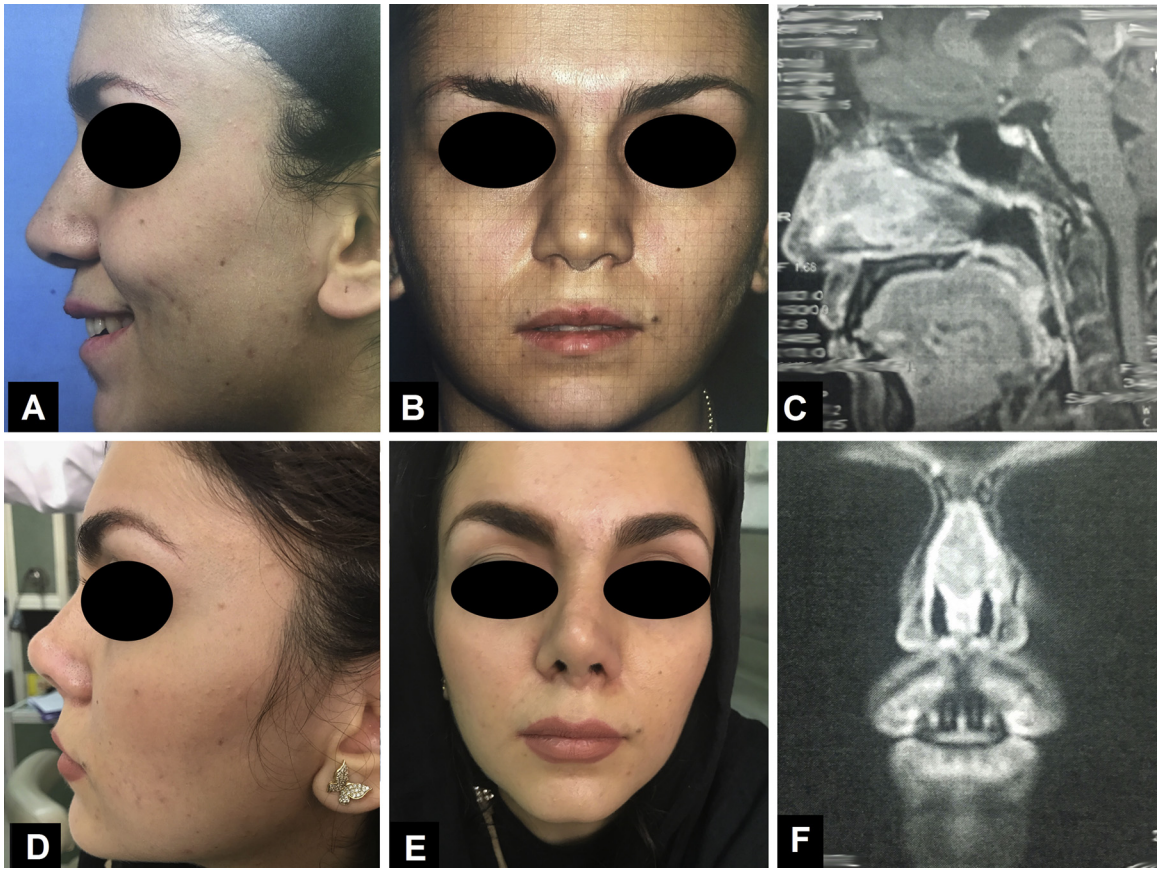

Fig. 1. Case patient 2: (A) lateral photograph obtained preoperatively; (B) frontal photograph obtained preoperatively; (C) sagittal T1 enhanced MRI; (D) lateral photograph obtained at 8 months postoperative; (E) frontal photograph obtained at 8 months postoperative; (F) coronal T1 enhanced MRI.

(Fig. 1). Both upper lateral cartilages, the nasal septum (inferior nasal septum to the uppermost parts of the superior septum adjacent to the cribriform plates), anterolateral nasal wall, anterior nasal floor, and posterior surface of both nasal bones were involved in both cases. The diagnosis was confirmed by immunohistochemistry examination.

The tumour was resected completely by combined endoscopic and external methods through an open rhinoplasty approach. The resulting defect included the whole nasal septum, bilateral upper lateral cartilages, and the whole mucosal lining of the mid-nasal vault. The remaining structures were the bilateral lower lateral cartilage, nasal bones, and complete overlying skin and muscular cover of the nose.

The sixth and seventh left-side ribs were harvested for the cartilage framework material. Due to the destruction of all possible donor sites for the creation of a reliable local mucosal flap, the PCF was considered for the restoration of the missing mucosal lining of the mid-nasal vault.

Surgical technique

After general anaesthesia, the patient was placed in a supine position. The anatomical course of the supratrochlear and supraorbital arteries was marked. The length of the required PCF was measured with a gauze. An 8-cm horizontal incision was then made in the right parietal area of the scalp, and a dissection in a subgaleal and then a sub-periosteal plane was performed under visualization with 0- and 30-degree endoscopes to create the planned PCF.

A 3-cm base was considered for the flap, and it was carried up to 1.5 cm above the orbital rim (Figs 2 and 3). Tunnelling was performed under the skin of the radix, and the harvested flap was passed through it and sutured to the remnant of the mucosa and the upper border of both lower lateral cartilages. The harvested rib cartilage was shaped to reconstruct the L-strut and both upper lateral cartilages, and was then applied over the new internal lining created by the PCF and fixed to the remaining structures. In the final step, the skin was sutured, nasal packing was positioned, and an external nasal splint was fixed.

Results

Case 1 was followed up for 18 months and case 2 was followed up for 8 months. No infection occurred in the postoperative period, and the framework stability and texture were good. The nasal shape was acceptable in both cases, and no tissue necrosis was reported on endoscopic examination. Both patients were happy with their new nose, and the nasal vault had an acceptable appearance. The only complication was excessive crusting inside the nasal cavity, particularly at the 2-week and 1-month postoperative visits.

Discussion

Different options are available for nasal reconstruction, depending on the size, area, and layers of the defect. However, in large multilayered defects, such as in the cases presented here, these choices may not be fully available. The size of the

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