

How we do it: Mini Posterior Septal Artery Flap for coverage after transphenoidal approaches*

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Summary

We propose a novel posterior nasal flap for use in endoscopic approaches to the sella and parasellar region that involve resection of the sphenoid face and a posterior nasal septectomy. It involves elevation of the mucosa of the posterior septum and sphenoid face with preservation of the angiosome based on the posterior septal artery. This flap has the advantages of maximal mucosal preservation in order to optimize postoperative healing and has been demonstrated to permit future elevation of a complete naso-septal flap for reconstruction of anterior skull base defects. An illustration of the technique is provided.

Key words: posterior nasal flap, septum, endoscopy, skull base defects

Introduction

Compared to traditional techniques, the endoscopic transphenoidal approach to sellar/parasellar pathology has rapidly become the favoured approach due to unparalleled visualization and decreased patient morbidity⁽¹⁾. With the ever increasing volume of cases being performed the issues of patient morbidity and nasal function post-operatively are assuming greater interest and importance. In addition to well-described neurosurgical/endocrine complications⁽²⁾, the most common sequela of endoscopic techniques is the formation of nasal crusting in the posterior nasal cavity due to septectomy and wide opening of the sphenoid face⁽³⁾.

When approaching the sella, the anterior sphenoid sinus face is generally removed inferiorly from the natural sphenoid ostia to the floor of the sphenoid sinus in an effort to optimize exposure of the clival recess and inferior sella. This bony sphenoid face is also routinely removed laterally as far as the orbital apex. As a posterior septectomy is performed to permit bimanual instrument triangulation, the sphenoid rostrum is excised as well. In some instances, attaining this maximal access can compromise the mucosa lining the inferior sphenoid and superior choanae/sphenoid face. In addition, the posterior septal branch of the sphenopalatine artery is often compromised when extending

the sphenoidotomy inferiorly. This not infrequently leaves a denuded surface of sphenoid bone and nasal septum that must heal by secondary intention and often becomes the source of posterior nasal crusting and can delay or compromise overall healing.

This sub-optimal healing or crusting in the posterior nasal cavity can be quite symptomatic with sensations of irritation and fullness as well as an offensive odour due to bacterial overgrowth under and around the large crusts that can form. Despite nasal saline irrigation post-operatively, patients can continue to develop nasal crusting in this area, likely because of its anatomic location and altered airflow patterns. These patients ultimately tend to return to clinic for endoscopic debridement or are treated by other physicians with antibiotics for the presumed acute sinusitis.

A posteriorly based axial nasoseptal flap that can be raised to aid in the repair of skull base defects or to manage CSF leaks⁽⁴⁻⁶⁾ is well-described, however, it has not been clarified that preserving the proximal angiosome of the posterior septal artery can lead to a more functional outcome after transphenoidal surgery by providing a natural mucosal lining to the inferior sphenoid and remaining nasal septum.

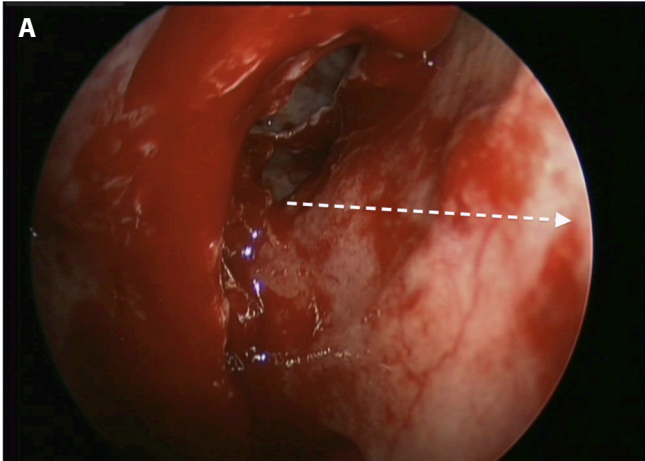


Figure 1A – Right side. Demonstrates the location and direction of incision and outlines the superior limit of the flap. The vector of the incision is anterosuperior from the lower limit of the sphenoid ostium.

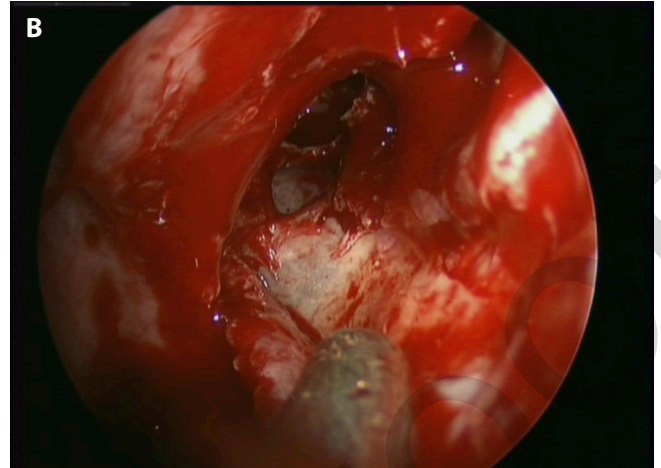


Figure 1B – Right side. Demonstrates the initial steps of flap elevation after completing incision. Posterior septal bone, sphenoid rostrum and sphenoid face are visible.

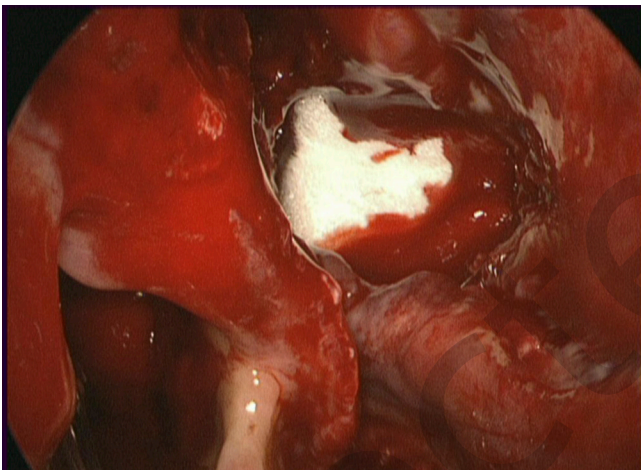


Figure 2 – Right side. Flap redraped to cover unresected portion of sphenoid face and posterior septum. Sphenoid sinus containing surgifoam is visible.

Description

The sphenopalatine artery is a terminal artery of the internal maxillary artery that exits into the lateral nose via the sphenopalatine foramen. In most cases, the artery bifurcates into two major branches; the posterior lateral nasal artery and the nasal septal artery⁽⁷⁾. As the artery is accepted to pass across the sphenoid face inferior to the ostium and superior to the choana, some literature suggests lifting the mucosa from a medial to lateral direction to preserve the arterial supply⁽⁸⁾.

If it is deemed that a formal nasal septal flap is not required to reconstruct skull base defects after transsphenoidal endoscopic approaches, we suggest that the mucosa overlying the inferior sphenoid sinus and nasal septum still be preserved for redraping of the sphenoid bone and residual septum at the conclusion of the endoscopic skull base surgery. This can be accomplished by using sharp dissection to delineate a mucosal

flap beginning at a level roughly corresponding to the inferior limit of the natural ostium of the sphenoid sinus (Figure 1A) and extending anteriorly and slightly superiorly onto the posterior nasal septum. This will form the superior level of the preserved mucosal flap. Care is taken to elevate the mucosa down to periosteum to preserve the arterial supply (Figure 1B). The laterally based mucosal flap can then be reflected inferolaterally into the choana/nasopharynx while the bony anterior face of the sphenoid is removed with either a drill or Kerrison punches. At the completion of the procedure the preserved mucosa is carefully replaced along the superior choana, inferior sphenoid face, and remaining vomer as well as providing coverage for the sphenoid floor if necessary (Figure 2).

Discussion

As proof of principle that the arterial supply can be preserved, we have recently had occasion to repair the CSF fistula resulting

from fenestration of a sellar arachnoid cyst on a revision basis. The initial approach involved the technique presented in this paper. The subsequent revision involved the successful elevation of a viable complete nasoseptal flap (anterior limit was limen vestibuli) with successful closure of the fistula and excellent appearance of the flap at 8 weeks post-op, including a pulsatile pedicle.

Conclusion

In summary, we offer a technique wherein careful preservation of the mucosa between the inferior sphenoid sinus and the

posterior nasal choana may serve as a useful adjunct to minimize the incidence of crusting found in the posterior nasal cavity following transphenoidal endoscopic skull base surgery. This mucosal covering based on the posterior septal artery can be redraped on the free edge of exposed sphenoid bone and nasal septum to minimize the functional impact of this minimally invasive surgical approach.

Conflict of interest

No Financial Disclosures

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