Repair of CSF Leaks in the Lateral Recess of the Sphenoid Sinus: Transsphenoid vs. Transpterygoid Approach

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INTRODUCTION

In some cases, the sphenoid sinus can have extensive pneumatization extending into the pterygoid process, and this area can be a common location for the development of spontaneous CSF leaks. Some have proposed a spontaneous origin for these leaks, attributed to a fusion point of ossification centers near the lateral sphenoid sinus commonly known as Sternberg’s canal. This difficulty to access region presents a challenge to the endoscopic surgeon.

A transpterygoid approach to the lateral sphenoid recess was first proposed by Bolger¹. Using this technique, the posterior wall of the maxillary sinus is removed and the sphenoid sinus is accessed via the pterygomaxillary space. Modifications of this approach have since been reported by other investigators². Possible complications associated with this approach include paresthesias due to V2 injury, decreased lacrimation, and altered mucociliary clearance in the maxillary sinus. This technique can also extend surgical time substantially, with Bolger’s original study reporting an average surgical time of around six hours.

In the current study, we describe our experience with an extended transpterygoid approach to lateral sphenoid sinus CSF leaks and meningoencephalocele.

METHODS AND MATERIALS

We retrospectively reviewed the clinical data for 6 patients who underwent the extended transpterygoid endoscopic repair of lateral sphenoid sinus CSF leaks and encephaloceles. Cases were performed by two surgeons between May 2007 and June 2010. All patients underwent preoperative imaging with stereotactic navigation and had confirmation of CSF positivity using transferrin testing.

A similar surgical technique was used for all patients. The procedure begins with infiltration of a vasoconstrictive agent in the region of the sphenopalatine and posterior septal arteries. The middle turbinate is lateralized and preserved. The natural sphenoid ostium is identified and widely enlarged across the sphenoid rostrum. Extended lateral dissection is carried out with a drill and the vidian canal and nerve is identified and isolated. In some cases, while drilling down through the sphenoid floor, the sphenoidal process of the palatine bone is partially resected, but the pterygoid plates are left intact. The cranial base defect and associated encephalocele and/or CSF leak is then identified and completely visualized with a 0, 45 or 70 degree endoscope. Any herniated tissue is reduced using bipolar electrocautery. A small area of mucosa is removed around the leak site and the cranial base defect is then reconstructed using a variety of grafts and techniques.

RESULTS

The medical records of 6 patients who met inclusion criteria were reviewed. Average patient age was 47.2 (33-61) years. Five patients were female and one was male. The site of surgery was equally divided between the left and right side. Three patients presented with CSF leak and three patients presented with CSF leak in combination with meningoeencephalocele.

Skull base repair was performed using Alloderm™ in 2 patients, AlloDerm™ with a free mucosal graft in 1 patient, fascia lata with a free fat graft in 2 patients, and fascia lata with a pedicled mucosal flap in 1 patient. Average duration of hospital stay was 4.8 (3-9) days. Three patients received a lumbar drain prior to surgery and the other three patients did not. Mean follow-up was 17.5 (8-41) months. No patients had recurrence of their symptoms at the end of the follow-up period. No major complications were observed. Minor complications included temporary xerophthalmia in one patient and temporary midface hypoesthesia in two patients. No permanent minor complications were reported.

DISCUSSION

CSF leaks in the lateral recess of the sphenoid sinus can be difficult to repair using traditional transethmoid, transsphenoid approaches. The transpterygoid approach improves access to this region, however, it adds to dissection time substantially and puts adjacent neurovascular structures at risk. In our experience, most lateral recess CSF leaks can be repaired using an extended transsphenoid approach and angled instruments and endoscopes. Full dissection of the pterygomaxillary space is rarely necessary. By early identification of the vidian nerve and extended dissection lateral to this nerve, instrumentation of the pterygopalatine ganglion and maxillary division of the trigeminal nerve can be avoided.

Determination of the ideal approach for lateral recess leaks should be made on a case by case basis. We have found that if a straight trajectory to the target defect can be plotted out above the pterygoid plates using an image-guided navigation probe, then the extended transpterygoid approach is feasible. Use of the transsphenoid approach to access lateral recess pathology does not provide the same exposure as the transpterygoid approach. For this reason, use of angled instruments and either 45 or 70 degree endoscopes is often a necessity. The use of angled instrumentation allows the dissection plane to remain more medial and superior than the true transpterygoid approach. Resection of a small portion of the palatine bone typically provides an adequate corridor for accessing the far lateral recess of the sphenoid sinus in most cases.

CONCLUSIONS

CSF leaks and meningoencephaloceles of the lateral sphenoid recess present a unique challenge to the endoscopic surgeon. The transpterygoid approach provides excellent access to this region, but can extend surgical time and put important neurovascular structures at risk. We have been able to access this area using a primarily transsphenoid approach and angled instruments and endoscopes. Minimal dissection of the palatine bone and pterygoid process is necessary, and the maxillary division of the trigeminal nerve and pterygopalatine nerve are generally well-protected.

REFERENCES
