Surgical Treatment of Suprasellar Dermoid Cyst via Endoscopic Endonasal Approach

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Abstract

Epidermoid and dermoid cysts are rare, accounting for <1% of intracranial tumors. These cysts are congenital, benign lesions characterized by a squamous epithelial lining and in the case of dermoid cysts, filled with mature adnexal structures of mesodermal origin such as hair follicles and sebaceous glands.[1] Epidermoid and dermoid cysts most commonly occur in the cerebellopontine angle (CPA) and in the midline, respectively. Less often, these cysts present as suprasellar or parasellar lesions. Typically, these tumors are observed in middle-aged patients with symptoms including headache, visual loss, and endocrine dysfunction. As of now, the standard of care is surgical resection.

We report on a 35-year-old patient with a dermoid cyst for whom an expanded endoscopic endonasal approach was taken, which is less invasive than an open approach.[2,3] A lesion located in the right suprasellar cistern, deforming the right cerebral peduncle, was causing a right cranial nerve III palsy. The patient was scheduled for surgery based on these findings. After unsuccessful attempts to mobilize the pituitary gland, an intraoperative decision was made to split the gland to access the lesion. The procedure was well-tolerated, and postoperative MRI showed gross total resection with small residual tumor in the interpeduncular cistern. Mild improvement of the patient's third nerve palsy was noted postoperatively. Bloodwork revealed no evidence of hormonal dysfunction after six months. The goal of this video is to demonstrate the versatility of endoscopic endonasal surgery to access lesions located behind the upper clivus, traditionally reserved to open approach. While splitting the pituitary enhanced access without hormonal dysfunction in our case, further research is necessary to determine if this is a consistently safe option.

Introduction

The 35-year-old patient presented with diplopia, complete right ptosis, and acute onset of complete right CN III palsy 4 weeks before consultation. Preoperative imaging indicated an extra-axial mass with fat signal in the right suprasellar cistern in proximity to the right CN III and V (Figure 1a, 1b).

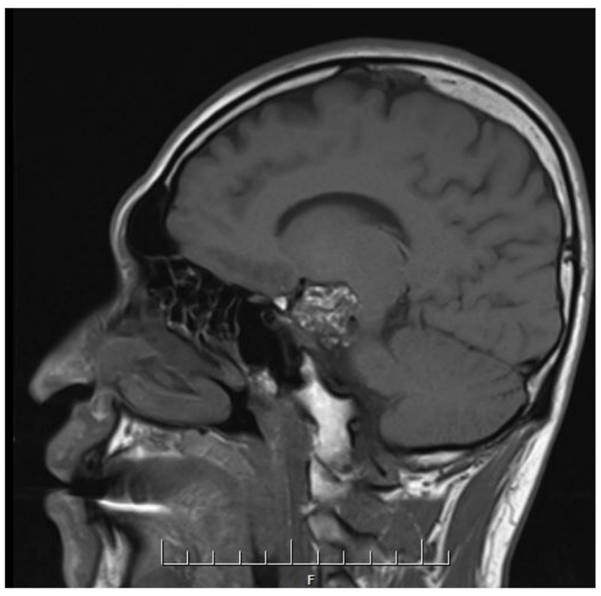

Figure 1a. Preoperative T1w postcontrast, sagittal view.

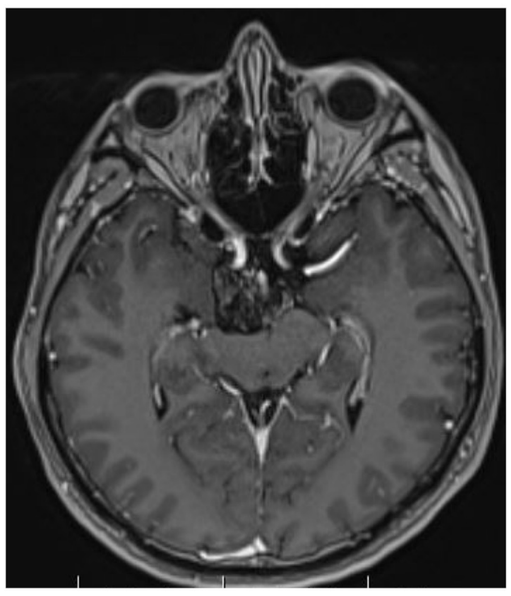

Figure 1b. Preoperative T1w postcontrast, axial view.

Methods and Materials

The right nostril was explored, sphenoid ostium identified, and monopolar cautery was used to raise the nasal septal flap. The posterior septum was removed for 2 nostrils – 4 hands technique . The sphenoid keel was removed and anatomy was established (Figure 2). The intrasphenoid septations were drilled and a window was created on the sellar floor and upper clivus until the anterior dura was visible (Figure 3). Despite drilling of the clivus, it was quickly evident that a transsellar approach was sufficient for debulking.

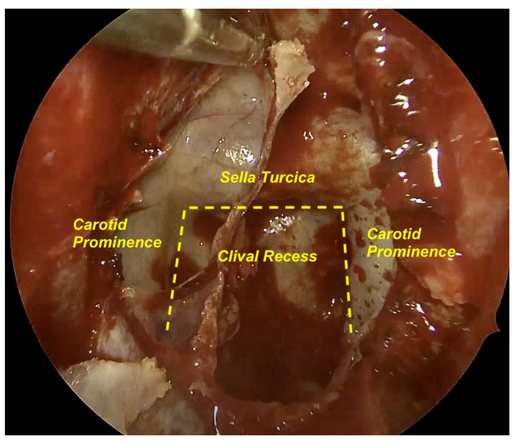

Figure 2. Establishment of skull base anatomy

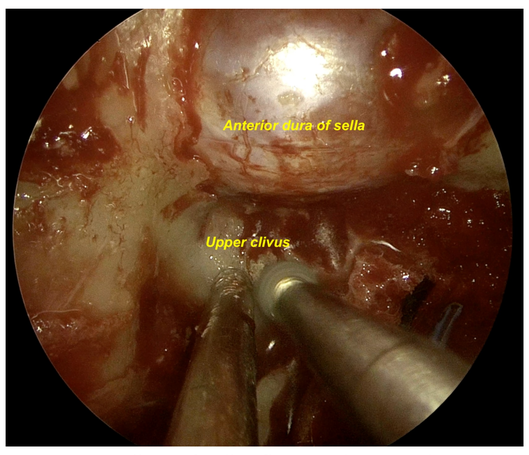

Figure 3. Drilling of sellar floor and upper clivus to expose anterior dura

We were able to access the pituitary gland which was partially mobilized to access the tumor. We had to bisect the pituitary gland to access the diaphragma sellae posteriorly and reach the tumor (Figure 4). This decision was made to avoid a right transcavernous approach, which can be associated with carotid injury, bleeding, and damage to cranial nerves. The splitting of the pituitary gland was followed by the opening of the diaphragma sellae, rendering the tumor evident (Figure 5). We began dissecting the tumor using curved curettes, microcurettes, hydro-dissection and suction to remove the bulk of the tumor. A piecemeal technique was performed. A multilayer closure using a Duragen inlay and a Duragen overlay was performed to cover the clival and sellar defects. A mucosal flap was then placed, tacked up with Surgicel®, and held together with Vistaseal™. We placed Gelfoam® squares over the reconstruction followed by a nasal foley to keep the reconstruction intact.

Figure 4. Splitting of the pituitary gland

Figure 5. Mobilization of bisected pituitary gland to expose tumor

Results

Postoperative imaging shows significant size reduction of the tumor, with residual punctate foci of T1-hyperintensity in the interpeduncular cistern (Figure 6a, 6b). Pituitary gland function remains intact, and bloodwork is normal 6 weeks postoperatively. The patient's cranial nerve palsy continues to improve but has not resolved completely 2 months postoperatively.

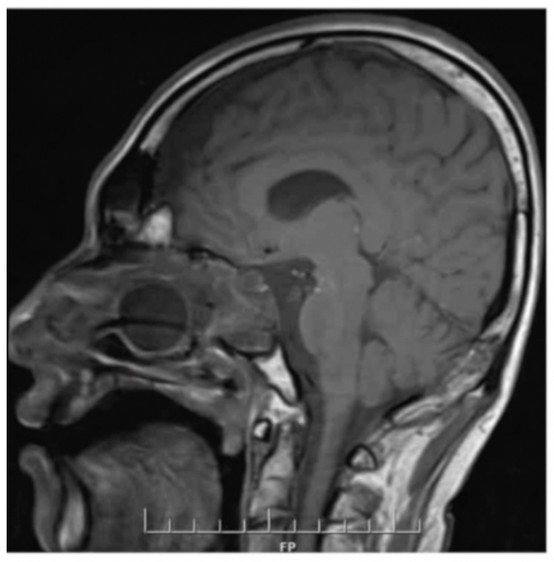

Figure 6a. postoperative T1w postcontrast, sagittal view.

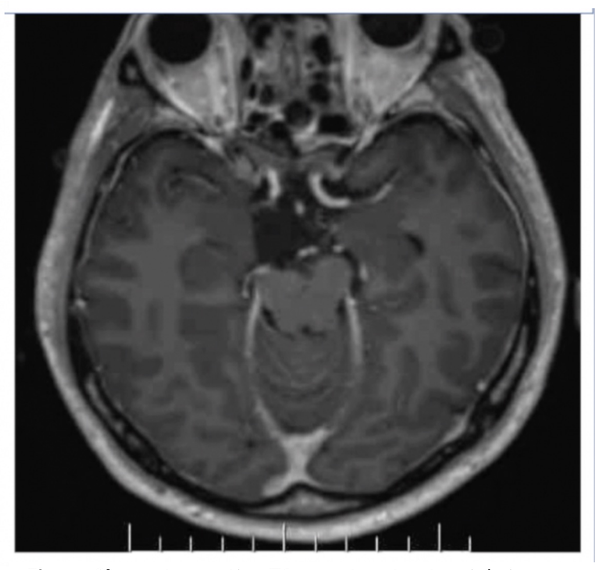

Figure 6b. postoperative T1w postcontrast, axial view.

Discussion

The endoscopic endonasal resection of a suprasellar dermoid cyst may be a good alternative to an open approach in some clinical circumstances. Notably, an open approach is more invasive and has a slower recovery, and gross total resection is more difficult. However, the endoscopic endonasal approach taken here – where the pituitary gland was bisected – has a risk of pituitary injury. Proper intraoperative judgement should be used to ascertain the risks compared to a transcavernous approach, which is associated with carotid injury, bleeding, and damage to cranial nerves. This patient demonstrated no evidence of hormonal dysfunction after six months, supporting this technique as a potential avenue for safe resection of these tumors. However, more research is required to assess the rate of pituitary dysfunction when the gland is intentionally bisected.

Conclusion

In conclusion, an endoscopic endonasal approach with splitting of the pituitary gland attained favourable clinical outcomes by eliminating the mass effect of the suprasellar dermoid cyst on surrounding structures like CN III and CN V. This approach for surgical removal of a dermoid cyst was a safe and feasible alternative to an open approach in this clinical scenario.

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