Transorbital approach resection for schwannoma at superior orbital fissure: A Case Report

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Abstract

Introduction: Resection of superior orbital fissure (SOF) tumors is challenging. We highlight the Endoscopic Transorbital Approach (ETOA) as a brain retraction-free, direct corridor to the SOF.

Case: A 33-year-old male with intermittent diplopia presented with a 2-cm SOF mass (suspected abducens nerve origin). Using ETOA, the tumor was successfully resected following extensive sphenoid wing drilling and meningo-orbital band incision. Postoperative dense lateral gaze palsy occurred, which MRI revealed was due to lateral rectus muscle edema rather than neural injury. The palsy was transient, and the patient achieved complete functional recovery at 1-year follow-up.

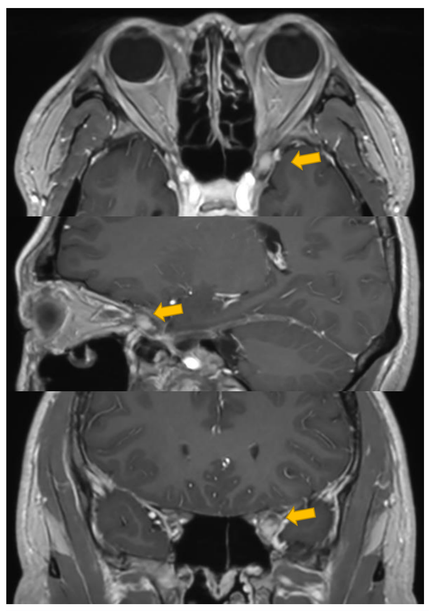
Conclusion : ETOA is a superior, minimally invasive option for SOF tumors.

Introduction

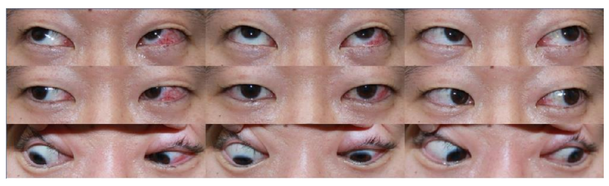
Resection of tumors located at the superior orbital fissure (SOF) is challenging. The pterional or orbitozygomatic approach with clinoidectomy has been traditionally used to reveal the lateral wall of the SOF. Recently, the endoscopic transorbital approach (ETOA) has emerged as an effective method to reach these lesions. We present a successful resection of a schwannoma located at the SOF via the ETOA.

Case presentation

A thirty-three-year-old man visited the clinic with recurrent intermittent diplopia. He had no underlying diseases or abnormal neurologic symptoms and signs other than diplopia. Magnetic resonance imaging (MRI) revealed a 2-cm extra-axial mass near the SOF.

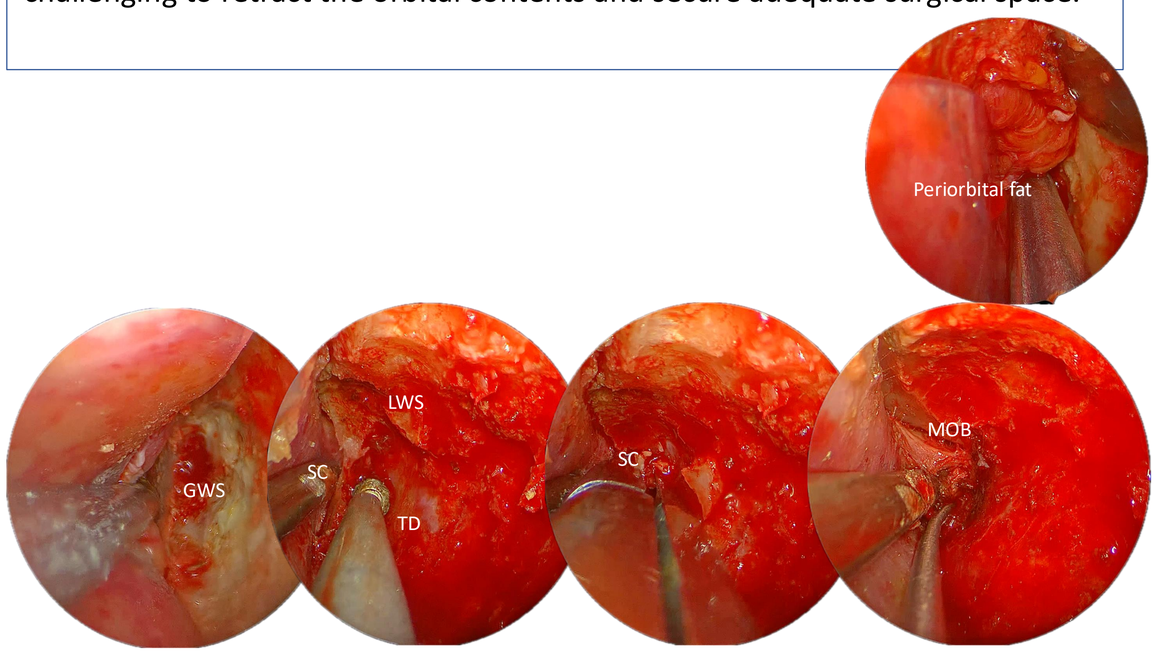


Preoperative T1-weighted contrast-enhanced MRI (Axial, Sagittal, and Coronal views). The yellow arrows indicate a well-defined, enhancing mass at the left superior orbital fissure, extending to the orbital apex and the anterior cavernous sinus.

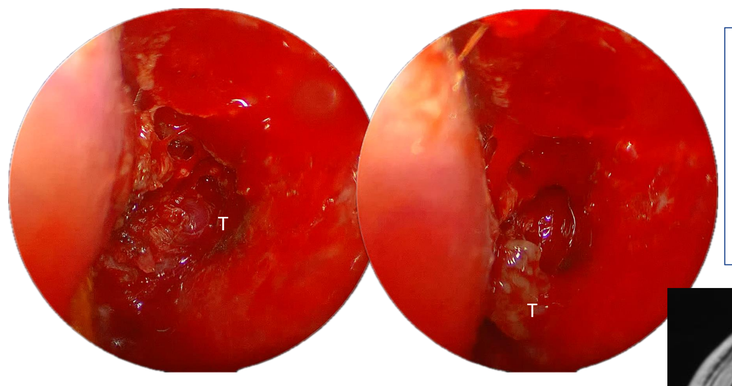


Preoperative nine-cardinal-position gaze photography showing no specific extraocular muscle (EOM) palsy.

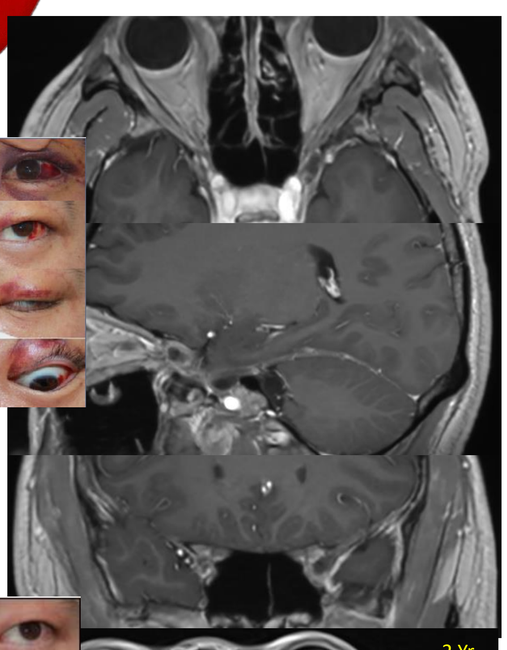
ETOA was planned for tumor resection. However, an incidental rupture of the periorbita occurred at the beginning of the procedure, which made it challenging to retract the orbital contents and secure adequate surgical space.



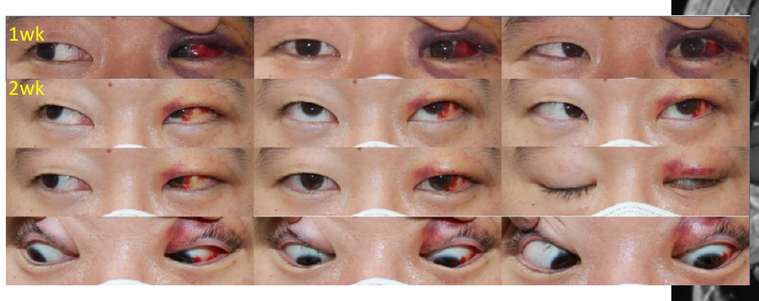
To visualize the SOF, the greater wing of the sphenoid (GWS) was drilled, followed by the lesser wing (LWS). The sagittal crest (SC) was then removed and the meningo-orbital band(MOB) was incised to achieve sufficient exposure for tumor resection.

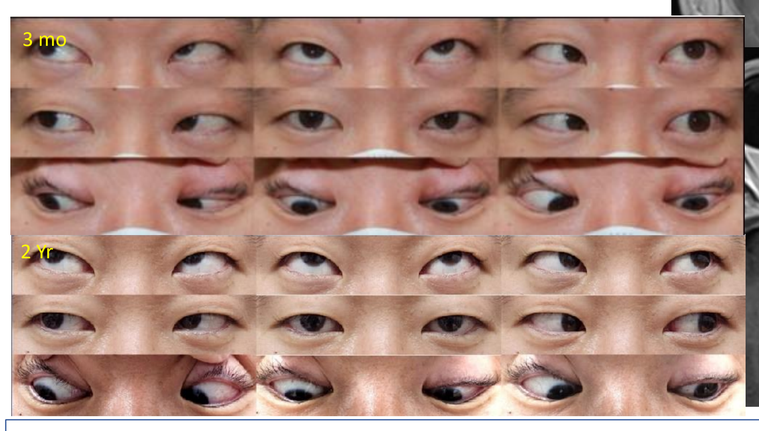


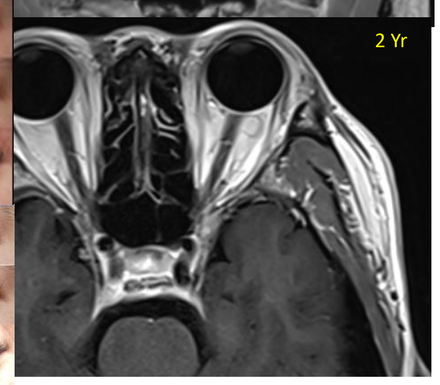
After exposing the lateral wall of the SOF dura, the tumor was successfully resected using ring curettes and forceps.



Postoperative MRI demonstrated gross total resection of the tumor, along with edema at the lateral orbital wall. However, significant contusion was noted at the surgical site, and the patient exhibited dense lateral gaze palsy immediately following the procedure.







Histopathological examination confirmed the diagnosis of a schwannoma. The patient's EOM limitation improved gradually over time. At the 3-month follow-up, only slight diplopia remained during lateral gaze. However, by the 1-year follow-up, the EOM limitation had completely resolved, and the patient was entirely asymptomatic.

Discussion

Schwannomas arising within the superior orbital fissure (SOF) are clinically rare and present significant surgical challenges due to the dense concentration of cranial nerves in a confined space. Although the exact nerve of origin is often difficult to identify intraoperatively, the patient's preoperative history of recurrent intermittent diplopia strongly suggests that the tumor likely originated from the abducens nerve (CN VI).

The primary goal of surgical intervention in this region is gross total resection while minimizing functional deficits. The endoscopic transorbital approach (ETOA) provides a direct surgical corridor to the SOF. In our case, extensive bone work, including drilling of the sphenoid wings and incision of the meningo-orbital band (MOB), was essential to achieve sufficient exposure of the SOF dura. While an incidental rupture of the periorbita occurred during the initial phase of the procedure, it was a manageable event and did not directly dictate the subsequent surgical steps.

A notable postoperative finding was the development of a dense lateral gaze palsy. Interestingly, despite this immediate deficit, the patient achieved a complete recovery within one year. Given the successful preservation of nerve continuity during the microsurgical dissection, this transient palsy was likely not the result of direct neural injury. Instead, it can be attributed to significant edema of the lateral rectus muscle, as suggested by the postoperative MRI. The inflammatory response and swelling of the muscle within the narrow SOF likely hindered its contractility, leading to a temporary restriction of lateral eye movement.

This case demonstrates that while the SOF is a high-risk zone for cranial nerve morbidity, the ETOA allows for safe and effective resection. Furthermore, it highlights that postoperative extraocular muscle palsy in this context may be a transient phenomenon caused by local muscular edema rather than permanent nerve damage, portending a favorable long-term functional prognosis.

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