

Endoscopic Management of Penetrating Skull Base Trauma: a case series

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Penetrating skull base trauma presents a unique set of challenges for surgical repair and management. These patients are at high risk for complications such as CSF leak, infection, and retained foreign body. Current management includes open cranial approaches to repair and reconstruct. (1) Here, we present a case series of 4 patients with penetrating trauma to the skull base and demonstrate how endoscopic endonasal surgery (EES) may be used as primary or adjunct surgical technique. (2)

Methods

A retrospective review was performed on 4 patients with penetrating skull base trauma at the University of Pittsburgh Medical Center who underwent EES to assess for outcome and complications.



Nail through medial orbit, tuberculum, and contralateral temporal lobe



Nail through the temporal lobe projecting into sphenoid sinus

Results

One patient had a nail traverse the cheek, maxillary sinus, medial orbit, tuberculum, and contralateral temporal lobe. (Fig. 1) It was removed using a combined endoscopic sublabial and endonasal approach, with an endonasal vascularized reconstruction.(3) (Video 1) The second patient had the nail enter from the pterion, orbit and end in the sphenoid sinus. (Fig. 2) This was removed through a mini-pterional approach with EES release and repair of the resultant CSF leak. The third patient had a pitchfork enter the orbit, oral cavity, and maxilla with frontal and temporal lobe penetration. Initially repaired with a bifrontal craniotomy and pericranial flap, a CSF leak persisted and then underwent 2 EES approaches for 2 separate CSF leaks. (Fig. 3) The fourth patient had a wood stick enter the medial orbit, traverse the lamina papyracea and cribriform plate. Once removed under EES observation the CSF leak was repaired. (Fig.4)

Results

All patients underwent conventional digital subtraction or CT angiography prior to foreign body removal, with none having an immediate or delayed vascular injury. With a minimum of 6 months follow up, all patients had a successful recovery.

Conclusions

Traditional management of penetrating skull base trauma often includes an open approach with pericranial flap reconstruction. This series demonstrates that EES may offer similar results alone or in combination to ensure appropriate skull base evaluation and reconstruction.



Top left, Top right and bottom left (initial pitchfork trauma). Bottom right (CT cisternogram after primary repair demonstrating ethmoid defect)



Wooden stick traversing orbit

Learning Objectives

By the conclusion of this session, participants should be able to: 1. Understand and formulate a multidisciplinary approach to identifying and providing initial management of penetrating skull base trauma. 2. Identify medical and surgical risks associated with penetrating skull base trauma. 3. Recognize the utility of Endoscopic Endonasal approaches in managing penetrating skull base trauma.

References

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