Endoscopic Removal of a Foreign Body of the Orbit and Paranasal Sinuses

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Case Presentation:
This is a 45 year old male who presented with vegetative material extruding from a laceration at the superior orbital rim. He had sustained a mechanical fall into a bush 3 months prior to presentation. He presented to an outside ED, where the laceration was repaired. On presentation to our institution, his exam showed a well healed periorbital laceration and 20/20 vision on the Snellen chart. A CT scan showed a linear foreign body with its proximal end in the medial orbit. This object traversed the medial orbital wall, ethmoid sinus, and sphenoid sinus. A dehiscence of the posterior sphenoid sinus wall was noted adjacent to the posterior edge of the foreign body. A CT-A confirmed that there was no apparent injury to the carotid artery. Due to the risk of vascular injury, the procedure was performed in the IR suite. Given the proximity of the foreign body to the carotid artery, an angiogram and balloon occlusion test were performed prior to the attempted removal and a sheath was kept in place. A combined endoscopic and open approach was performed by the Ophthalmology and Otolaryngology services. A septoplasty with posterior septectomy, left total ethmoidectomy and bilateral sphenoidotomy was required in order to expose the object. Following this, we were able to see a stick entering the ethmoid sinus at the lamina papyracea and extending to the right lateral sphenoid sinus. Next, a periorbital incision was made and dissection was performed along the medial orbital wall until the stick was encountered. The object was then able to be removed by grasping its proximal end in the orbit and pulling it out. The patient had no neurological deficits postoperatively and was discharged the following day.

Discussion:
Penetrating injuries of the orbit and paranasal sinuses are a rare injury. The foreign bodies reported range from glass, metallic fragments, wood splinters, bamboo, oral implants and toothbrushes (1-8). The proximal end of the foreign body started within the orbit and traversed the ethmoid sinuses and septum, while the distal tip was in the sphenoid sinus. Imaging showed the posterior wall of the sphenoid sinus was dehiscent and that the tip of the foreign body was only millimeters from the carotid artery. The object had been present for months and the degree of inflammation near the carotid was unknown. A paranasal sinus foreign body with such a close proximity to the carotid has not previously been reported in the English literature. The patient underwent an angiography balloon occlusion test to ensure patency of the anterior cranial vessels. In order to ensure control of the carotid artery in the event of bleeding, the procedure had to be performed in the Interventional Radiology Suite along with the Ophthalmology team. In this case, both an endoscopic and open approach to removal became necessary in order to free the foreign body and prevent migration of the piece that was within the sphenoid sinus. Preoperative imaging and intra-operative image guidance are also crucial to the removal of the foreign body (6,9), as this allowed the surgical team to appreciate the foreign body within the sphenoid sinus and to trigger the appropriate workup to prevent a complication from removal. This case demonstrates how multiple surgical specialties and appropriate pre-operative tests can work together in ensuring safe and effective removal of a foreign body of the paranasal sinuses and orbit without damage to vital structures.

CT Imaging:

TOP LEFT: Image of the foreign body after removal from the patient. TOP RIGHT: The patients existing laceration was used as an incision to explore the orbit and find the proximal end of the foreign body. BOTTOM RIGHT AND LEFT: The foreign body is seen within the left ethmoid sinus as it crosses through the nasal septum. The distal end was found in the lateral right sphenoid sinus.

Conclusion:
Foreign bodies of the sinuses can cause complications including foreign body migration, infection and abscesses formation. These can often involve other nearby organs and structure, including the orbit and brain. Multidisciplinary approaches can be effective in ensuring a safe and effective removal.

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