Impacted Bullet in the Sphenoid Sinus: A Case Report

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Keywords

Sphenoid sinus · Bullet · Endoscope

Abstract

A bullet encountered as a foreign body in the sphenoid sinus is a rare occurrence. We report a case of a bullet impacted in the sphenoid sinus following a firing assault from point blank range. The bullet was safely removed with the assistance of an endoscope preserving the structures around the sphenoid sinus. Adequate knowledge of the anatomical variations with regard to the sphenoid sinus is essential to ensure safe removal of foreign bodies, thereby avoiding catastrophic complications. We believe that endoscopic foreign body removal should be advocated more often, rather than open approaches, for foreign bodies impacted beyond the sphenoid sinus involving the anterior skull base.

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Background

Foreign bodies in the nasal cavity are more common in children than in adults [1]. Foreign bodies most commonly get lodged in the maxilla and frontal sinuses compared to the ethmoids and sphenoid sinuses [2, 3]. Foreign bodies reach the sphenoid sinus either through the orbit or through the nasal cavity. Proximity of the sphenoid sinus to vital structures such as the optic nerve and internal carotid artery may render life-threatening complications. Removal of such foreign bodies requires good preoperative planning, sound anatomy, and knowledge of variations of the sphenoid sinus. Endonasal endoscopic removal of such foreign bodies is preferred considering effective magnification and illumination. We present a case of an impacted bullet in the sphenoid sinus following a firing assault from point blank range.

Case Report

A 35-year-old male patient was referred to us from the emergency department for an alleged history of gunshot injury from point blank range. The patient was unconscious on arrival to the emergency department and his vitals were stabilized over 2 days. Primary examination of the patient showed the presence of a 3 × 3 cm defect over the forehead with exposed bone fragments within the defect (Fig. 1).

Examination of the patient revealed dilated pupils, absent pupillary reflexes, and no perception of light in the right eye. The left eye examination was normal. Extraocular movements were normal in all direction in both eyes. Routine investigations including ultrasonography of the abdomen done in FAST (focused assessment with sonography in trauma) showed no significant findings. Computerized tomography (CT) scan of the brain showed hemorrhagic contusions involving the bilateral basifrontal cortex with subdural hemorrhage seen over the right frontal convexities extending into the anterior falx cerebri. X-ray and CT of the nose and paranasal sinuses revealed a metallic artifact seen in the right sphenoid sinus impinging on the right optic canal with metallic pellets in the ethmoid sinus (Fig. 2, 3).

Fig. 1. Preoperative picture showing the defect following bullet injury.

Fig. 2. X-ray showing the bullet lodged in the sphenoid sinus.

Fig. 3. CT scan showing the location of the bullet impinging on the right optic canal.

Fig. 4. Intraoperative endoscopic picture of the bullet.

Three days following injury, the patient underwent endoscopic removal of the bullet lodged in the posterior ethmoids and anterolateral wall of the sphenoid sinus (Fig. 4). Subsequently, he underwent 3D reconstruction CT of the head and was planned for reconstruction of the defect with a left forehead flap and cancellous bone graft. The patient was followed up postoperatively after 6 months of reconstruction with a satisfactory esthetic outcome and complete resolution of visual acuity.

Discussion

Foreign bodies rarely involve the sphenoid sinus, with more common involvement of the maxilla and frontal sinuses. The most common route of entry is usually through the orbit or the nasal cavity. CT scans play an important role in assessing the relation of the foreign body with the

surrounding structures. Digital subtraction angiography has been used to rule out vascular injury before attempting foreign body removal [4]. Removal of such foreign bodies warrants urgent removal in view of intracranial migration, systemic lead poisoning, and its associated complications [5].

All foreign bodies have a propensity to act as a source and nidus of infection at the site of lodgement. With particular regard to the sphenoid sinus, considering its close proximity to the optic nerve, cavernous sinus and its contents, the associated foreign body can lead to catastrophic complications. Our patient was lucky, not having any associated complications and undergoing an uneventful removal procedure.

The best surgical approach to the sphenoid sinus in today's era remains endoscopic, owing to its far superior illumination, magnification, and cosmetic outcome. In addition, it facilitates simultaneous repair of the skull base defects caused by the foreign body [6–8]. Open approaches may be required for the removal of foreign bodies involving the sphenoid-ethmoidal region in rare circumstances [9, 10].

Conclusion

Sphenoid sinus foreign bodies are rarely encountered by the otolaryngologist. Endonasal endoscopic approach proves an effective and safe technique for the removal of these foreign bodies and repair of the possible skull base defect. A thorough knowledge of the anatomical variations involving the sphenoid sinus remains pivotal in ensuring a safe removal and avoiding possible catastrophic complications.

Statement of Ethics

The research was conducted ethically in accordance with the World Medical Association Declaration of Helsinki. The subject gave written informed consent to publish his case (including publication of images).

Disclosure Statement

The authors have no conflicts of interest to declare.

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