Endoscopic removal of air gun pellet in the sphenoid sinus

P. Strek, O. Zagolski, J. Skladzień

Department of Otorhinolaryngology, Collegium Medicum, Jagiellonian University, 2 Śniadeckich St., Kraków, Poland

Key-words. Paranasal sinuses; sphenoid sinus; endoscopic sinus surgery; foreign body; gunshot

Abstract. Endoscopic removal of air gun pellet in the sphenoid sinus. The objective: The presence of an isolated foreign body in the sphenoid sinus is a rare finding, and a retained projectile in this sinus is even more uncommon. Case report: The authors report the case of a 15-year-old male that was shot in the face with an air gun but was nevertheless able to seek for medical help. The anatomical considerations of the gunshot injury are made, and radiological assessment of the foreign body is presented. The result and Conclusion: The projectile could be successfully removed with an endoscopic technique, no short or long term sequelae occurred.

Introduction

Foreign bodies in the paranasal sinuses are uncommon. In more than 60% of the cases, they are iatrogenic, and in about 25% of the cases due to industrial accidents. Self-inserted foreign bodies are found in psychiatric patients. The maxillary sinus is affected in 75%, and the frontal sinus in about 18% of the cases. Involvement of the ethmoid cells is less frequent and a foreign body limited to the sphenoid sinus is an extremely rare condition. Penetrating facial injuries are not uncommon, and transorbital foreign bodies extending into the sphenoid sinus have been reported. Headache is the main symptom of acute injury to the sphenoid sinus. Presenting symptoms of retained bodies in the sphenoid sinus are vague and non-specific, like in most pathological conditions of this sinus. Any delay in treatment can be potentially lethal because vital anatomical structures of the skull base are in close close vicinity to the sphenoid sinus. The most important acute complications include bleeding, compression of the optic nerve, and liquorhea. Late complications consist mainly of pain, vision disturbances, and chronic infection. Microbiological examination of the flora associated with foreign bodies in the paranasal sinuses mostly reveals a mixed flora with a high amount of actinomyces and aspergillus.

A transsphenoidal gunshot injury of the head is associated with a high mortality because such trauma mostly involves damage to vital neural and vascular structures. Computed tomographic scanning of the sinuses is indicated before planning removal. While open procedures are useful for removing foreign bodies extending from the orbit to the sphenoid sinus, endoscopic sinus surgery is a valid alternative for lesions limited to the sphenoid sinus, because it provides a direct route to this sinus.

Case report

A 15-year-old male was shot with an air gun, and sought our medical advice on the day of the injury. He complained of pain in the left maxillary region and of intense headache localized in the retro-ocular region. The entrance wound of the projectile was localized 1.5 cm below the floor of the left orbit. The patient had no ophthalmological signs. The result and Conclusion: The projectile could be successfully removed with an endoscopic technique, no short or long term sequelae occurred.
was also removed. The postoperative course was uneventful and the patient noted improvement in all preoperative symptoms. Histopathological examination confirmed chronic inflammation of upper respiratory tract mucosa.

**Discussion**

The opaqueness in the left maxillary sinus reflects blood clots after wounding by the pellet. The kinetic energy of the pellet was absorbed by the bone laminae before it reached the superior wall of the sphenoid sinus. If the angle of the shot had been different, it could have penetrated the anterior cranial fossa with lethal consequences to the patient. Close vicinity of vital anatomical structures in the region of the sphenoid sinus probably explains the low number of patients that have foreign bodies in this region and that are able to seek medical help. Although the pellet was found on the sinus floor, its path through the sinuses was in an upward direction and must have hit the cranial basis without perforating it. The foreign body had to be removed as it caused severe pain and may have caused complications. Removal of foreign bodies extending from the orbit to the sphenoid sinus requires open surgical procedures. In case of an air gun pellet in the sphenoid sinus and a penetration path exclusively confined to the sinuses, endoscopic techniques offer access to the foreign body and sufficient visualisation of the projectile trajec. Therefore, the authors decided to use the endoscopic technique, and with very good result. Only few authors have reported the use of endoscopic surgery for removal of foreign bodies of the sphenoid sinus (Table 1).

**Table 1**

<table>
<thead>
<tr>
<th>Authors</th>
<th>Type of foreign body</th>
</tr>
</thead>
<tbody>
<tr>
<td>Li et al.</td>
<td>proximal shunt catheter migrated into the sphenoid sinus</td>
</tr>
<tr>
<td>Kayikcioglu et al.</td>
<td>Kirschner wire used for premaxillary fixation migrated intrasphenoidally</td>
</tr>
<tr>
<td>Kitajiri et al.</td>
<td>bamboo lodged in the sphenoid sinus</td>
</tr>
<tr>
<td>Wu et al.</td>
<td>ballpoint pen extending from the medial aspect of the left orbit, through the left ethmoid sinus and the nasal septum, to the right sphenoid sinus</td>
</tr>
<tr>
<td>LaFrentz et al.</td>
<td>ballpoint pen penetrating the orbit, lamina papyracea, posterior ethmoid sinuses, and sphenoid sinus in a 22-month-old child</td>
</tr>
<tr>
<td>Datta et al.</td>
<td>metal arrowhead in orbit and sphenoid sinus</td>
</tr>
<tr>
<td>Monticelli et al.</td>
<td>air rifle injury penetrating the nasal septum, the maxillary and sphenoid cavities and the dura mater, with the pellet lodging in the anterior cranial fossa between the sinus cavernosus and the internal carotid artery</td>
</tr>
<tr>
<td>Mladina</td>
<td>metal foreign body localized at the sphenoethmoidal junction, removed endoscopically</td>
</tr>
<tr>
<td>Risavi et al.</td>
<td>Shrapnel shells in the sphenoid sinus in a child, removed endoscopically</td>
</tr>
<tr>
<td>Brinson et al.</td>
<td>Review of the literature concerning foreign bodies in the sphenoid region.</td>
</tr>
</tbody>
</table>
**Conclusion**

Air gun projectiles lodged in the sphenoid sinus can be safely removed using endoscopic techniques.

**References**


Olaf Zagoński, M.D.
ul. Dunin-Wąsowicza 20/II/9
30-112 Kraków
Poland
E-mail: olafzag@poczta.onet.pl