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Wooden Orbital Foreign Body in a Six-year-old Boy – Case Report

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Abstract:

Introduction: Orbital foreign bodies, particularly of organic origin, continue to pose significant diagnostic and therapeutic challenges. Clinical signs suggesting the presence of an orbital foreign body include decreased vision, pain, restricted ocular motility, proptosis, diplopia, extraocular muscle injury, and orbital tissue inflammation.

Case report: We present the case of a six-year-old boy who sustained trauma to the left orbital region with a wooden stick two days prior. On admission, visual acuity (Vos) was 0.3, and orbital X-ray showed no abnormalities. A bulbar conjunctival wound with embedded wooden fragments was noted, which were subsequently removed. Due to the lack of local improvement, orbital computed tomography was performed on the fourth day of hospitalization, revealing a foreign body in the left orbit, measuring 3.6 cm, extending through the inferior orbital fissure into the infratemporal fossa. On the same day, with the assistance of a neurosurgeon and a maxillofacial surgeon, the foreign body was completely removed via the conjunctival entry wound, resulting in improvement of both the general and local condition. Postoperatively, intravenous clindamycin and ceftazidime were administered for seven consecutive days. Follow-up examinations in the outpatient ophthalmology clinic at 2, 6, and 12 weeks showed no abnormalities.

Conclusions: Management of wooden orbital foreign bodies requires a multidisciplinary approach, preceded by thorough history-taking, detailed examination, and appropriate imaging. The treatment of choice is prompt and meticulous removal of the foreign body to prevent infection and its associated complications.

Key words: wooden orbital foreign body; orbital trauma; computed tomography; children.

Introduction

One sixth of all orbital injuries are associated with the presence of intraorbital foreign bodies [1]. Wooden foreign bodies are relatively rare and typically occur in patients with orbital trauma sustained during falls or play, particularly among children and adolescents [2–4]. Wood, as an organic material with a porous structure, provides a favorable substrate for bacterial proliferation. If not promptly removed, it may lead to serious complications such as orbital cellulitis, orbital abscess, or orbital fistulae [5]. Furthermore, radiological detection of wooden foreign bodies is challenging because their appearance can vary considerably, making them a distinct diagnostic problem [6, 7].

Case report

A six-year-old boy was admitted to our Department on an emergency basis due to swelling of the eyelids of the left eye (OS), purulent discharge from the conjunctival sac of the OS, redness, and pain in the left orbital region. Two days earlier, the boy had been struck in the OS region by a peer with the end of a broomstick. The following day, eyelid swelling, purulent ocular discharge, and redness of the OS developed, accompanied by pain. On the day of admission and the preceding day, he experienced episodes of vomiting. The boy stated that he did not recall the circumstances of the injury. There was no history of fall, loss of consciousness, or fainting. An orbital X-ray performed in the emergency department revealed no foreign body (Figs. 1, 2).

On admission, Vod = 1.0 sc, Vos = 0.3 sc, and intraocular pressure (IOP) in the OS = 17 mmHg; the eyeballs were normally positioned, with restricted motility of the OS downward and to the left, accompanied by pain. Local findings in the OS included eyelid edema, conjunctival inflammation, and purulent discharge in the conjunctival sac. Due to suspected bulbar conjunctival wound, the conjunctival sac was explored under general anesthesia. A foreign body (wooden fragments) was found and removed, and the bulbar conjunctival wound of the OS was identified and sutured. Intravenous biofuroxime and metronidazole were administered. Because of persistent local symptoms, orbital computed tomography (CT) was performed on the fourth day of hospitalization, revealing a foreign body measuring 3.6 cm in the inferolateral part of the left orbit, extending through the inferior orbital fissure into the infratemporal fossa (Figs. 3, 4).

On the same day, with the assistance of a neurosurgeon and a maxillofacial surgeon, the foreign body was completely removed via the conjunctival entry wound. Postoperatively, the antibiotic regimen was initially changed to vancomycin but was subsequently replaced with intravenous clindamycin and ceftazidime for

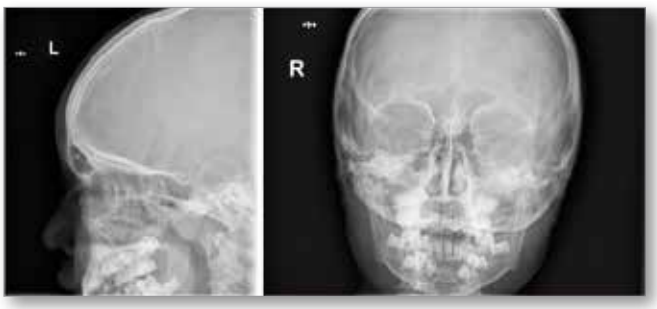

Fig. 1., 2. Orbital radiographs showing no abnormalities.

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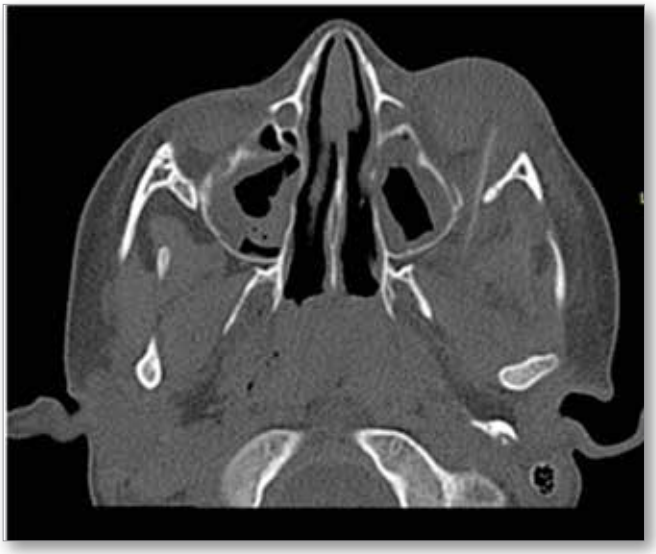

Fig. 3. Coronal CT scan showing a wooden foreign body in the left orbit.

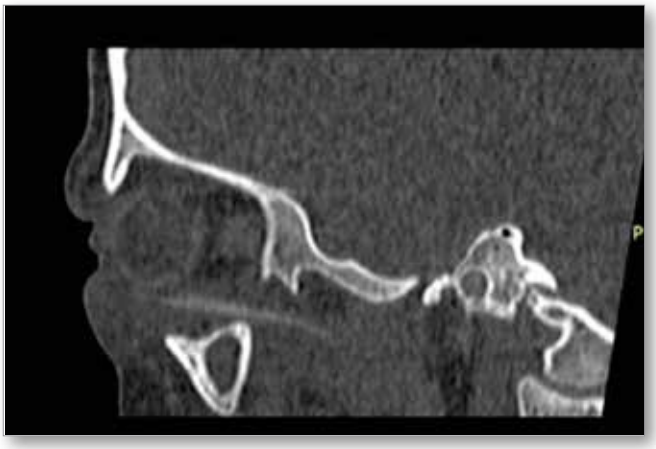

Fig. 4. Sagittal CT scan showing a wooden foreign body in the left orbit penetrating into the infratemporal fossa.

seven consecutive days due to an allergic reaction. This treatment resulted in improvement of both general and local condition (visual acuity in the OS = 1.0 sc at discharge). Follow-up examinations conducted in the outpatient ophthalmology clinic at 2, 6, and 12 weeks revealed no abnormalities.

Discussion

One of the greatest challenges in patients with intraorbital wooden foreign bodies (IOFWBs) is their detection. Failure to recognize and remove such a foreign body can lead to very serious complications. IOFWBs represent a true diagnostic challenge for the radiologist. In the described patient, orbital X-ray did not reveal the presence of a foreign body, although conjunctival exploration demonstrated wooden fragments in the inferior fornix (Figs. 1, 2). Some fragments were removed, but, as it later turned out, not all of them. On admission, the boy also presented with restricted ocular motility of the left eye, which is a relatively common symptom observed in up to half of patients with IOFWBs [7]. Due to deterioration of both local and general condition, CT was performed on the fourth day of hospitalization, revealing a foreign body in the orbit (Figs. 3, 4). Data from the literature confirm that ultrasound and X-ray may fail to detect wooden foreign bodies [2, 3, 5, 8]. CT remains the gold standard for detecting IOFWBs because it is less expensive, more widely available, suitable for children, and provides rapid results [2, 5–8]. However, a meta-analysis on IOFWBs demonstrated that CT failed to detect 47.9% of them [8]. This may occur because dry wood can have low density, mimicking air bubbles or adipose tissue, or because it may become invisible on CT scans over time, potentially leading to misdiagnosis [2]. Li et al. analyzed 14 patients with IOFWBs. CT detected a foreign body in six patients, all of whom had sustained trauma within the previous seven days [3]. Magnetic resonance imaging (MRI) should be performed after a negative CT scan if there is a justified suspicion of IOFWBs and if MRI is not contraindicated [5, 6]. In the analysis of 32 IOFWB cases by Tas et al., only two patients required extension of diagnostics with MRI, while CT was sufficient in the remaining 30 individuals [2]. Comparable findings were reported by Khanam et al., where CT helped establish the diagnosis in five patients, whereas MRI did so in only one [9]. You et al. similarly noted that, in the available literature, 19.2% of IOFWBs were not recognized on the initial MRI [8]. Overall, the misdiagnosis rate across ultrasound, X-ray, CT, and MRI (and thus failure to identify IOFWBs) was 52.9% [8]. Nasr et al. also observed that preoperative CT/MRI identified organic foreign bodies in 42% of cases [1]. These findings demonstrate that the presence of IOFWBs cannot be excluded despite negative imaging. In such cases, prolonged observation and repeat imaging (such as MRI) are indicated, as MRI is slightly more detailed than CT, particularly for detecting small wooden fragments [7].

Retention of wood in the orbit carries a very high risk of infection and subsequent serious complications. Therefore, it must be removed in every case. The foreign body is typically extracted through the entry wound (in the conjunctiva or eyelid) or through the center of the fistula/abscess [8]. Wood often splinters and breaks, so all fragments must be meticulously removed. The wound should be irrigated with an antibiotic, and the fistula/abscess along with necrotic tissue should be excised. Incomplete foreign body removal can lead to local deterioration, necessitating repeat surgery. Such a situation occurred in our patient, in whom a 3.6 cm fragment of wood remained in the orbit. Among 51 reported cases of IOFWBs, as many as 42% of patients required at least two surgical procedures [8]. Our patient underwent two interventions. Because the wooden fragment penetrated into the infratemporal fossa, both a pediatric neurosurgeon and a maxillofacial surgeon were present during the procedure. Jabang et al. note that patients with such injuries often require a multidisciplinary approach due to the complexity of the trauma [10].

The risk of infection in cases of IOFWBs is very high. All patients with this type of injury should receive tetanus prophylaxis. Broad-spectrum antibiotics are recommended because infection can rapidly progress into the orbit [2, 10]. In cases of suspected intracranial penetration, a third-generation cephalosporin combined with vancomycin is indicated [2]. Since our patient was allergic to vancomycin, the microbiologist recommended clindamycin combined with ceftazidime, which led to improvement in both local and general condition.

Conclusions

Management of IOFWBs requires a multidisciplinary approach following thorough history-taking, detailed examination, and appropriate diagnostic imaging. The treatment of choice is meticulous removal of the foreign body to prevent infection and associated complications.

Disclosure
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