A Case of Retained Wooden Foreign Body in Orbit

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A 41-year-old man visited our clinic complaining of esodeviation of the right eye. He had been operated on for corneal laceration 3 years before. One month later, exodeviation of the right eye had developed. The result of computed tomography (CT) was reported as orbital abscess and cellulitis. Although antibiotic treatment was administered for 2 weeks, the exodeviation didn’t improve. On ocular examinations performed in our hospital in November-2001, his right eye was esotropic and had a relative afferent pupillary defect. Vision of the right eye was decreased to 0.02. Fundus examination showed optic atrophy. A new CT scan disclosed a foreign body introduced into the right medial orbital wall, nasal cavity and ethmoidal sinus. Although foreign body was surgically removed, vision and eye movement were not improved. In the case of a patient who has undergone orbital trauma, complete history taking and physical examinations must be performed. On suspicion of a foreign body, imaging study such as CT or MRI must be performed. However, because CT findings can be variable, careful follow-up is needed.

Key words: deviated eye, optic atrophy, wooden foreign body, CT, MRI

INTRODUCTION

Orbital foreign bodies are not only difficult to detect, but also, if retained for a long time, can cause the significant complications such as orbital cellulitis, orbital abscess, optic nerve injury, extraocular muscle injury, exophthalmos and so on. These complications and clinical features of a retained foreign body vary according to its size, characteristics, shape, penetrating method and penetrating site. Especially, a wooden foreign body is very difficult to detect, even when computed tomography (CT) or magnetic resonance imaging (MRI) is used.

We report a case of a retained wooden foreign body that was not detected for 3 years although CT scan had been performed. The wooden foreign body was retained in a subclinical state. As far as we are aware, this kind of case has never previously been reported.

CASE REPORT

A 41-year-old man who complained of right eye esodeviation and visual loss visited our clinic in November-2001. His symptoms and signs had developed after periorbital trauma 3 years previously. At that time, he had suffered a penetrating injury in his right eye due to an iron skewer while falling down. Primary closure was performed due to corneal laceration at a neighboring hospital. One month later, exodeviation of the right eye and periocular pain had developed. For further evaluation,
he was referred to another general hospital. Complete ophthalmic examinations and a CT scan were performed. His corrected vision of the right eye was 0.8. His right eye had motion limitation to the medial side and was protruded to the lateral side, and was thereby in mildly exotropic state. There was no relative afferent pupillary defect. CT scan disclosed the diffuse orbital cellulitis and abscess which protruded the eyeball. (Fig. 1) The patient was treated with antibiotics. Although periocular pain subsided, exodeviations was not improved. Over 3 years, exodeviations was changed to esodeviations.

On ophthalmic examinations performed in our hospital, his corrected vision of the right eye was 0.02. A relative afferent pupillary defect was found in the right eye. The right eye was deviated to the medial side, resulting in esotropia, 40-50 prism. On forcedduction test, there was significant limitation in all directions. Biomicroscopic examination showed a 10mm-sized papillary mass in the medial canthal area. (Fig. 2) There was mild corneal opacity at the inferior half, which was a scar due to the previous corneal surgery. The anterior chamber was quiet and lens was clear. On fundus examination, the optic disc of the right eye looked pale. In the examination of the left eye, there was no abnormality.

CT scan disclosed a 4-5cm-sized tubular mass that was penetrating into the right medial orbital wall and nasal cavity, reaching to the posterior ethmoidal sinus. Its margin was definite and it was accompanied by calcification. (Fig. 3) Initially, we suspected this mass to be a foreign body. The mass was surgically removed by an ophthalmologist and an otorhinolaryngologist under general anesthesia.

The papillary skin mass was removed and sent for pathologic diagnosis. The tip of the foreign body was exposed at the removal site. Adhesion between the foreign body and surrounding tissues was carefully released with blunt westcott scissors, and then the foreign body was easily removed by pulling anteriorly, although there was considerable hemorrhage and a large amount of purulent materials. The empty space was irrigated with diluted antibiotic solution, and then a draining silicone tube was inserted. The foreign body was wooden, and sized about 5 x 1 x 1cm. (Fig. 4) Bacterial and fungal cultures were performed. The otorhinolaryngologist performed additional surgery for the necrotic nasal cavity and ethmoidal sinus.

On postoperative day 1, a large amount of purulent discharge was drained. The result of bacterial culture was the growth of Bacteroides capillosus and Streptococcus intermedius and their sensitivity to vancomycin and levofoxacin. The patient was

![Computed tomography photograph](image)

*Fig. 1. Computed tomography photograph performed 3 years ago. Right medial wall fracture and inflammatory lesion with suspicious abscess can be seen.*
treated with vancomycin and levofloxacin, after which the drained amount was decreased. On post-operative day 7, there was no drained discharge.

The patient’s vision and eyeball deviation were not improved. Relative afferent pupillary defect persisted. Pathologic findings of the papillary mass were the presence of inflammatory reactions and the increased melanin pigment.

**DISCUSSION**

The diagnosis of orbital wooden foreign body is very difficult, but given its severe complication, very important.\(^1\)\(^-\)\(^5\) Especially, a wooden foreign body contains a large amount of bacteria and provides good media for bacterial growth due to its porous and organic characteristics. So, a wooden foreign body can cause panophthalmitis,\(^1\)\(^-\)\(^2\) periorbital abscess\(^3\)\(^,\)\(^4\) and fistula.\(^4\)\(^,\)\(^5\) In our case, although there had been no manifested clinical infection for 3 years, significant infection was developed after its removal. This latent period for the development of infection was due to the prevention of bacterial growth and spread by the surrounding inflammatory membrane and accompanied calcification. The definite CT finding of foreign body was also due to the formation of the membrane and calcification. This is the typical CT finding of a wooden foreign body; the body is initially invisible but becomes prominent within months or years. Therefore, the radiologist who reported the CT finding missed the foreign body. With clinical information, he would have detected it.

The medial deviation and positive forced duction test were due to the adhesion with the surrounding soft tissues. However, according to the ophthalmic-
logical records from the previous hospital, the patient’s right eye showed lateral deviation and full duction. The lateral deviation at that time was due to the mass effect of the foreign body and its surrounding inflammation, and full duction implicates that there was no significant adhesion. Three years later, however, as adhesive reaction was progressed, adhesion and contractile reaction caused esodeviation and duction limitation. Following treatment at our hospital, the patient needed an operation for adhesion release, but his prognosis was poor. If the foreign body had been surgically removed in the period soon after the original injury, the prognosis would have been better.  

In considering the cause of the visual loss, primary corneal closure had no effect on his vision because his corrected vision, as measured at the general hospital was 0.8 at postoperative 1 month. The relative afferent pupillary defect and optic disc pallor suggest that an optic nerve injury was the cause of his visual loss. Silvia Weinacht et al. well explained its mechanisms as direct injury, ischemic change by physical compression to optic nerve or vessels, or inflammation. Among them, chronic inflammation may have caused the optic nerve injury reported here.

Periorbital penetrating injury is a very dangerous event which can menace a patient’s life because the penetrating material can easily reach the brain through the orbital fissure or surrounding sinus structure. In this case, the foreign body penetrated the medial orbital wall and nasal cavity, and reached the posterior ethmoidal sinus. A small degree of posterior advancement could have caused brain damage.

According to the radiologist’s report of the CT scan that was performed at the general hospital, diffuse cellulitis and orbital abscess were present. In reviewing the CT scan with clinical information, the lesion suspected to be an abscess could have been considered as foreign body. Consequently, initial history taking is very important for any physician. Furthermore, if the clinician had suspected an orbital foreign body, irrespective of the radiologist’s report, the foreign body could have been detected earlier by careful follow up with CT or MRI. If so, the patient’s visual loss and eyeball adhesion may have been prevented. In cases of periorbital injury of unknown cause, the absence of any bony structure abnormality and evidence of foreign body must be confirmed by imaging study such as CT or MRI. In particular, whenever there is any suspicion, careful follow-up is essential. When a metallic foreign body is suspected, CT should be performed firstly. Furthermore, in the case of suspicious, but not definite findings, careful follow-up is needed. Alternatively, MRI can be considered after confirmation of non-metallic foreign body by plain imaging.  

The diagnosis of wooden foreign bodies is very difficult. A typical example was given by Liu D and Al Shail E. They performed CT and MRI several times, and surgically removed a wooden foreign body. Postoperatively, however, many foreign bodies remained undetected by CT, MRI and exploration.  

Previously, plain imaging and ultrasonography were used to find orbital foreign bodies. As CT and MRI were developed, they became standard tools for the diagnosis of foreign bodies. CT findings of wooden foreign bodies vary over time. After a few weeks, the density of wooden materials decreases to less than that of fat, so they may be mistaken as air. After a few months, the density is similar to that of extraocular muscle or other surrounding tissues. During this period, the detection of wooden foreign bodies is very difficult. Sometimes, a foreign body becomes evident due to accompanied calcification and inflammatory membrane formation in a few years. Our patient showed the typical CT changes of a retained wooden foreign body. MRI is well known as a superior method for the detection of a wooden foreign body. However, MRI can be performed only after the absence of any evidence of metallic foreign body.
has been confirmed. Furthermore, MRI is expensive and time consuming.

There is no single confirmative method for the diagnosis of wooden foreign body. Hence, clinical suspicion, history taking and complete physical exams are essential. In case of suspicion, careful follow-up is needed.

In our case, the clinical courses and complications of a retained wooden foreign body, such as infection, injury of extraocular muscle, adhesion of periocular tissues, and optic nerve atrophy, are well described. Especially, this case highlights the variation of CT findings of a wooden foreign body retained for three years.

In conclusion, in any case of periorbital injury the clinician must maintain suspicion of an orbital foreign body. In very suspicious cases, imaging studies such as CT or MRI must be performed. However, as a wooden foreign body may not been detected in the acute stage, careful follow-up is essential.

REFERENCES