



MISSED DIAGNOSIS OR MISDIAGNOSIS : RETAINED INTRAORBITAL FOREIGN BODY IN CASES OF OCULAR TRAUMA

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ABSTRACT Intraorbital foreign bodies usually occur after the high velocity injuries penetrating the orbit. A retained foreign body can give rise to serious complications including loss of the eye. Due to variations in the clinical presentations and imaging characteristics of Intraorbital foreign bodies, misdiagnosis and missed diagnosis often occur during initial visits. Delay in the diagnosis may lead to high risk of orbital infection. Surgery is the mainstay of the treatment. However some residue of foreign bodies may be retained for which the detailed clinical history, careful ocular examination and resources like CTscan and MRI are required. In this retrospective study we have reported three cases of missed intraorbital foreign body who were diagnosed with retained intraorbital foreign body after some time lapse of initial trauma. We have reviewed various literatures regarding clinical features, diagnosis, imaging modalities and surgical treatment regarding the same.

KEYWORDS : Retained, Intraorbital foreign body, penetrating, Surgery

INTRODUCTION

The Intraorbital foreign body is an important cause of ocular morbidity typically caused by high velocity trauma to orbit and rarely after relatively trivial trauma. Intraorbital foreign bodies are more commonly observed in males than in females and in younger than in older patients. They can be classified according to their composition into a) metallic foreign bodies or b) non-metallic foreign bodies, which may be inorganic e.g. glass or organic such as wood or vegetative matter. In general, metal and glass are well tolerated, and if not causing any symptoms or signs, may be left in situ, while organic matter like wood and vegetative matters are poorly tolerated and cause intense inflammatory reaction causing severe intraorbital complications including orbital cellulitis, abscess formation, proptosis and extraocular muscle damage and need to be removed as soon as possible.

Case Report

Case 1

A 40 years old male patient presented at our institute in august 2023 with complain of pain and redness in left eye for 2months with past history of trauma with wooden stick 3 months back. He consulted at a local hospital 3 months back for the trauma in left eye and conjunctival tear was found in left eye and was repaired. On examination visual acuity of Right eye was 6/6 and Left eye was 6/12. On slit lamp examination, right eye anterior segment was within normal limit and in left eye there was mild proptosis with downward displacement of eye, presence of conjunctival granuloma nasally with mucopurulent discharge and extraocular movements restricted in elevation, abduction and adduction. On fundus examination, right eye posterior segment was within normal limit and left eye showing hyperemic disc with subretinal folds centrally in posterior pole.

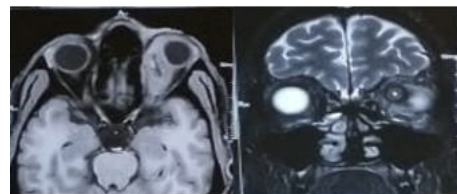


Contrast MRI brain with orbit with correlative CT scan suggestive of 4.5*4.5*17 mm cylindrical T1 hypointense, T2 mildly hyperintense well defined FB showing moderate hypodensity on CT seen in superomedial aspect of intraconal fat in left orbit suggestive of foreign body possible wood.

A surrounding 10*24*14 mm mildly T2 hyperintense area with T2 hypointense walls noted in superomedial left orbit intraconal fat encasing the foreign body. This is causing mild mass effect and

flattening of superomedial aspect of left eye globe and causing inferolateral deviation of left optic nerve- possible minimal surrounding abscess with prominent granulation tissue.

Surrounding STIR hyperintense enhancing oedema seen in intraconal and extraconal fat suggesting possible left orbital cellulitis.



Patient was underwent left eye wound exploration under general anaesthesia and a wooden foreign body of size 20 x 3 mm was removed.



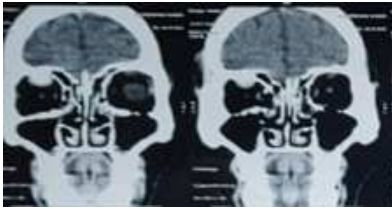
Postoperative status of patient was good and improved.

Case 2

A 42 years old male patient presented at our Institute in august 2023 with complain of swelling in right eye for 4 months with past history of road traffic accident 5 months back. He consulted at a nearby government hospital for road traffic accident and was found to have a lacerated wound approximately 60mmx3mm on right side of forehead extending till brow and sub-brow area which was repaired. On examination visual acuity of right eye was 6/18 and Left eye was 6/6. On examination, there is a swelling in upper nasal part of right eye, downward displaced eye with extraocular movements restricted in elevation, abduction. Left eye anterior segment was within normal limit. On fundus examination, both eye posterior segment was within normal limit.

CT Brain with pns and orbit suggestive of bulky right superior rectus muscle with linear hyperdensity measuring 27x9 mm in right superior

rectus suggesting foreign body.



Another hyperdense foreign body measuring 4x7 mm along superolateral aspect of right orbit with fracture of superior wall of right orbit with mild ptosis present.

Patient was underwent right eye wound exploration under general anaesthesia and multiple wooden foreign bodies of varied sizes were removed, largest of size 25 x 7 mm.



Postoperatively patient was stable and improved.

Case 3

A 24 years old male patient presented at our institute in October 2023 with complain of swelling in left eye for 2months with past history of fall of roof on head with left eye injury 2 months back. Following trauma he went to local hospital where primary management was done and operated for left eye lower lid tear. On examination visual acuity of both eye was 6/6. On slit lamp examination, right eye Anterior segment was within normal limit and left eye has lower lid swelling lateral to punctum with mild proptosis was present. On fundus examination, both eye posterior segment was within normal limit.

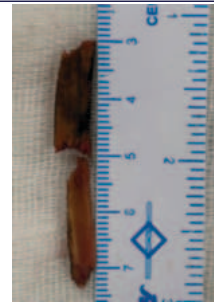


CT Scan brain with orbit suggestive of left sided intraorbital foreign body granuloma formation extending into left lower lid. 22*4 mm linear hypodense material with hyperdense rim in intraconal compartment at inferomedial aspect of left orbit possibility of Intraorbital foreign body wood.



Surrounding soft tissue density 43*11*21mm extending into left lower lid, orbital apex, medial and lateral recti muscle and optic nerve suggestive of granuloma formation.

Patient was underwent left eye wound exploration under general anaesthesia and two wooden foreign bodies of size 20 x 8 mm & 24 x 5 mm were removed.



Postoperatively patient was stable and improved.

DISCUSSION

Penetrating lid or orbital injuries should always raise suspicion of an intraorbital foreign body, mainly if the trauma was of high velocity^[1]. They are generally missed during initial presentation. The patient may either be symptomatic or asymptomatic. Clinical manifestations of intraorbital foreign body are diversified and non-specific. Common symptoms include periorbital redness and swelling, conjunctival congestion and chemosis, ptosis, proptosis, extraocular movement restriction and visual impairment^[7]. Less common clinical manifestations include diplopia and mass. The organic nature of wood and its porous nature make it easy for microorganism to adhere and grow and hence retained wooden foreign bodies may cause suppurative, fistula/sinus, discharge and cellulitis leading to orbital infection and may spread to craniocerebral structure, paranasal sinuses.

It is well known that the severity of injury in penetrating trauma of the orbit is often underestimated in physical examination. Therefore, radiological imaging plays an important role. Plain radiography is helpful to confirm the presence of the foreign body. X-ray is not often used to detect intraorbital wooden foreign bodies (IOWFBs) because wood cannot be identified by this modality. Ultrasound has an advantage in the diagnosis of long-lasting IOWFBs as it may show irregular space-occupying lesions of granulation tissue, low echo purulent cavity or strong echo spots within the lesion. However, foreign bodies are not always visible and cannot be accurately located in examination^[2]. Computerized tomography (CT) scan is regarded as the gold standard as it helps to pinpoint the exact location hence providing a guide to access during surgery. In the acute stage, wood appears as a low-density similar to air, which is also common in orbital trauma. Thus, it is difficult to identify in the initial visit, especially for small pieces of wood. However, in the sub acute stage, wood becomes moderate density similar to orbital fat. In the chronic stage, wood shows high density which is markedly visible on CT scan. On Magnetic resonance imaging (MRI), wood appears hypointense relative to intraorbital fat on all MRI scans, regardless of its hydration. MRI scans are superior to CT in diagnosis of small pieces of wood, especially T1-weighted images. T1-weighted images are better than proton density or T2-weighted images for diagnosis of intraorbital wooden foreign body as they require less scanning time (which could reduce the probability of motion artefacts during imaging), show brighter images of fatty tissue (thus the contrast between fatty tissue and wood is more obvious). Hence, overall, MRI should be performed if a wooden foreign body is suspected despite a negative CT. MRI is contraindicated in metallic foreign bodies as it may pose a risk of migration and injury to orbital structures. Although intraorbital foreign body cannot be completely excluded despite the negative imaging. Long-term follow-up and the re-examination of imaging should be suggested.^[234]

Surgery remains the preferred treatment for intraorbital foreign body. Surgery is planned based on several factors. These include the nature of the foreign body, which, if organic, warrants surgery; the location of the foreign body, if posteriorly located and inorganic, should be left alone; and presence of other foreign body-related complications such as intense inflammatory reactions, abscess, chronic discharging sinus, and optic nerve compression. The original traumatic entrance, the top of a fistula, the centre of a granuloma and abscess can be chosen for the initial surgical incision. Since the wood usually shatters during intraoperative manipulation, so meticulous exploration needs to continue despite the discovery of a foreign body. Careful exploration and thorough removal of necrotic tissue during the surgery could help avoid residual foreign bodies. Intraoperative irrigation with antibiotic saline, placement of a drainage strip and postoperative anti-infection

treatment could reduce postoperative infection and improve the prognosis of patients. The re-examination of CT and MRI imaging should be suggested if the sign of infection presents, such as fistula or abscess. Also, long-term follow-up is necessary for the local chronic inflammatory and formation of foreign body granuloma^[1-4].

Early diagnosis, management, and extraction of the foreign body greatly influence the outcome. However, it is crucial to weigh the benefits versus risks. Utmost care must be taken to prevent fragmentation of wood pieces during extraction, which can result in fragment retention, migration or late infection^[5]. Posteriorly located foreign bodies tend to confer a worse prognosis because of associated traumatic optic neuropathy.

The above discussed patients presented with different clinical presentation with different mode of injuries. The average duration between initial trauma and presentation is 3 month and seen mostly in middle aged men. All these patients previously presented at some other health centre where they were primarily managed but intraorbital foreign bodies were missed. After thorough clinical and radiological examination, each patient was advised to undergo surgical management. Surgery was performed; foreign body extraction was done and was also sent for microbiological examination. In post operative period, patients were admitted in hospital and injectable Antibiotics were given for around 7-10 days according to sensitivity testing. After 2 months follow-up, patients were symptomatically improved.

CONCLUSION

Good history, examination and imaging are essential in diagnosing intraorbital foreign bodies. Not all intraorbital foreign bodies require surgical removal and weighing the benefits and risks preoperatively is essential. In cases of ocular injury following accidents or penetrating injury, one should suspect the intraorbital foreign body especially vegetative matter embedded inside causing the trouble to the patient which can be managed properly and timely leading to satisfactory outcome.

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