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Case Report

An intraorbital foreign body with paradoxical radiological interpretations to dive in or not? a surgeon's dilemma

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ABSTRACT

A 10-year-old girl presented to our O.P.D. with intra-orbital trauma. On radiological workup following admission, USG B Scan, MRI Brain and 3D reconstructed faciomaxillary imaging were indeterminate for presence of foreign body, whereas CT scan showed a hyperdense lesion suggestive of intra-orbital foreign body. In this condition of imaging dilemma, surgical exploration was decided since there was no improvement in clinical symptoms via lateral orbital approach. Two small wooden pieces were detected in orbital exploration. This case highlights the role of history taking, clinical judgement in all cases of intraorbital tumour more so in paediatric population than solely going by the investigative modalities.

Keywords: Intra-orbital trauma, Radiological workup, Wooden foreign body

INTRODUCTION

An intraorbital foreign body an important cause of ocular morbidity especially in the paediatric and adolescent age groups. It refers to a foreign body that occurs within the orbit but outside the globe.[1]

Orbital foreign bodies are more commonly observed in males than in females and in younger population as compared to elderly. They are usually classified according to their composition into 1) metallic such as steel; 2) non-metallic, which may be inorganic such as glass; 3) organic such as wood or vegetable matter. In general, metal and glass are well tolerated, and if not symptomatic, can be left in situ, while organic matter such as wood and vegetable matters are usually poorly tolerated, regularly eliciting an intense inflammatory reaction, and need to be removed as early as possible.[2] It usually occurs after a high velocity injury such as a gunshot or industrial accidents, but even relatively trivial trauma can cause it.[3]

Intraorbital foreign bodies are lodged within the walls of the orbit, which creates a risk of damage to surrounding structures, such as the extraocular muscles and optic nerve through abducent nerve.[4]

Surgery is planned based on certain aspects that includes the nature of the intraorbital foreign body, location of the foreign body (anterior or posterior orbit), and presence of other injuries or foreign body-related complications (such as optic nerve compression, infections, and extraocular muscle involvement).[5]

CASE REPORT

A 10-year-old girl presented to our outpatient department with orbital trauma while playing outdoors as depicted in Figure 1.

Ocular examination showed visual acuity of 6/6, N6 in the right eye and denial of perception of light in left eye. Ocular examination of right eye was unremarkable. On

examination of left eye, there was mild ptosis and the contour of globe could not be assessed. There was conjunctival hyperaemia, chemosis and lid oedema along with traumatic laceration in left upper eyelid. Limitation of movement was noted in all gazes. Cornea was hazy with exposure keratopathy which caused non-visualization of both anterior and posterior segments.

Figure 1: Patient at presentation.

Investigations

The child was admitted in our inpatient ward and subjected to a battery of investigations.

On Routine Blood investigations, Hb was 10.5gm/dl, Total count 2600/cmm, Neutrophil 78/cmm, Lymphocytes 18/cmm, Monocytes 03/cmm, Eosinophils 00/cmm.

RBC series shows decrease in count, with normal morphology and infiltration of cells for age. No nucleated red cells were seen. Red cell morphology showed a mixed population of normocytic normochromic and microcytic hypochromic cells. Sodium, Potassium and all other electrolyte parameters were within normal limits. Viral markers were negative for HIV and Hep. B and C.

Ultrasound B scan of left eye showed oedematous upper and lower lid with soft tissue swelling and irregularities in the skin of upper lid.

NECT imaging showed hyperdense lesion of HU 130-140 in the anterior aspect of left eye with overlying soft tissue swelling with air foci within, suggesting possibility of foreign body as depicted in Figure 2.

MR imaging showed both intraconal and extraconal soft tissue swelling with inflammatory changes within the left orbit, predominately involving superior part. Pre septal swelling is also noted. Mild proptosis of left eye is also noted. There were no features suggestive of foreign body as depicted in Figure 3.

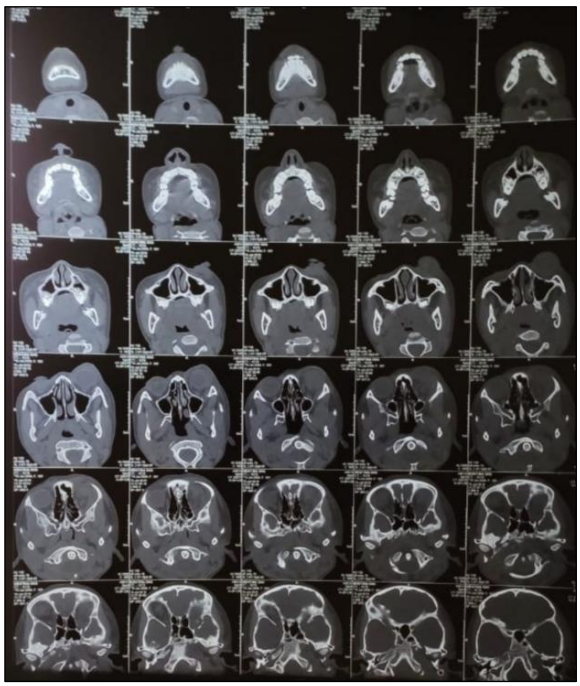

Figure 2: CT scan of the patient.

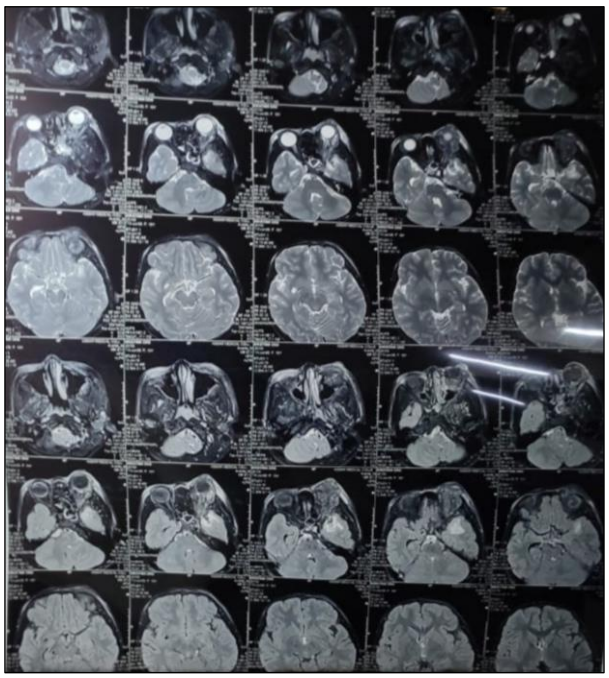

Figure 3: MRI scan of the patient.

A 3D reconstructed MR Image of Facio-maxillary region shows a lesion continuous with the lesion in left temporal lobe with a break in the greater wing of sphenoid on left side and haemorrhagic contusion in left temporal lobe with no features suggestive of foreign body as depicted in Figure 4.

Figure 4: 3D Reconstructed facio-maxillary imaging.

Figure 5: Some intra-operative photos.

Management

The child was admitted in our inpatient department and received intravenous ceftriaxone 1gm twice per day besides topical antibiotics, lubricants, tab. Prednisolone 10mg (0.5mg/kg).

A multidisciplinary team approach was mandated including the Department of Anaesthesia and Department of Plastic surgery to provide expedient yet cautious and safe treatment and due to diagnostic dilemma surgical exploration was decided.

Multidisciplinary surgical team including ophthalmologists, plastic surgeons took up the case. The procedure was performed under General Anaesthesia.

An incision was made from the inferior lateral brow, along with lateral orbital rim and infero-laterally along a line at upper body of the zygomatic arch, with a scalpel blade, authors cut the skin along the marked line, extended the cut through orbicularis muscle and deep fascia to the periosteum of orbital rim, post-surgical exploration, 2 small pieces of wood measuring (3 and 4 mm respectively) were removed as depicted in Figure 6, followed by scrupulous curettage and copious irrigation of the inflamed pocket and suturing of the surgical wound by nylon 6.0 sutures as depicted in Figure 5.

Figure 6: Wooden foreign body.

Figure 7: Patient at discharge.

Postoperatively, the child was started on intravenous broad-spectrum antibiotics and anti-inflammatory medications. Four weeks after the surgery, her best corrected vision in right eye was presence of perception of light with significant resolution of the periorbital oedema and conjunctival chemosis.

The eyeball was in its normal position, extraocular movements were normal in all gazes and fundus was normal as depicted in Figure 7.

DISCUSSION

The small child involved in this case could not remember entry of any wooden particle in her eyes, and no wooden pieces were immediately visible in the wound, henceforth in patients presenting with penetrating periorbital trauma, we should have a high index of suspicion for retained foreign bodies based on detailed history of the injury and thorough evaluation of clinical signs, more so when inflammatory signs persist and extraocular movement limitation is evident.

Bartkowski et al, have reported 20 Intraorbital foreign bodies in 677 orbital trauma cases for a total incidence of 2.9%.[6]

Intraorbital wooden foreign bodies present difficulty in diagnosis and management due to their radiolucent nature, amongst all organic substances, wooden foreign bodies provide an ideal environment for bacterial growth due to their nature and consistency.[7]

In cases of retained Intraorbital wooden foreign bodies, it mainly leads to complications such as prolonged suppuration with a draining fistula, foreign body granuloma, orbital cellulitis, abscess formation, panophthalmitis, extraocular muscle damage, exophthalmos and even brain abscesses.[8,9]

Authors report this case to warn ophthalmologists of the difficulties faced in early diagnosis of intraorbital wooden foreign bodies and the diagnostic dilemma often faced.

There is no definitive Gold standard imaging technique for detecting intraorbital wooden material, due to the radiolucent nature of intraorbital wooden foreign bodies plain film radiography has no significant role in detecting foreign body. CT findings of wooden particles vary over time and with the composition of the cellulose matrix and are very commonly mistaken for air or fat.

In the acute stage with considerably low density of wood, it resembles air bubbles. In the subacute stage, wooden objects show a moderate density similar to orbital fat.[10]

In the chronic stage, the density can become higher than that of the adjacent extraocular muscles, raising the possibility of detection in CT imaging. On MRI, both dry and fresh wood are usually hypointense relative to intraorbital fat on both T1 and T2-weighted sequences and do not enhance with gadolinium but is usually misleading for diagnosing wooden foreign body.[11]

However, MRI cannot be used when metallic foreign bodies are suspected, as the magnetic field may move any metallic structures inside the orbit. USG B Scan is time consuming while also being less effective due to interference of gas in detecting wooden bodies in the orbit.[12]

Hence as seen in this case, no single imaging study can be considered the gold standard for diagnosing intraorbital wooden foreign bodies and if clinical suspicion is present, surgical exploration is the way to go forward.

Hence to conclude, meticulous history-taking, thorough clinical examination, high index of suspicion for intraorbital foreign body, no matter how trivial the trauma may be, more so in paediatric age group along with a low threshold for imaging studies are essential to make a timely diagnosis of a retained intraorbital foreign body.

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