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Snooker cue tip retention within a sub-Tenon's traumatic inclusion cyst, followingaccidental trauma with a snooker cue.

History

A 69-year-old man presented to the eye emergency department for increasing binocular diplopia for the past few months. In 2006, he had sustained an accidental injury to the right eye with a pool cue under the right upper lid. He went to the emergency department, and a plain X-ray showed no fractures or foreign bodies and therefore was discharged. Five years later, he developed a solid lesion on the site of the initial injury. AnMRI scan was performed which showed an inclusion sub-Tenon's cyst in the superior aspect of the right orbit.The cyst was excised,and histology showed the presence of a 'benign cyst'The patient made an excellent recovery and was discharged. In 2023, the lesion slowly reappeared but was initially ignored by the patient. However, due to increasing diplopia he sought treatment. On examination, there was a solid lesion in the superonasal quadrant, underneath the right upper lid and attached to the globe, causing hypoglobus and an elevation deficit. His vision was 6/6, the color vision was unaffected, and his pupils reacted normally to light with no RAPD. Exophthalmometry was symmetrical in both eyes and dilated fundoscopy showed a healthy optic nerve with no choroidal folds or features of optic nerve compression. An urgent MRI was requested, which showed a well- defined mass in the intraconal space of the right orbit, placed between the globe and the superior rectus muscle (figure 1). The patient underwent surgery, and the lesion was approached through an anterior orbitotomy with a vertical lid split. While trying to mobilize the lesion and due to its strong adherence to the globe, the lesion ruptured releasing copious amount of cream material (figure 2). Inside the lesion, there was a black foreign body, hemispherical in shape and corresponding to the black mass seen in the cyst on the MRI scan.

In the histopathology laboratory, the foreign body that wasseen inside the cyst at surgery was clearly the tip of a snooker cue. It exhibited a very regular, semi-circular dome shaped appearance, with a slightly roughened (Fig 3A). Histology confirmed the presence of a cyst. The wall of the cyst was fibrous (Fig3B-asterisk) and it surrounded a concertinaed, collapsed cyst lining. At higher power, the cyst was lined by non-keratinizingstratified squamous epithelium (Figure 3C). No goblet cells were seen. Immunohistochemistry showed that this epithelium was positive for Cytokeratin 13 and 19, confirming a conjunctival epithelial origin (not shown). There was only minor chronic inflammation around some blood vessels in the fibrous cyst wall. There was no foreign body giant cell response. No acute inflammation or infectious agent was identified. No chalk-like material was identified, given the origin of the foreign body. Review of the original histology from 2006 showed an identical cyst appearance. The overall features were those of a traumatic sub-Tenon's inclusion cyst of conjunctival origin.

Figure 1. Coronal and sagittal MRI view of the lesion showing a hemispherical black lesion in a fluid-filled cyst (left image especially clear).

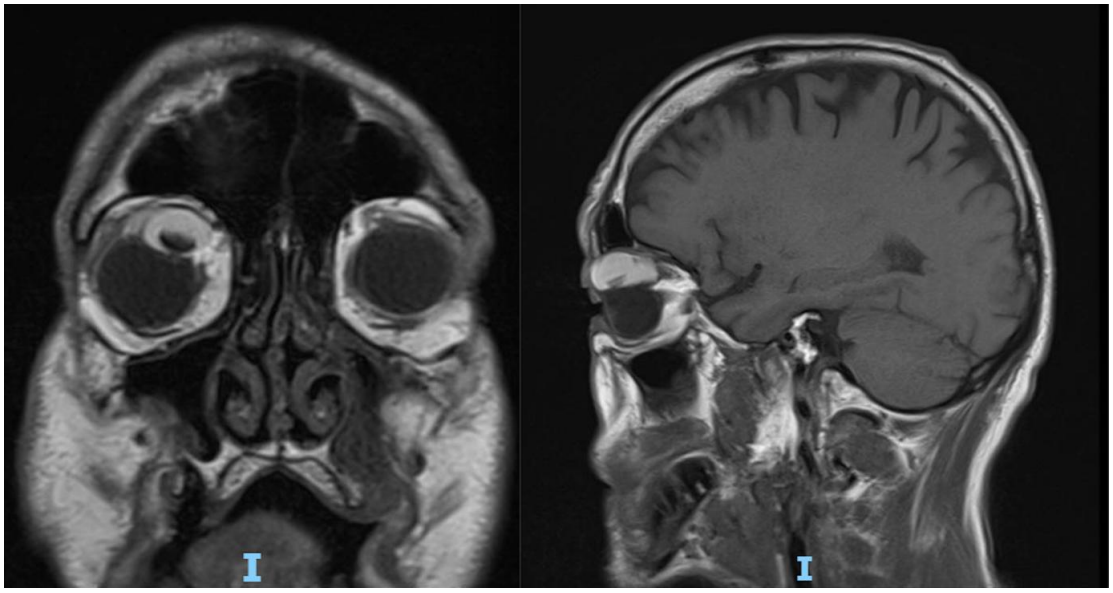
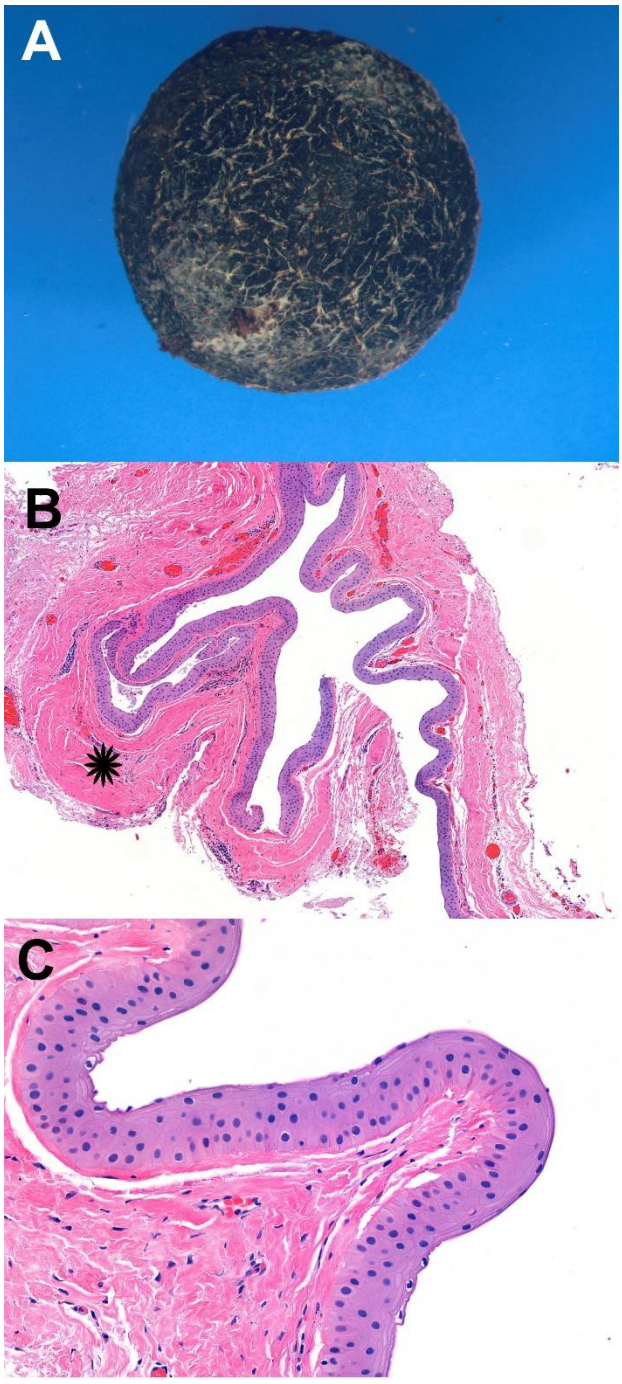


Figure 2: Intraoperative photo of ruptured cyst.

Figure 3 Macro and Micro images



Discussion

Orbital trauma is the second main cause of blindness and is often associated with ocular and cerebral injuries (6). Some of these cases may initially seem trivial, and they often present to a busy emergency department that fails to recognize the extent and severity of the injury.

Snooker cue injuries to the orbit are rare, but they can often conceal potentially life-threating injuries and can be associated with retained FBs. The brain and orbit can be reached from a remote injury to the eyelid, nostril, and mouth. In 1986, Kirkby reported a case of orbitocranial injury after a snooker cue penetrated his upper eyelid. The patient sustained a major intracranial injury for which he underwent surgery and recovered with residual hemiparesis (7). Later, Hykin *et al.* published a case of optic nerve avulsion due to forced rotation of the globe by a snooker cue causing a permanent superior altitudinal field defect (8). Similarly, Roisentul*et al.*report a traumatic optic neuropathy in a 43-year-old-man secondary to a snooker cue injury through the mouth (9). Sometimes, these types of injuries can leave retained foreign bodies that manifest many years later. Aulino et al (10) reported , a young man found to have an intraparenchymal retained FB, 16 years after a blow to the left orbit with a snooker cue (10).
Abdelaziz *et al.* report a 29-year-old man with traumatic Brown syndrome and a retained snooker cue tip, in the frontal lobe after tripping over onto the tip of a pool cue (11).

In our case, it took 19 years to find the retained FB despite the patient undergoing surgery for an inclusion sub-Tenon's cyst. Pool cue tips are typically made from leather or phenolic resin which makes them difficult to detect on commonly used imaging modalities and do not cause a major inflammatory reaction. The cue tip was encased in the inclusion cyst, so it is likely that it was protected from the immune system, hence the striking absence of inflammation and foreign body giant cells on histological examination. Additionally, the initial clinical presentation is usually indolent and can go unrecognized,as the entry site is usually small and does not cause a major trauma to the surrounding tissues.Therefore, we recommend approaching these injuries with great care and a high index of suspicion as they can cause potentially cause blindness and can even threaten the life of the patient.

Table summarizing previous ocular injury by snooker / pool cues on PUBMED

Authors / Reference	Age/Gender	Type of injury	Time between initial injury and diagnosis	Pathology	Treatment	Outcome
Kirkby(7)	M	Tip of the snooker cue penetrated upper lid	4 hours	Penetrating orbitocranial injury	Neurosurgical evacuation of haematoma	Hemiparesis
Hykin et al. (8)	22 M	Snooker cue slipped and hit the left eye	Immediate	Optic nerve avulsion	No treatment	Superior altitudinal field defect
Roisentul et al. (9)	43 M	Snooker cue tip forced into oral cavity	Immediate	Traumatic optic neuropathy	Intravenous antibiotics and steroids	Exotropia, reduced vision
Aulino et al. (10)	35 M	Blow to the left orbit with a snooker cue	16 years	Generalized seizure, left temporal lobe vasogenic edema, intraparenchymal retained FB	Surgical excision	Full recovery
Abdelaziz et al. (11)	29 M	Tripped over onto the tip of a pool cue	2 months	Traumatic Brown syndrome and retained FB in the frontal lobe	Frontal craniotomy	Compensatory head posture and minor diplopia

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