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# **An Arrow Penetrating the Globe and the Sinonasal Complex – A Case Report**

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## **ABSTRACT**

### **Introduction**

Foreign bodies represent on average 11% of all ENT emergencies. Associated eye trauma represents 5% of all cases of blindness in developing countries. Accidental and homicidal arrow injuries presenting to an otorhinolaryngologist are still a stark reality in this modern era.

### **Case Report**

A 22 year-old female presented with an accidental arrow injury in her left eye; extending into the nose. On examination, she had no light perception in left eye and a penetrating injury of the sclera. CT scan showed extensive injury to ipsilateral nasal cavity, floor of left orbit and the maxillary sinus and anterior ethmoid cells. Multidisciplinary approach ensured removal of the unusual foreign body from the orbit, nose and paranasal sinuses.

### **Discussion**

Accidental injury in ear, nose or throat with sharp projectiles presents a challenge. Arrowhead may be poisoned and thus exploration is delayed until the systemic effect of the poisoned is reduced. An injury such as this involves a multidisciplinary approach. As ENT surgeons we must be aware such challenges and equip ourselves with the knowledge to tackle them.

### **Keywords:**

*Emergencies; Foreign Bodies; Developing Countries; Arrow; Orbit; Blindness; Ethmoid Bone; Nose; Paranasal Sinuses.*

The use of bow and arrow simply for acts of play despite its lethal uses can often lead to a fatal outcome. Its use for hunting and wars have been a tradition amongst the tribals of India. Due to this scenario, accidental and homicidal arrow injuries are still a stark reality in this modern era. This leads to loss of life and other forms of morbidity such as blindness. We present a case of non-fatal transorbital arrow injury to the eye and paranasal sinuses.

High velocity projectile injuries merit certain management adaptations from gunshot or low velocity stab wounds. This case highlights the necessity for retrograde removal of the arrow in the direction of its line of trajectory. There is need for colleagues in various disciplines to be aware of such injuries because managing these patients requires a multidisciplinary approach.

## **Case report**

A 22 year-old female from a remote rural area of Gangarampur, Balurghat, sustained an accidental arrow injury in her left eye extending into the nose (Fig. 1). The arrowhead got stuck and she developed pain, redness, bleeding from the injured eye, loss of vision and epistaxis from both nostrils. She was brought to the nearby rural health centre, the shaft was cut and then she was referred to Ophthalmology Emergency Room of a Tertiary Care Hospital. After ophthalmological evaluation the patient was referred to Otorhinolaryngology Department for subsequent assessment nearly 16 hours after being injured.

On examination, the unaided visual acuity in her right eye was 6/6 (Snellen's chart) and other examinations were normal. She had no light perception in the left eye. On further examination, the left eye had a tear in the upper eyelid and a penetrating injury of the sclera, a few millimetres away from the limbus extending from the 1 o'clock to the 3 o'clock position, and uveal tissue prolapse. About 1 cm of the arrowhead was visible

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**Fig. 1** The patient at presentation with the stem of the arrowhead peeping near the lateral canthus of the left eye (white arrow)

from the outside (Fig. 2). On manipulation, the arrow did not show any movement and appeared to be fixed to deeper structures. The cornea was hazy and there was hyphaema. The pupil was round, dilated and did not respond to light. Nasal examination revealed that the arrow had breached the left lamina papyracea, entered the ipsilateral nasal cavity passed across the nasal septum to enter the contralateral maxillary sinus. A CT scan of orbit, nose and paranasal sinuses was performed to corroborate the examination findings. The floor of the right orbit and maxillary sinus were not involved. Anterior ethmoidal cells on the left were involved. Lower third of the nasal septum was breached and pushed to the right side. Medial wall of the opposite maxillary sinus was involved (Fig. 3). There was no systemic involvement.

It was decided to explore the wound, but keeping in mind that arrowheads are often poisoned, enough time was allowed to pass before exploration. On exploration under general anaesthesia, the arrowhead was found fixed to the medial wall of the orbit. As the globe was already ruptured, partial evisceration of the left eye was performed by the ophthalmologists and the patient handed over to the Otolaryngologists. After removal



**Fig. 2** Arrow seen penetrating the left eye

of the uveal tissues, the wide flange of the posterior end of the arrow was seen within the globe. A cruciate incision was made lateral to the left lateral canthus at the point of entry in order to release the end of the arrow. The arrowhead was pulled out by firmly gripping it and dislodging it from the medial wall of the orbit



**Fig. 3** CT Scan showing arrowhead traversing the left orbit and nasal cavity

and the nasal cavity without much bleeding. Rotatory or twisting movements were avoided as they could have resulted in extensive fracture of the orbital wall. The rear portion of the arrowhead (the widest part) was gently negotiated through the scleral wound and finally the entire arrowhead was removed (Fig. 4). Evisceration was completed.

Nasal endoscopy using 0 and 45 degree endoscopes was done to evaluate the nasal cavity. Fortunately, there was minimal bleeding from the septum and lateral wall of the left nasal cavity with minimal tissue loss. The septal perforation was small and did not call for repair. Nasal packing was done with Merocel (Tm) was done to prevent synechia. The canthal injury was repaired. The arrowhead measured 10 cm in length, 9 cm of which was inside the point of entry. The breadth of the arrowhead inside the orbit was 15 mm (widest part) (Fig.5). The patient was treated with systemic and topical antibiotics and analgesics. The post-operative period was uneventful. Follow up was done at 1 and 3 months postoperatively by clinical examination and nasal endoscopy which did not reveal any synechia or feature of sinusitis.

#### Discussion

Foreign bodies represent a frequently encountered



Fig. 4 Delivery of arrow from the orbit

pathology in emergency ENT practice. According to Dutta et al., these represent on average 11% of all ENT emergencies.<sup>1</sup> Eye trauma represents 5% of all cases of blindness in developing countries.<sup>2</sup> Rarely, foreign bodies traverse the orbit into the cranium or to the adjacent paranasal sinuses causing extensive damage to the surrounding structures. The orbit measures about 3.5 cm vertically and 4 cm horizontally. Occasionally, a sharp thin foreign body traverses the globe to reach the recesses of the orbit, particularly if it enters with sufficient force and is of sufficient size to gain great momentum. In these circumstances, it may cause damage beyond the confines of the orbit. The orbital walls could get fractured - usually the greater wing of sphenoid, the petrous portion of the temporal bone and the sella turcica are affected. After traction of the orbital walls, the foreign body may enter the frontal sinus, the sphenoid bone or the nose. Metallic arrowheads have been described in the literature by Hirschberg (3.2cm long) and by Steindorff (2.5cm long).<sup>3</sup>

In our case, nearly 9 cm of the arrowhead was inside the point of penetration. The CT scan of the orbit demonstrated that it had reached the contralateral nasal cavity. While retained foreign bodies in the nasal cavity are not in themselves unusual, the route which this foreign body traversed makes it an interesting case study. Based on the wound location and extent of injury, it was inferred that the arrow punctured the eyeball at 1 o'clock to 3 o'clock positions. It narrowly missed the cribriform plate. Conservative treatment was not considered as there were comprehensive effects on the



Fig. 5 The arrowhead after removal from the orbit



**Fig. 6 Clinical photograph (3 months post-operative)**

eyeball and communication was established with the ethmoidal sinus, maxillary antrum and the nasal cavity. As the patient had no light perception in the injured eye and there was possible risk of sympathetic ophthalmia, a partial evisceration and endoscopic examination of the nose and sinuses were done. However, in such cases pyogenic infection is always a risk, leading to the onset of periostitis and fistula formation. There may also be a risk of gas gangrene formation, development of tetanus, chronic sinusitis (when a sinus is involved), meningial infection or cerebral abscess formation (if cranial cavity is involved). In this case, the 3 months follow-up period was uneventful. (Fig.6)

## Conclusion

Penetrating injury to the orbit and nose by an arrowhead in our present scenario is a rare challenge for any surgeon. High velocity projectile injuries merit certain management adaptations from gunshot or low velocity stab wounds.<sup>4</sup> Certain salient features must be kept in mind when dealing with such cases. Firstly, unlike other projectiles, the arrowhead may be poisoned and thus exploration is delayed until the systemic effect of the poison is reduced.<sup>5</sup> Secondly, this involves a multidisciplinary approach. As ENT surgeons, we must be aware such challenges and equip ourselves with the knowledge to tackle them.

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