Bolt from the Blue: A Large Foreign Body in the Maxillary Antrum Necessitating Delayed Primary Reconstruction with Split Cranial Bone Graft

Ramesh K. Sharma, MCh¹ Guru Karna Vemula, MCh¹ Jerry R. John, MCh¹

¹Department of Plastic Surgery, Postgraduate Institute of Medical Education and Research, Chandigarh, India

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Address for correspondence Ramesh K. Sharma, MCh, Department of Plastic Surgery, Postgraduate Institute of Medical Education and Research, Room 43, 2nd Floor D Block, Nehru Hospital PGIMER, Sector 12, Chandigarh 160012, India
(e-mail: drsharmark@gmail.com; drsharmark@yahoo.com).

Abstract

Keywords

- ▶ foreign body
- ▶ maxillary antrum
- ▶ bony defect
- ▶ split cranial bone graft

We report an unusual case of a large metallic foreign body embedded in the maxillary antrum leading to extensive bony destruction of the mid-face following a road side accident in a 12-year-old boy. There was extensive bony loss that necessitated reconstruction for both aesthetic and functional reasons. The same was accomplished by using split cranial bone graft in a delayed primary manner after a gap of 7 days following initial debridement. There was primary healing with good aesthetic and functional results.

A foreign body in the maxillary antrum is not unusual. They can be of traumatic origin^{1–4} or can be found iatrogenically such as after dental procedures.⁵ Metallic foreign bodies are readily detected on imaging. The posttraumatic lodging of foreign bodies in the mid-face can be accompanied with extensive contamination and soft tissue loss. This can lead to both aesthetic and functional deformities necessitating an early reconstruction as the delay in reconstruction can lead to compromised results. We report an unusual case of a large metallic foreign body lodged deep inside the maxillary antrum in a 12-year-old boy following a roadside trauma. This was successfully managed with delayed primary reconstruction with autogenous split cranial bone graft.

Case Report

A 12-year-old boy was admitted to the Emergency Department with alleged history of roadside accident. There was a curvilinear laceration in right nasolabial fold that had already been sutured elsewhere. Computed tomography scan face revealed a foreign body in right maxillary sinus with extensive bony comminution of orbital walls. There was fracture comminution of the right zygoma and parasagittal split of the right maxilla (▶ Fig. 1). The wound was explored through the

laceration under general anesthesia. A large metallic bolt was found embedded deep in the maxillary antrum. There was gross contamination with dirt and gravel and the fractured bones were comminuted. Debridement and foreign body removal was done (▶ Fig. 2). The wound was kept open and daily irrigations were done with antibiotic saline solution till the discharge became minimal and the wound appeared clean. A week later, the wound was explored again by extending the existing laceration and the bony defect was displayed (▶ Fig. 3, upper row). There was loss of infraorbital rim, orbital floor, anterior wall of maxilla, and fracture of the zygoma. The zygoma was fixed at the frontozygomatic suture with miniplate. The bony defect was planned to be reconstructed with appropriately contoured split cranial bone grafts. Three pieces of the bone were harvested, one each for the floor, infraorbital rim, and the anterior wall. These were fixed with miniplates (▶ Fig. 3, middle row). This permitted reconstruction of the bony orbit of near normal dimensions can be seen in the postoperative scans (▶ Fig. 3, lower row).

The postoperative course was uneventful. ▶ Fig. 4 shows result at 4 months postoperative period (upper row) with good eye movements (lower row). Although there is slight hypoglobus and enophthalmos, the patient is well adjusted

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Fig. 1 Upper row: (left) showing already sutured lacerated wound; (right) plain radiograph skull showing large foreign body. Lower row: showing fracture zygoma and fractures of floor, lateral and medial wall infraorbital margin, and anterior maxillary wall and parasagittal split maxilla.

and is able to carry out his daily activities without any head tilt.

Discussion

The foreign bodies lodged inside the facial skeleton are not rare and can present in a variety of situations following trauma or even dental procedures. They may be noted soon after the injury or may lie hidden initially and may be discovered on investigation following appearance of symptoms as a result of pressure effects or secondary infection.

Our patient had reported soon after the injury and had no idea of the foreign body lodged after the accident; this was

noted only after radiological examination conducted in the emergency room.

The foreign body was removed and a thorough debridement performed. The mid-face region had fractures and bone loss affecting the zygoma, orbital floor, infraorbital margin, and the anterior wall of maxilla. There was total disorganization of the orbital socket. We decided against the use of titanium mesh in an open contaminated maxillary antrum with unstable soft tissue coverage. The use of a viable autogenous bone graft such as cranial bone graft was chosen for reconstruction. The split cranial bone graft has stood the test of time since it has been popularized by Tessier. The appropriately contoured bone pieces were harvested that were used to reconstruct the floor, infraorbital margin, and the missing anterior wall of maxilla. It may be

Fig. 2 (Left) Large foreign body seen lodged deep inside the maxillary antrum; (right) removed metallic bolt.

Fig. 3 Upper row: exploration of the wound and extent of bony defect. Middle row: three pieces of split cranial bone harvested, fixed with miniplates. Lower row: showing reconstructed orbit and zygoma and maxilla; the donor site of the split cranial graft can also be appreciated.

Fig. 4 Upper row: postoperative appearance at 4 months. Middle and lower row: showing eye position and movements at 4 months. There is slight hypoglobus and enophthalmos.

emphasized that this was done after about a week of initial debridement to minimize infection. The provision of good skin cover was possible by designing a cheek rotation flap incorporating the existing laceration. The delayed primary bone reconstruction has helped us achieve the dual purpose of good functional and aesthetic goals. Autogenous bone graft is gold standard method for facial bone defect reconstruction.^{6,7} Tessier popularized different techniques and uses of cranial bone graft harvest.⁸ It is popular because of its histocompatibility, mechanical properties, and very slow resorption rate.⁹ These bone grafts are cost effective,¹⁰ have low infection rate compared with alloplastic material, low donor site morbidity, and get osteointegration with surrounding tissue. Soft tissue coverage to sinuses is not required when cranial bone grafts are used due to excellent revascularization.¹⁰

This case report emphasizes the role of delayed primary bone grafting in maxillofacial trauma in a growing skeleton.

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