Penetrating Facial Injury with Retained Knife Blade: A Case Report

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Abstract

Retained foreign bodies in the maxillofacial region are uncommon and rarely reported. In this case, a report of a penetrating facial injury with a retained knife blade is presented. The importance of thorough clinical and radiographic examinations in order to prevent the possibility of a missed or failed diagnosis is discussed.

Keywords: Maxillofacial trauma; Retained foreign body; Penetrating injury

Introduction

Penetrating wounds in the maxillofacial region secondary to knife injuries are relatively uncommon. Those with retained knife blades are even less commonly reported [1-5]. Review of the literature commonly attributes these low rates of occurrence to the attempts to protect the face in self defense [1,4,5]. Patients may often present with other knife-inflicted wounds to the hands and thorax or abdomen [1].

Injuries to the maxillofacial region may be associated with serious complications and can be potentially life threatening. In addition to possible facial bone fractures, important structures, including the facial nerve, parotid gland and parotid duct, may be affected. The orbital region is noted to be particularly vulnerable to injury and may result in more serious complications, including impairment of ocular mobility, disturbances in vision or even complete loss of vision [6-8]. As the structure of the orbit often directs penetrating objects towards the orbital apex, there is a high potential risk of intracranial penetration [4,9-11]. Intracranial involvement may lead to more serious, life-threatening sequelae, including hemorrhage, hematomas, pneumocephalus, cerebrospinal fluid leakage, or even late complications such as meningitis or cerebral abscess [4,9-11]. Accurate diagnosis and prompt, appropriate management is of utmost importance in the management of penetrating facial injuries with retained foreign bodies.

Case Presentation

A 37-year-old male presented to the emergency department approximately twelve hours after being involved in an altercation where he reports he was attempting to break up a fight. He presented complaining of mild pain and numbness, as well as some bleeding from a cut on the right face. He denied any loss of consciousness or changes in vision. On physical examination, the patient was found to have multiple superficial lacerations of the face, neck, and thoracoabdominal region, as well as a deep laceration of the right infraorbital region (Figure 1). Gross vision was normal, extraocular movements were intact, and his pupils were equally round and reactive to light. (The patient was also evaluated by the ophthalmology department). Paresthesia was noted in the right V2 (maxillary branch) nerve distribution.

Radiological examination was performed. CT scans (without contrast) revealed a retained foreign body (knife blade) in the right inferior orbit, extending into the right maxillary sinus and pterygopalatine fossa (Figures 2 and 3). No evidence of intracranial involvement was noted. CT angiography was subsequently performed to evaluate for any vascular injury or proximity of the retained blade to adjacent vasculature. The right internal maxillary artery was noted to be grossly intact within the lateral aspect of the right pterygopalatine fossa with no contrast extravasation suggestive of arterial injury (Figure 4).

The decision was made to remove the retained knife blade under general anesthesia. Both interventional radiology and vascular surgery departments were made aware of the case and...
remained on standby in the event that arterial embolization or surgical intervention were needed upon removal of the foreign body. The margins of the existing laceration were retracted and the blade immediately visualized (Figure 5). Adjacent infraorbital rim periosteum was incised in order to increase visibility of the foreign body. Attention was then directed intraorally where a maxillary vestibular approach was made. Subperiosteal dissection was performed and a bony window was made in the anterior wall of the right maxillary sinus in order to visualize the knife blade and allow for additional surgical access, if needed (Figure 6). A 4.7 cm knife blade was removed from the orbit via the entry wound using gentle, controlled force, without bleeding or complications following removal (Figure 7). The bony window was replaced and closure of facial and intraoral sites completed.

An additional CT was obtained immediately post-operatively to verify complete removal of the blade. At six weeks post-operatively, the patient was noted to have continued right CN V2 paresthesia, otherwise no visual complications or other sequelae were reported.
Discussion

Retained foreign bodies following penetrating injury to the maxillofacial region by a knife blade are fairly uncommon and rarely reported. The largest report to date is that of Meer et al, with a record-based study of 24 cases of penetrating knife injuries with retention of the blade [2]. Prior to that, the largest study with retained blades in the maxillofacial region was that of Grobbelaar and Knottenbelh, with a report of 11 patients [3]. Two cases were reported by Shinohara et al. [1], and Cohen and Boyes-Varley presented 37 patients who sustained penetrating injuries of the maxillofacial region with retained foreign bodies, however only four of these involved a knife blade [12]. In multiple cases, alcohol consumption or intoxication of the patient was cited [1,2,8,11,13].

Initial emergency evaluation of a patient with penetrating knife injury to the maxillofacial region should be thorough and systematic, and often requires a multidisciplinary approach. Initial airway and hemodynamic stabilization of the patient should be performed, as well as assessment of damage to vital structures. Once the patient is stable, appropriate laboratory and radiographic evaluations may then be performed. Specialty consultations should also be obtained, and may include neurosurgery, ophthalmology, otolaryngology and maxillofacial surgery, depending on the anatomical areas involved. A detailed history of the mechanism of injury should be obtained, from the patient, witnesses, or EMT, when possible. Penetrating injuries may be overlooked in cases where an incomplete history of the associated trauma is provided. Complete examination of the head and neck region should be performed, with care taken to explore any wounds that appear more than superficial. Patients may often present with other knife wounds to the hands and thoraco-abdominal areas, as seen in our case. In any patient sustaining deep knife wounds to the maxillofacial area, imaging is warranted.

With any clinical evidence or suspicion of a retained foreign body, radiographic evaluation should be performed. Typical radiographic examinations would include plain film radiographs, CT, MRI, or ultrasonography. At a minimum, two plain film radiographs taken at right angles should be obtained in order to identify the location of the foreign body in relation to vital structures [2,4,12,14]. Computed tomography (CT) is usually the first line of imaging performed in cases of deeper penetrating injuries, particularly when attempting to detect metallic foreign bodies [4,15]. In cases where plain film or CT may not be immediately available, ultrasonography has been documented to be useful in foreign body detection [4,11,12,14]. Thorough knowledge of the vascular anatomy of the maxillofacial region is especially important. If a foreign body, such as a retained knife blade, is visualized on plain films or CT, angiography may be indicated [2,13]. While catheter angiography is the standard of care in the identification of vascular injuries, CT angiography may alternately be used in the event traditional angiography is unavailable [14]. Many major vessels are present in the maxillofacial region, and damage to the vasculature should be initially suspected until proven otherwise. Even if significant bleeding is not present on initial examination, the foreign body may cause disruption of the vessel walls, causing development of pseudoaneurysms. If disrupted during foreign body removal, these may result in excessive, severe bleeding [12]. The surgeon should always be mindful of these possibilities, and angiography is of great value when planning to surgically retrieve the foreign body. The surgeon may consider consulting interventional radiology or vascular surgery in the event a problem should occur during retrieval of the object and selective embolization or surgical ligation of the associated vessels becomes necessary.

Surgical management of patients sustaining penetrating wounds to the maxillofacial region with retained foreign bodies varies. Treatment may depend on the composition or type of foreign body, size, location of the object, and relationship to associated structures. The ideal method of removing the retained knife blade is careful extraction through the initial entrance wound, in a controlled setting under general anesthesia [2,4,5,12]. Care should be taken to avoid trauma to adjacent structures during withdrawal, especially if the blade is serrated. Thorough exploration of the wound after foreign body removal should then be performed with copious irrigation of the site. When indicated, tetanus prophylaxis and appropriate perioperative antibiotics should be administered.

As seen in this case, the initial history of the associated trauma is often inaccurate or incomplete, especially when alcohol consumption or intoxication is involved. Physical findings may not entirely correlate with the reported nature of the injury or predisposing event. In addition to a thorough physical examination, routine radiographic examination (plain film radiography at minimum) is necessary in all cases where injuries to the maxillofacial region are not clearly superficial or the history of the inciting event is unclear.

References