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Case Report

Unusual penetrating cervicothoracic injury with retained iron rod

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ABSTRACT

Penetrating cervicothoracic injuries are exceedingly rare and have a complicated mechanism of injury. The emergency team faces substantial challenges in diagnosing and treating these kinds of injuries. Evaluation and management are still contentious, and there isn't a single, widely recognized management strategy. We report an unusual accident in a young male who presented with iron rod penetrating left side of neck and coming out of left scapula. The iron rod was removed under general anaesthesia and patient made an uneventful and smooth recovery.

Keywords: Case reports, Penetrating neck injuries, Thoracic injuries, Foreign bodies, Impalement injuries

INTRODUCTION

Among all traumatic injuries to the neck, penetrating injuries are among the rarest and are associated with high mortality and morbidity.[1] The injuries are commonly caused by stab wounds followed by gunshot wounds and massive bleeding being the most common cause of death. The combined cervicothoracic injuries with retained iron rod are extremely rare. These types of injuries pose significant diagnostic and therapeutic challenge for emergency team. The evaluation and management remains controversial and there is no universally accepted specific approach in the management. We present a case of cervicothoracic impalement by 85 cm iron rod in a young male and its management.

CASE REPORT

A 30-year-old male while driving a jeep with his head out of the window and his hands on steering wheel when a truck carrying iron metal rods suddenly braked, leading to a collision. One of the rods penetrated left side of the neck and came out of left scapula. At the site of accident, the iron rod was cut and he was brought to the hospital with iron rod in situ after eight hours of accident (Figure 1 and 2). The patient was hemodynamically stable and his vitals parameters were normal. The air entry was equal and there was no surgical emphysema. The entry wound was in the left carotid triangle and exit wound at the left scapula. Both the wounds were contaminated. Clinically there was evidence of fracture of left scapula. Chest radiography and computed tomography (CT) was not technically feasible. Clinically there was no evidence of major vascular or visceral injury in neck and chest. Under general anesthesia, with endotracheal intubation the surgeon stood on a stool, with the patient's left neck and chest extending over the edge of the operating table, the 85 cm long and 12 mm wide iron rod was removed from neck.

The wounds were observed for bleeding or any air leak for 15 min and gently irrigated with povidone-iodine and hydrogen peroxide, followed by normal saline, and then packed. multidisciplinary team (MDT) including cardiovascular and thoracic surgeon, head and neck surgeon, orthopedic surgeon were summoned and adequate blood units were kept ready.

The intraoperative and postoperative course was uneventful and subsequently patient was discharged on fifth postoperative day (Figure 3) and at subsequent follow-up for one year patient was doing well.

Figure 1: Penetrating neck injury front view.

Figure 2: Impalement of neck and chest by iron rod.

Figure 3: Wounds at the time of discharge.

DISCUSSION

In penetrating neck injury (PNI) the wound goes deep to the platysema which extends classically from skull base above to the sternum below. Amongst all trauma cases, isolated neck injuries are rare [10%] but with significant mortality [10%].[1] The wounds are commonly caused by stab and gunshot injuries. The neck contains important vital structures (e.g. spinal cord, esophagus, carotid and vertebral arteries) packed in a small compact area.[2] Injuries to carotid and subclavian vessels cause a high mortality. Unrecognized neck injuries can be catastrophic because of rapid exsanguination or airway obstruction. The factors contributing to the diagnostic and therapeutic dilemmas include complex anatomy, potential vascular or neurologic injuries, and a lack of consensus in literature regarding appropriate evaluation and management. Patients presenting with major vascular or visceral injury should be immediately explored.

Impalement occurs when a rigid object penetrates a part of the body and remains retained in situ. These injuries incorporate both blunt and penetrating type of injuries in that the object or the body at the time of impact is travelling at a relatively low velocity and the energy is dissipated over a short distance.[3] However in the present case impalement was caused by iron rod while the person was travelling at speed of about 30 km/hour. Hui et al reported a case of cervicothoracic penetrating injury with thick branch wood.[2] The patient required repair of common carotid artery, chest exploration, debridement and suture with removal foreign body. Olivo et al reported a case of 16-year-old male with a PNI, on both sides of the neck caused by a large wood.[4] On exploration of both sides of neck under general anesthesia they did not found any major vascular or visceral injury. Similarly, our patient was also fortunate not to have an injury to any vital structure of the neck or chest except fracture of left scapula. Deb reported PNI by 10 mm rusted iron rod in 35-year-old-male who sustained accidental fall at home under influence of alcohol.[5] The rod penetrated below the mandible in the left side and exited through the oral cavity on right angle of the mouth. He was also fortunate not to have major vascular or visceral injury and subsequently discharged on the sixth postoperative day.[5] Wang et al reported neck trauma caused by a rebar (14 mm diameter) penetrating both sides of neck and involving the parotid gland in a 55-year-old man after fall from second floor of a building.[6] They removed the rebar successfully and performed tracheostomy prophylactically which was closed successfully on the 16th postoperative day. While removing the rebar, the authors fitted chest tube over the rebar to avoid crush injury to the surrounding blood vessels and nerves. The authors recommend that a chest tube could be used as an option while removing sharp or spiral foreign bodies from the neck. In case of organic foreign bodies, early exploration and removal reduces the chances of wound infection with favourable outcomes.[7]

The neck zones were classified as zone I extend from clavicle and sternal notch to the cricoid cartilage, zone II extending from cricoid cartilage to the angle of mandible while zone III extends from the angle of the mandible to skull base.[1] Historically, zone II injuries were explored

mandatorily while remaining zones were managed based on clinical symptoms and vital parameters, as these areas are difficult to access. Before the development of spiral CT angiography, triple endoscopy (laryngoscopy, bronchoscopy, upper gastrointestinal endoscopy) combined with a conventional angiogram of the neck was regarded as the gold standard for nonoperative management.[1]

The enhancement of CT scan imaging quality and availability is leading to the adoption of 'no-zone' management for hemodynamically stable patients as a standard practice in trauma centers.

The neck is considered a singular anatomic region, emphasizing specific injuries rather than dividing it into three distinct areas. Multidetector CT scan of neck and chest provides excellent resolution regarding neurovascular and aerodigestive tract injury with high sensitivity and specificity. Those patients with no injury to vital structure can be managed by close observation. The sensitivity of CT is less in patients with injuries near pharyngoesophageal region.[1] In the present case, CT angiography was not possible because of technical problems. The interpretation of CT angiographic images may be limited by artifact caused by metallic fragments retained in the neck.[8]

CONCLUSION

Penetrating cervicothoracic injuries although relatively rare, a good knowledge of anatomy along with proper assessment of injury is a prerequisite before removal. Patients presenting with obvious major vascular or visceral injuries should be immediately explored. CT scans, when feasible, are essential for the evaluation and management of injuries in hemodynamically stable patients.

The injuries at the first instance may look horrific, however, with little courage, multidisciplinary approach and patient's luck, these injuries can be managed successfully. Not all cases of PNI require mandatory non therapeutic exploration.

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