

Penetrating iron rod impalement injury abdomen and chest - A rare case with surgical and anaesthesia challenges

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Abstract

Urbanisation with industrial activities area causing increasing number of trauma cases now a days, but still penetrating thoraco-abdominal trauma is unusual in normal routine emergency practice. Here we present a rare case of penetrating injury to thorax and abdomen which was successfully managed. A 54-year-old male presented in emergency with a fall from a high-rise building at a construction site on to a rod. He was brought to the emergency with the cut end portion of the iron bar in situ penetrating anterior –posterior aspect of thorax and abdomen. The rod was removed carefully, and the damaged lung lobe resected, liver injury to segments 5, 6, 7 and dia phrag matic injuries were repaired.

Keywords: Trauma, Thoraco-abdominal injury, Penetrating injuries, Impalement injuries thorax, Rod injury

Introduction

Thoraco-abdominal penetrating impalement injuries are relatively rare, but they present many challenges in the emergency room to surgeons and anesthesiologists. Impalement injury results from a rigid object penetrating and remaining lodged within the body [1].

Impalement injuries are described as a big foreign body that penetrates a body cavity or an extremity through and through while remaining in position, typically a steel bar or a wooden object [2].

Traumatic injuries are categorised as either penetrating or blunt depending on the cause. According to the existing literature, managing these injuries is in question because there aren't many cases, and the surgical

approach is problematic. Thoracic penetrating wounds are uncommon but serious because they run the risk of involving critical organs. Patient positioning issues could make it more difficult to handle their anaesthesia and surgery.

We report a case of penetrating iron bar impalement injury involving the chest and abdomen due to a fall from height on a rod at a construction site. The anterior-posterior penetration of the iron bar had its unique challenges as the patient couldn't lie down supine with the iron rod in place.

Radiologic investigations, administration of anaesthesia and surgical Manoeuvre were very challenging.

Case Report

A 54-year-old male presented in emergency with a fall from a high-rise building at a construction site on to a rod. He was brought to the emergency with the cut end portion of the iron bar in situ penetrating anterior – posterior aspect of thorax and abdomen.

The rod was cut at the construction site, and he was shifted in an open tractor trolley as he was unable to get into any ambulance to the emergency. In emergency, patient was conscious, oriented and rapidly going into shock. He was in severe pain and unable to lie down on a bed straight because of the protruding rod from the back of his chest. (Picture A and B).



Figure 1: Patient in emergency room



Figure 2: In operation theatre

Examination showed a metallic rod (5 feet long and 1.5 inches' diameter) entering from the right hypochondrium and exiting from right 7th intercostal space in scapular line with bleeding at the entry and exit wound.

As he was rapidly losing consciousness, and unable to lie down flat, he was immediately shifted to the operation theatre without any Radio logical in vesti gations.

Two operation theatre tables were placed close together with 2 inches gap in between them. The patient was induced sitting up and laid down diagonally with the rod lying in the gap between the two tables. This arrangement of the tables for the patient allowed the patient to lie down with the projecting rod on the backside (Picture C). IV 16G line was secured.



Figure 3: Intra- operative photograph

With a surgical assistant giving support to the rod, general anaesthesia was administered. Then invasive radial arterial was used for monitoring the BP and ABG analysis. Once induced one of the tables was removed and the patient was turned to the left lateral position. Right lateral thoracotomy extending to laparotomy (thoraco-abdominal incision) was done, obliquely along the course of penetrating rod. The operative finding showed penetrating injury to the lower lobe of right lung, diaphragm, and liver. Diaphragm was incised radially, Pringle's man oeuvre was done, the rod was removed carefully, and the damaged lung lobe resected, liver injury to segments 5, 6, 7 and diaphragmatic injuries were repaired. Bleeding from the liver injury was managed with absorbable Gelatine sponge and foam placed in the penetrating portion of the liver. Inter-costal and abdominal drain were placed.

Postoperatively, the patient was made uneventful recovery (Picture D) and he was discharged from the hospital in 2 weeks. There was bile drainage through the abdominal drain, which subsided in 6 weeks; after which it was removed in OPD. He joined back to work after 3 months of injury (Picture E).



Figure 4: At the time of discharge



Figure 5: After 3 months

Discussion

Penetrating abdomino - thoracic injuries demand immediate life-saving measures, appropriate resuscitative care, urgent shifting of the patient to the tertiary care center and prompt intervention by a multidisciplinary team [2].

Hossein et al. [3] observed that 35.4 per cent of trauma patients had penetrating injuries with only 2 patients out of 211 patients having both abdominal and chest trauma. Injury due to falls is only 8.5 per cent. Though penetrating abdominal-thoracic injuries are rare, similar cases were reported. Md Belal Alsabek et al. [4] reported a case of two metal bar injuries of the torso. Jitendra Sank pal et al. [1] discussed two construction iron bars causing thoraco- abdominal impalement injuries. A similar injury of abdomino-thoracic penetration by a metallic bar was reported by Hamid al Sayed et al. [5].

Due to the patient's unusual position, the need for strict immobilisation, and the necessity for single lung ventilation, anaesthesia is frequently difficult [2, 4, 5]. However, our patient was able to lay supine but later, after exploration, needed a different endotracheal tube with a double lumen to repair lung damage. Changing the endotracheal tube during surgery is a potentially dangerous procedure that should be avoided unless, as in

this instance, intubation was simple and the conversion to a double lumen tube was not anticipated to be challenging. The impaled object should never be attempted to be removed blindly, and it should only be removed under direct vision after being shown the object and the wounded thoracic structures [1, 4, 5].

The participation of a multidisciplinary team was crucial because this patient needed assistance from an orthopaedic surgeon to treat bony injuries, a gastroenterologist to repair the transverse colon, and a cardiothoracic surgeon to perform a splenectomy. Like this patient, who fully recovered with only mild paraesthesia in the left arm, the majority of patients are young, in excellent health, and recover from injuries quickly. These wounds frequently need complete debridement, anti-biotics, and tetanus prophylaxis because they are highly contaminated and could become infected.

Conclusion

Thoraco-abdominal penetrating impalement injuries by the metallic iron bar is a very rare case and once-in-a-lifetime experience.

Immediate shifting without removing the iron bar and careful transportation to the tertiary care emergency is a crucial step in management. Management with the involvement of a multidisciplinary team is the cornerstone of saving lives in these difficult situations.

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