

Successful management of a thoracoabdominal impalement injury

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A 63-year-old female presented to the hospital with a history of alleged accidental fall onto a rusted iron rod. She was hypotensive but stable. Cooling of the rod while cutting the protruding part was performed as per basic trauma life support (BTLS) access. Following resuscitation, she was re-evaluated clinically and radiologically, and prepared for surgery. The iron rod trajectory was shown on computed tomography (CT) scan to be entering through the left popliteal fossa, then traversing the abdominal cavity with injury to the descending colon and the left dome of the diaphragm.

At laparotomy the iron rod was removed under vision. The laceration to the left dome of the diaphragm was repaired. The perforation of the descending colon was identified and repaired. Colostomy was deferred as there was no peritoneal contamination. The penetrating thigh wound was debrided. Her recovery was uneventful. She was discharged on postoperative day 15. She came for follow-up as out-patient after 3 weeks and the thigh wound had healed.

Impalement injuries are rare and often severe. Most impalement injuries require a multidisciplinary approach. Adequate early resuscitation, proper evaluation and early surgical management is ideal. Immediate stabilisation of the foreign body from the time of encounter is essential. Removal under anaesthesia is mandatory.

Keywords: impalement injury, trauma, diaphragm injury, colonic perforation

Case report

A 63-year-old female was brought to casualty with a history of alleged accidental fall onto an iron rod six hours before.

On primary survey, the patient's airway was patent, and her respiratory rate was 36/minute with saturation maintaining at 88% in room air. Oxygen support was started. Air entry was reduced on the left side of the chest with equivocal resonance. She was hypotensive with initial blood pressure of 80/40 mmHg. The patient responded to intravenous fluids and did not require a blood transfusion. The patient was catheterised after primary evaluation.

On local examination, an iron rod was found entering through the medial aspect of the left popliteal fossa extending into the groin in the subcutaneous plane. The iron rod was palpable per abdomen along the left iliac fossa, left lumbar and until the epigastric region. The tip of the iron rod could be palpated in the left 9th intercostal space.

The patient's trauma score of 6.8 indicated a good survival rate. After stabilising the foreign body, the protruding rod end of 25 cm was cut using an electric saw. Prior to cutting the proximal part, the protruding iron rod was covered with saline soaked gauze to prevent the conduction of heat. CT abdomen and thorax images

revealed the through-and-through perforation of the descending colon, the left dome of diaphragm injury and left haemopneumothorax with minimal pneumomediastinum.



Figure 1: A – Shows the entry point of the iron rod in the popliteal fossa with the arrow depicting the palpable iron rod in the subcutaneous plane of the abdomen. B – Non-contrast CT-multiplanar reformation image showing the entire course of the rod from the point of entry and traversing the abdominal cavity.

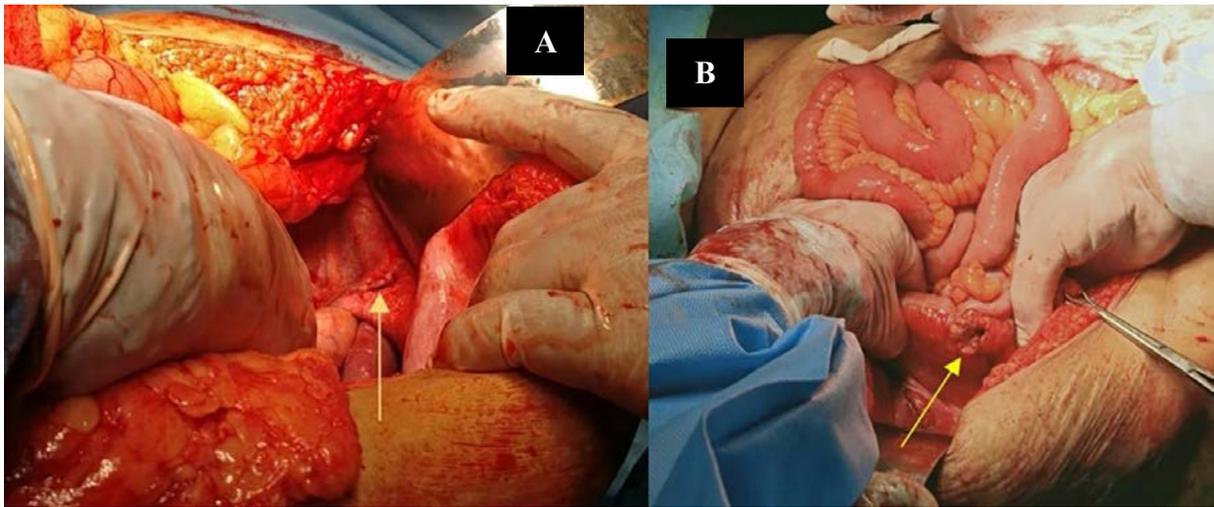


Figure 2: A – Intraoperative image with the arrow depicting the injury to the diaphragm. B – Image showing perforation in the descending colon.

At the time of laparotomy, an intercostal drain was placed in the left pleural space. The iron rod was pulled out from the entry site under vision. Suture repair of the right dome of the diaphragm was achieved with 1-0 prolene. The through-and-through injury in the descending colon was closed in two layers. The left thigh wound was debrided and left open for daily dressing. She required ventilator support in the initial postoperative period but was weaned off on postoperative day 1. The patient had an uneventful postoperative recovery regarding abdomen, chest and left thigh wound. She also had a disrupted right sacroiliac joint for which she required physiotherapy. Passive and active tetanus immunisation was given. The patient was discharged on postoperative day 15. She came for follow-up after 3 weeks and the thigh wound had healed completely. She was advised to physiotherapy.

Discussion

Impalement injury is usually a combination of both blunt trauma and penetrating injury. Two types are recognised: type 1, which occurs when a moving human body encounters an immobile object, is the most common;^{1,2} type 2 is when a moving object, which can be sharp or blunt, pierces into an immobile human body, as in cases of assault.^{3,4} Prehospital service does play an important role for on-the-spot resuscitation and stabilising of the impaled object. The impaled object can cause injury to vital organs causing compromise in the normal physiology, and it might be providing a tamponade effect in situ. Early phase death can be due to haemorrhage, airway obstruction, cardiac tamponade or even due to aspiration.⁵

There should be rapid transportation of the patient to a tertiary care centre. Removal of the impaled object should never be tried at the incident site as it may counteract the tamponade effect. Initial resuscitation must be started with targeted examination without wasting time for unnecessary investigations.⁶ Shortening of the impaled object can be tried for better transportation and for convenience in the operation room. However, it must always be kept in mind that prior to shortening of the external impaled object, it has to be stabilised and precautions taken to prevent conduction of heat.

Extraction of the impaled object should always be done under anaesthesia with proper exposure and under vision.

Impalement injuries that traverse multiple body cavities require a multidisciplinary team assembled preoperatively. Postoperatively, full support in an intensive care unit is often required.

Conflict of interest

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