Successful Anesthetic Management of a Massive Thoracoabdominal Impalement Injury

A 44-year-old man was sitting on a chair when a serrated iron rod (1 m × 3 cm) fell from the 17th floor of a building under construction and penetrated through the right supraclavicular region.

He was brought to the emergency department and was awake, conscious, and anxious in a semi-prone position. His vitals were as follows: blood pressure 150/90 mmHg, pulse 104/min, and SpO2 99%. Two large-bore peripheral lines were secured; blood samples were sent for laboratory investigation, and blood products were kept ready for transfusion.

X-ray revealed 4th and 5th rib fractures [Figure 1], an intact pelvis [Figure 2], with a rod until the right iliac fossa. The operating room (OR) was prepared with all resuscitation equipment.

In OR, the patient was set slowly in the supine position by logrolling [Figure 3]. Under local anesthesia, an arterial line was secured in the left hand and a triple-lumen central line catheter was placed through the left internal jugular vein under ultrasound guidance. Pre-emptive noradrenaline infusion was started at 0.05 μg/kg/min to avoid hemodynamic compromise on induction. Anesthesia was induced using 1 mg/kg ketamine, 1 μg/kg fentanyl, and 0.6 mg/kg atracurium. The patient was intubated using an endotracheal tube 8.0. Antibiotic prophylaxis included 1.5 g cefuroxime and 500 mg metronidazole. Arterial blood gas (ABG) analysis [Table 1] indicated respiratory acidosis. However, we chose not to aggressively treat it with HCO_3 to avoid complications such as hypernatremia. Instead, we tried to correct fluid balance with central venous pressure (CVP) monitoring and improve ventilation.

Exploratory laparotomy revealed that the serrated rod had entered from the right supraclavicular region, pierced the diaphragm, lacerated liver segments VI and VII (laceration size: 8 × 2 × 2 cm), entered the retroperitoneum, and pierced the lumbar musculature. The rod was pulled out through the supraclavicular fossa. The 3 × 3 cm diaphragmatic rent was sutured. A transperitoneal drain was placed in the liver bed. Right intercostal drain was inserted. Hemostasis was achieved. Since the blood pressure remained stable, noradrenaline was stopped. The abdomen was closed, and the necrotic tissue at the site of rod insertion was debrided. Postoperative ABG analysis is shown in Table 1.

The surgery time was 1.5 h (blood loss, 200 ml; urine output, 100 ml). Two packed red blood cells were transfused. The patient was shifted to the intensive care unit and was put on ventilator without any inotropes. Postoperatively, he showed no symptoms or signs of infection, and we continued the

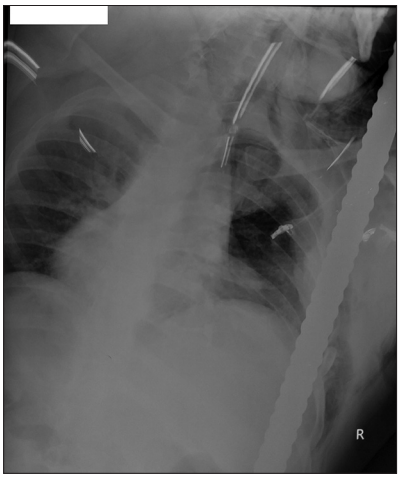

Figure 1: Chest X-ray showing intact clavicles, fractures of the 4th and 5th ribs, and the rod passing through the thoracic cavity

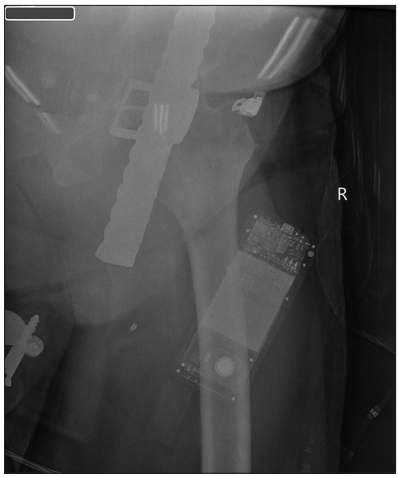

Figure 2: Chest X-ray showing rod in the intact pelvis

Figure 3: The patient lying supine on the operating table with the rod still partly lodged in him

Table 1: Immediate pre- and postoperative arterial blood gas analysis

Parameters	Immediate preoperatives	Immediate postoperative values
pH	7.201	7.298
pCO2	57.5	40.7
paO2	136	121
Hemoglobin	8.0	10.5
Na	137	135
K	3.6	3.6
HCO^3	21.7	19.4

broad-spectrum antibiotics. He was extubated on day 2. On day 5, he was discharged.

Thoracoabdominal impalement injury can damage one or more vital organs, and death can occur within 30 min to a few hours of injury due to complications such as hemorrhage, hemothorax, pneumothorax, cardiac tamponade, etc.[1,2] Previous reports have stated that the penetrating object must not be removed in haste and that depending on the patient's condition, computed tomography scan may be conducted in addition to X-ray and/or abdominal ultrasound.[3,4]

In OR, we used ketamine for induction rather than propofol/thiopentone because the latter lower blood pressure, whereas ketamine increases the sympathetic outflow.[2]

Infection is a worrisome complication with penetrating injuries and can lead to serious complications.[3,5] Prophylaxis with broad-spectrum antibiotics was started before surgery and continued until discharge.

Our patient had a good postoperative outcome and was discharged on the 5th postoperative day. He was followed up in the outpatient clinic and had no problems after 3 months of injury.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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