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Case Report

Multiple impalement injuries of the torso with two metal bars: A case report

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ABSTRACT

Introduction and importance: Impalement injury is a type of penetrating trauma that is rarely mentioned and studied in the medical literature. Patients who could show up at the emergency room are those who got an isolated stab wound in their extremities. The torso injuries are usually fatal in the scene of the accident. We report two metal bars that impaled in the pelvic, back, abdomen and thorax of the patient who was admitted in OR directly.

Case presentation: A 20 year-old construction worker fell down on two metal bars. At the scene; we cut the metallic bars off the column and then we transported the patient keeping the foreign bodys in situ. Right sided tube thoracostomy was done, and then the patient had an exploratory laparotomy detecting vital organs that had be injured before taking out the 2 bars. The technique steps focused mainly on checking heart, lung, liver, kidney, main vessels and spinal cord; respectively.

Clinical discussion: Third world countries should provide a safety environment for construction workers. Surgeons should be able to make a decision to operate the patient immediately without time wasting by unnecessary investigation. This investigation could be useful later intra-operatively.

Conclusion: The safety of workers should be strongly recommended in non-developed countries and it plays a main role in the rescuing. More case series are needed to share and improve the medical practice in dealing with this rare but fatal situation.

1. Introduction

This work has been reported in line with the SCARE 2020 criteria [1]. Multiple impalement injuries are very rare and only a few cases have been reported in the medical literature [2-6]. These types of injury are produced from objects that penetrate and remain impaled in the human body [2]. According to the existing literature, the management of impalement injuries is controversial, mainly because of the small number of patients that could survive until they present at the emergency department. They are potentially life threatening due to the associated hemorrhagic shock and visceral injury. Patients often produce complex anesthetic and surgical challenge due to the inability in positioning and transporting [2]. In our case report, we present the initial management, surgical approach and postoperative care of a patient with chest, abdomen, back, pelvic and scrotum impalement due to a fall from a building surface on two metal bars.

1.1. Case presentation

A 20 year-old construction worker fell down from a surface of new building and landed on two metal bars. The patient was stuck at the accident scene for almost half an hour with severe pain and mild continuous bleeding. He was separated from concrete column by rescue workers after cutting the metallic bars off the column and then he was transported to our university hospital keeping the foreign bodys in situ.

The first bar was 2 m long and 12 mm diameter. It penetrated the patient from his left scrotum (shown in Fig. 1) and entered the abdomen 2cm right from the umbilicus and then went out from the back below the scapula (shown in Fig. 2). The second bar was about 1 m long and 12mm diameters; it stabbed directly the right gluteal region and went deeply in the back (shown in Figs. 3 and 4). The patient was conscious but agitated when he arrived at our emergency room. His pulse was 105 beats per minute, blood pressure (BP) was 110/70 mm Hg, respiratory rate (RR) was 28/min, Glasgow coma scale (GCS) was 15/15 and SpO 2 of 92%. There was no past significant medical or surgical history. Other social

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Fig 1. Patient with in-situ first rod in the scrutum and abdomen.

Fig 2. Patient with in-situ first rod gets out from the right shoulder.

Fig 3. Patient with in-situ second rod in the right gluteus.

Fig. 4. The entrances of two rods.

and family histories were unremarkable.

Immediate resuscitation according to advanced trauma life support (ATLS) protocols was conducted. Right sided tube thoracostomy was done, which drained 500ml fresh blood. Nasal oxygen was started, intravenous access was secured, and blood cross matching was done. No additional labs or radiological investigations were done. Broad spectrum antibiotics and tetanus immunization were ready to be injected.

The patient was immediately taken to the operating room, and placed in semi left lateral position. General anesthesia with sevoflurane was administered. Medline laparotomy and an incision through the skin of scrutum were made simultaneously. The whole entire abdomen was explored. The anterior rod pierced segments VI (S6) and VII (S7) of the liver, continued through the diaphragm at right costophrenic angle to

enter the right thoracic cavity. The right lung was penetrated, but the rod was away from the heart and then went in front of the subclavian vessels. Gallbladder and main biliary tree were normal. Retroperitoneal exploration proved that the right kidney wasn't injured. The second rod didn't enter the space or harm the right common iliac vessels.

Our surgical intervention was carful; we pulled the residual distant part of the anterior rod from the right shoulder and chest to the abdominal cavity and then we released it totally from liver. No marked additional bleeding then happened from either chest or abdomen. We closed the hepatic wound by mattress sutures to achieve complete hemostasis. The hole in the diaphragm was also repaired. Intraoperative x-ray imaging showed that the second rod penetrated right gluteal muscles and stopped in the right flank. Drainage, closure and dressing were done systemically.

1.2. Medial view

Postoperative recovery was uneventful. One unit of pRBCs was transferred. Then the patient was transported to ICU. COVID19 pandemic led us to perform swab test for the patient; it came later with negative result. The patient was discharged from ICU in three days. Postoperative chest X-ray showed fully expanded lung with no collection (shown in Fig. 5) and chest drainage was removed at 6th post-operative day. The antibiotics were postponed in 5th post-operative day, and the patient was followed-up for 4 months as an outpatient; bile leaking, dyspnea, urinating, defecating and impotence haven't been reported.

2. Discussion

Non-developed countries and low-income societies used to report impalement injuries where construction workers are often injured or even die over lack of protective equipment [3-6]. In Syria, we faced complicated and rare blast injuries among the Syrian war [7], but we rarely practiced impalement injuries which are the other type of penetrating trauma. Reviewing PubMed Library detects just a few cases in the last decade over the world [4]. Impalements trauma is classified in two types [10]: Type 1 injury, when a body impacts stationary objects and type 2 when a moving object penetrates a stationary body.

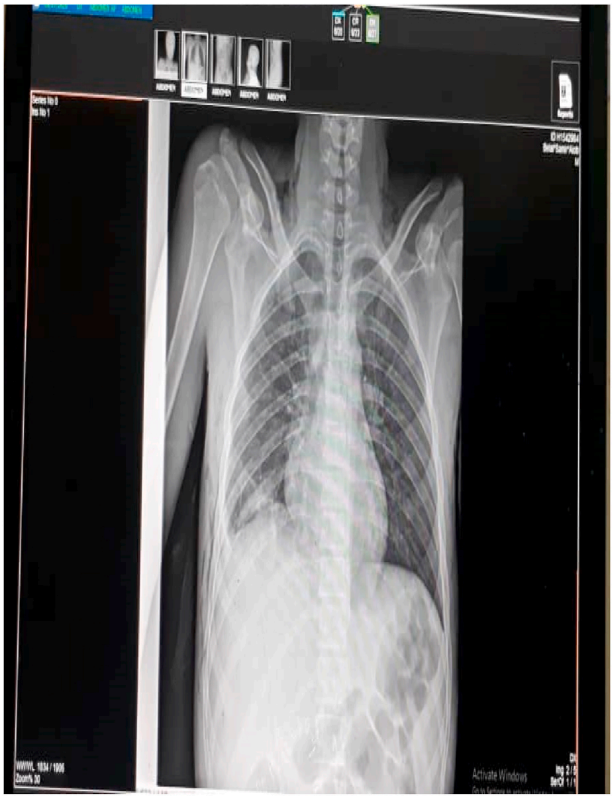

Fig. 5. Chest x-ray of the patient in the discharge day.

The limitation of this report could be in the lack of visual materials that show how the ambulance service team dealt with case at the scene, because the high rate of mortality is not just related to this severe type of trauma, it is also affected by the fatal mistakes that could happen during releasing the fixed impaling patients, transporting them to major hospitals and operating them correctly [4,9,11].

Progressive dyspnea would be the most important and critical symptom in the torso injury. The anesthetic management of these types of injuries is challenging because of urgency for the surgery and associated hemodynamic instability [8]. The golden addition in this type of trauma will be after bleeding control by removing the metallic rod away from the body with minimal additional injuries.

Patients who pass the operation and are discharged without complications; they are often suffered from post-traumatic stress and need psychological assistance [6].

3. Conclusion

Third world countries should provide a safety environment for construction workers. A qualified first aid team is also needed in releasing fixed impaling patient; this is strongly recommended and plays a main role in the rescuing. Surgeons should be able to make a decision to operate the patient in the time, delay the valuable investigation to do it during the intra-operative time and arrange the surgical techniques according to the priority of urgent vital organs injuries. The medical literature needs more case series to share and improve the medical practice in dealing with this rare but fatal situation.

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Ethical approval

Informed consent was taken for this case report.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

All the authors made an equal contribution to the creation of the presented clinical case.

Mhd Belal Alsabek: attending Surgeon at Al-Mouwassat University Hospital who direct the surgery and follow up the case, corresponding author, collected the data, reviewed the PubMed Library and wrote the manuscript. drsabekb@gmail.com.

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Mohamed Khatab: the surgical resident at Al-Mouwassat University Hospital and the assistant surgeon of this operation. www.khatabm22@gmail.com.

Registration of research studies

Name of the registry: This case report is not a first time of reporting new device or surgical technique. So I would not need a Research

Registry unique identifying number (UIN).

Unique Identifying number or registration ID:

Hyperlink to your specific registration (must be publicly accessible and will be checked):

It is a case report not a research.

Guarantor

Mhd Belal Alsabek.

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The authors declare that there is no conflict of interests regarding the publication of this paper.

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