Case Report

Impalement Injury to the Abdomen: Report of a Case

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Abstract

Impalement presents a combination of injuries severe enough to cause the homeostatic mechanisms to malfunction or fail. It challenges the abilities of the managing team as well as the available medical resources. Its management is even more demanding in environments where health-care personnel, facilities for emergency care, and communications infrastructure are absent or poorly funded and equipped. The primary objective of managing impalement injuries is to prevent further injuries and preserve or restore homeostasis. Leaving the impaling object *in situ* until in the operating room is a time proven approach as it allows for managing life-threatening hemorrhage in the operating room. Adequate volume replacement, good visualization, debridement of injuries, and anti-infective measures are complementary. We present a case of type I abdominal impalement in a young man who sustained minimal visceral or neurovascular injuries and underwent exploratory laparotomy for his injuries; he developed a traumatic incisional hernia. He defaulted on the scheduled hernia repair.

Keywords: *Anti-infective measures, debridement, impalement injury, lavage*

Date of Acceptance:
08-Feb-2017

Introduction

Impalement injuries are uncommon[1,2] but can quickly and easily cause the homeostatic mechanisms to malfunction or fail with consequent heightened morbidity and mortality. Type I impalement involves the decelerating human body falling on a stationary object, while a type II impalement involves a mobile object piercing through the stationary human body.[3]

Impalement presents with features of both blunt and penetrating injuries and pose a management challenge to the attending surgeon and anesthetist working in underfunded and poorly staffed health institutions because of the possibility of sustaining multiple organ and tissue injuries which may require facilities for support of critically injured organs.

Many severely traumatized or impaled patients die at site[4] from hemorrhage, severe cranial, and chest injuries. We present the case of an adult male who fell from a palm tree and got impaled through his lower abdomen on a sharp, freshly cut branch of a tree. He was brought to the emergency unit with the impaling object in place within 3 h of the incident. He underwent an exploratory laparotomy.

Access this article online

Quick Response Code:

Website: www.njcponline.com

DOI: 10.4103/njcp.njcp_465_15

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A 30-year-old man presented to the emergency unit with abdominal pain and bleeding of 3 h. He volunteered falling from the top of a palm tree onto the freshly cut branch of a tree which penetrated his lower abdomen and exited through his buttocks and left him suspended [Figures 1 and 2]. He was extricated by cutting the lower part of the branch and reduction of its length without attempts at removing the branch. He was fully conscious after the fall, and the resulting external bleeding was not significant.

At the emergency unit, he was fully conscious, lying in the left lateral position and severe pain, with a pulse rate of 105 beats per minute, regular and small volume and a respiratory rate of 22 cycles. His packed cell volume was 40%, blood pressure was 110/60 mmHg, and temperature was 37.3°C. A radiograph of the pelvis showed a large defect in the iliac bone.

There was a length of freshly cut wood 75 cm long and 8–10 cm diameter in the suprapubic region exiting through

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How to cite this article: Udo IA, Eta O, Sokwa C, Etuknwa E. Impalement injury to the abdomen: Report of a case. Niger J Clin Pract 2017;20:1210-2.

Figure 1: Impaling branch at the entry point in the right groin; note the minimal hemorrhage, clear urine in the tubing and penile shaft swelling

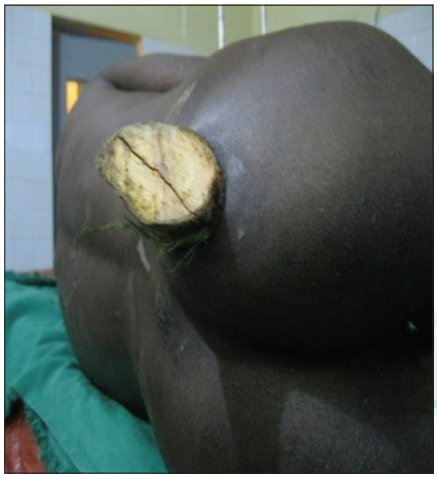

Figure 2: Exit point of the impaling object in the right buttock

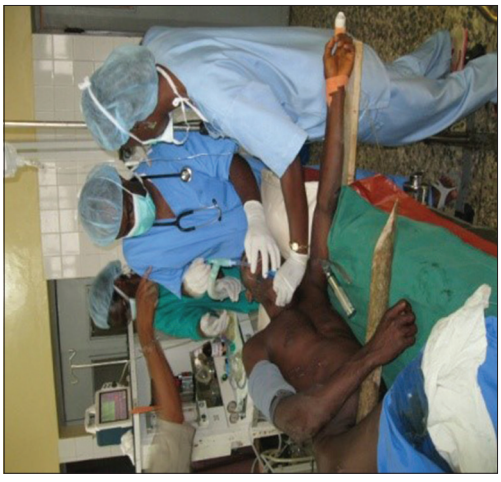

Figure 3: Difficult intubation in the left lateral position; patient could not be placed in the supine position

his right gluteal region, bleeding from both entry and exit wounds. The dorsalis pedis pulse was present in the right foot and no neurological deficits were found in the involved limb. He did not sustain head, spinal cord, or limb injuries.

He was resuscitated and received tetanus toxoid and a combination of a second generation cephalosporin and metronidazole and underwent exploratory laparotomy with findings of complete disruption of the right rectus abdominis muscle, hemoperitoneum of 300 ml, a single perforation of the ileum at the antimesenteric border, a bruised appendix lying adjacent to the impaling object and perforation of the right iliac bone. Multiple fragments of bone and the bark of the tree branch were in the peritoneal cavity. The neurovascular structures of the right lower limb were spared. His liver, spleen, and diaphragm were not injured.

There was a large irregular defect in his right iliac bone through which the impaling object traversed and was tightly impacted. The wood was gradually disimpacted with the aid of a hammer. A wedge resection and repair of the ileal perforation and an appendicectomy were done. The injury tracts were debrided and copious saline lavage of the peritoneal cavity done. The skin wounds were left open, and the patient managed in the intensive care unit for 24 h.

He developed wound infection on the 5th day and wound dressing was done with tulle gauze until the wound was clean and healed secondarily. An incisional hernia developed at the entry site. He was discharged after 8 weeks and scheduled for incisional hernia repair 12 weeks after discharge.

Discussion

Impalement presents with unusual and grotesque forms of abdominal trauma.[5,6] Cases of impalement have been reported from construction sites arising from falls, and rarely from a collision with a protruding object.[7] In our practice, there is no data on the incidence of impalement injuries; however, we receive reports of fall from height, particularly among palm wine tappers and persons harvesting palm fruits, suggesting this is a cause of impalement in our community. They often die at site and our experience managing such patients is limited.

The kinetic energy transferred to the torso which results in impalement is often much and cause extensive physical damage which accounts for why victims often die at the site from the injuries sustained. The impaled patient often present with an injury complex comprising both blunt and penetrating injuries and a complete assessment of the entire patient is mandatory to identify the primary and associated life-threatening injuries.[8]

Often, a multispecialist team is required to properly and adequately assess and operate on the patient. This requires consultations which must be made early to avoid delays in attending to the patient.[4,6] In our setting,

challenges with transporting the injured to hospital, payment for service and availability of appropriate facilities for managing severely injured exist. We, therefore, considered this delayed presentation of a living impaled patient a rare event and acted to save his life. We assembled the minimum team members for assessment and immediately proceed with laparotomy while adequate provision was made to continue care in the intensive care unit.

It was worth observing that the rescuers, not being trained in trauma care, left the impaling object intact, and only reduced its length. This presupposes that they may have encountered similar events in the past and knew the dangers of manipulating the impaling object. Series of reports on impalement injuries have emphasized caution at manipulating the impaling object at the incident site; but rather advise that the impaling object be left *in situ* and reduced to a size or length which can enhance the patient being transported to a health facility1.[4,5] This measure aims to reduce severe life-threatening hemorrhage that may ensue should the tamponading effect by the impaling object in a large vessel be suddenly removed and also avoid breakage of the impaling object.

Patient positioning for anesthesia and surgery could be unconventional because of the location the impaling object which may not allow for any conventional position, and this could make airway management difficult.[9,10] The index patient was intubated in the left lateral position because of the part of the impaling object protruding from the gluteal region [Figure 3] and the early part of surgery done in the same position till after the impaling object was removed when he was adjusted to the supine position. Adequate visualization of the extent of injury caused by the impaling object is important. Access depends on the magnitude of injuries and could be by conventional or nonconventional abdominal incision or a combination of incisions for penetrating abdominal injuries.[5]

The external presentation of the patient may not fully reflect the severity of the internal life-threatening injuries. The magnitude of visceral and vascular injuries in our index case contrasted markedly from what was anticipated preoperatively by the managing team; we anticipated injuries to the iliac vessels, urinary bladder, caecum, and bony pelvis but minimal internal injuries were encountered and were easily remedied. Extensive debridement and copious lavage of the injury tracts were done. The regular dressing of the infected wounds kept them clean and aided healing. Broad spectrum intravenous antibiotics therapy reduced the risk of severe infection.

Conclusion

The external appearance of injuries in impalement may not reflect the severity of the internal injuries. Prompt and adequate assessment, resuscitation and early operation where indicated is always advised.

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.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Greenberg MI. The diagnosis: Impalement injury. EMN 2001;23:20.
2. Thomas MO, Ogunleye EO. Penetrating chest trauma in Nigeria. Asian Cardiovasc Thorac Ann 2005;13:103-6.
3. Crawford DL, McVay WB. Delayed presentation of colonic impalement injury by picture frame glass fragment treated using hand-assisted laparoscopic colectomy. Surg Laparosc Endosc Percutan Tech 2008;18:619-21.
4. Williams N, Bulstrode C, O'Connell P, editors. Bailey and Love's Short Practice of Surgery. Boca Raton: CRC Press; 2013.
5. Knott LH, Barnett WO. Transcorpus impalement: Occurrence in an unusual manner. J Trauma 1978;18:680-1.
6. Ketterhagen JP, Wassermann DH. Impalement injuries: The preferred approach. J Trauma 1983;23:258-9.
7. Missliwetz J. Fatal impalement injuries after falls at construction sites. Am J Forensic Med Pathol 1995;16:81-3.
8. Horowitz MD, Dove DB, Eismont FJ, Green BA. Impalement injuries. J Trauma 1985;25:914-6.
9. Sawhney C, D'souza N, Mishra B, Gupta B, Das S. Management of a massive thoraco-abdominal impalement: A case report. Scand J Trauma Resusc Emerg Med 2009;17:50.
10. Dobson GT. Airway management in a patient with a nail-gun injury to the floor of the mouth. Ulster Med J 2000;69:148-51.