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Contents

Monthly Volume 13 Number 12 December 18, 2022

ORIGINAL ARTICLE

Retrospective Study

Observational Study

CASE REPORT

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Monthly Volume 13 Number 12 December 18, 2022

Contents

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CASE REPORT

Wooden foreign body impalement through the right shoulder region – an unusual penetrating injury: A case report

Abhay Harsh Kerketta, Ritesh Kumar, Seelora Sahu, Jayanta Kumar Laik, Manoj Kumar Rajak

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Abstract

BACKGROUND

Impalement of the body is a rare injury and comes with varied presentation. There is no set classification or defined protocols for managing this injury. This case report aims to create awareness among trauma surgeons about unusual presentation and management of such case.

CASE SUMMARY

A 45-year-old man presented to the emergency department with a sharp penetrating wooden plank at right clavicular region between the neck and shoulder following a road traffic accident. The vehicle had crashed into a roadside wooden hut, thus causing an impalement injury. He was meticulously worked up and taken to emergency theatre. The wooden plank was removed and the wound healed uneventfully. Postoperatively, he had fairly good shoulder function and was able to return back to work successfully.

CONCLUSION

Each impalement injury brings in challenges in management as no two cases are the same. The varied presentation and risks involved should be known to medical professionals handling the emergency. Coordinated multidisciplinary team approach is needed for successful outcome.

Key Words: Impaling; Wooden; Foreign body; Sharp object; Trunk; Case report

Core Tip: Penetration of the body, cavity, or region by an elongated object which remains *in situ* is called impalement injury. It can result from both penetrating and blunt trauma, with the severity of injury being factored by mechanism and velocity of trauma. Associated crushing, penetration, tissue loss, wound contamination, major fractures, and massive blood loss bring great challenges to surgeons besides posing difficulty in administering anesthesia.

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INTRODUCTION

Impalement injuries have been defined as penetration of a body cavity or region by an elongated object which remains *in situ* following the injury[1]. It can result from both penetrating and blunt trauma, with the severity of injury being factored by mechanism and velocity of trauma[2]. Associated crushing, penetration, tissue loss, wound contamination, major fractures, and massive blood loss bring great challenges to surgeons besides posing difficulty in administering anesthesia[3].

CASE PRESENTATION

Chief complaints

A 45-year-old male driver who lost control of a four-wheeler and hit against a roadside wooden hut, presented to the emergency department with a sharp penetrating wooden plank at right clavicular region between the neck and shoulder following the accident.

History of present illness

The vehicle had crashed into a roadside wooden hut, thus causing an impalement injury (Figure 1A).

History of past illness

Not significant.

Personal and family history

Not significant.

Physical examination

An initial assessment in the emergency room (ER) revealed a conscious patient with stable vitals and no respiratory distress. There was a large piece of wood passing through-and-through the right trapezius muscle just above the clavicle and midway between the neck and shoulder (Figure 1A). He had no evidence of any neurological deficit and the peripheral pulses were comparable in both upper limbs. He was administered Inj Tetanus Diphtheria, started on intravenous antibiotic, and immediately mobilized for radiological assessment.

Laboratory examinations

All laboratory parameters were within normal limits. However, the case was further confronted by a positive coronavirus disease 2019 (COVID-19) test report.

Imaging examinations

A rectangular cast with a slightly crooked radio-opaque shadow was seen jutting cranio-caudally, on the radiograph (Figure 1B). No other bony injury was observed.

FINAL DIAGNOSIS

Wooden foreign body (FB) impalement of right shoulder region without any neurovascular deficits following a road traffic accident.

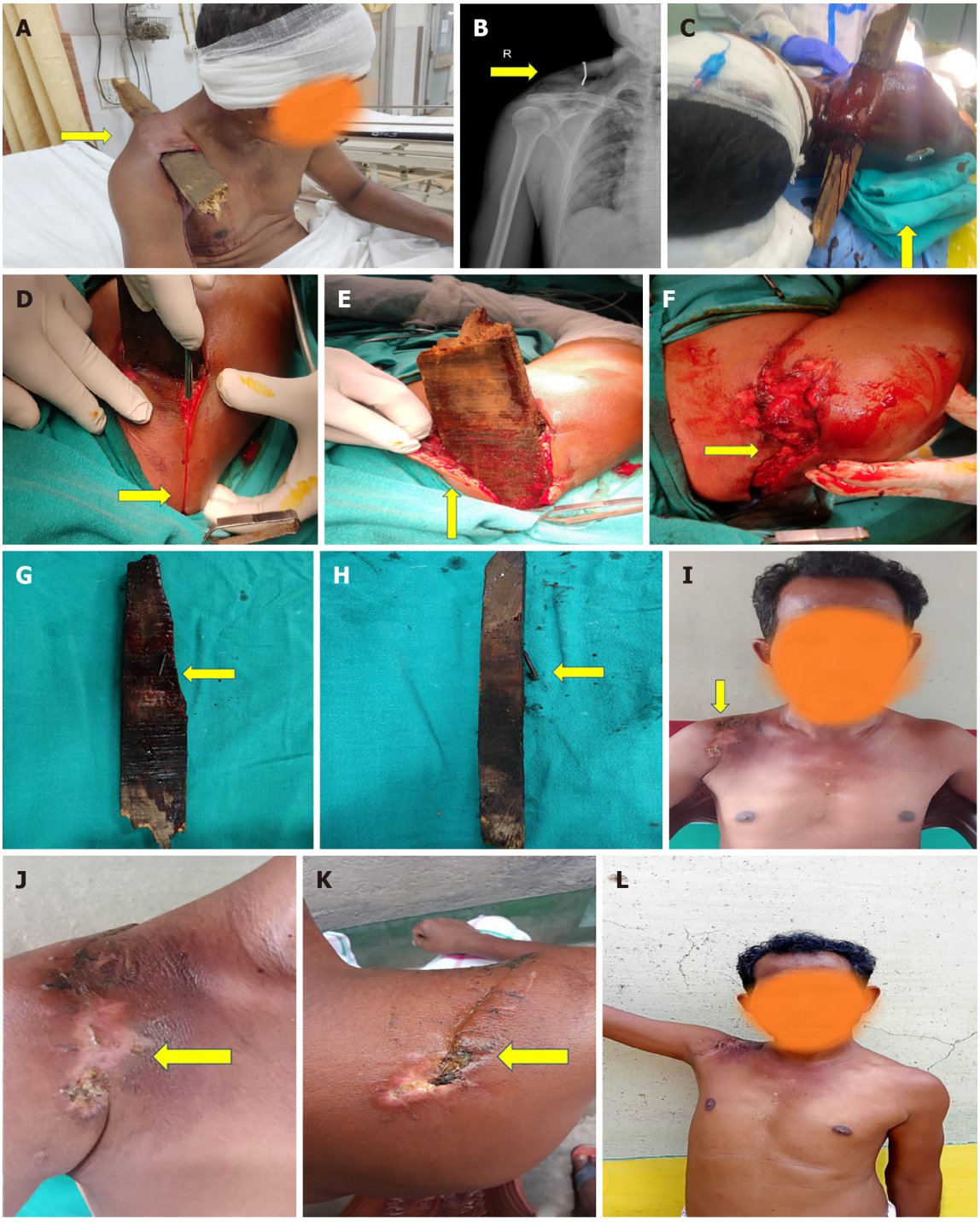

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Figure 1 Chronological figures showing impaled foreign body with its outcome. A: Emergency presentation of the injured right side with the wooden foreign body *in situ*; B: X-ray showing a rectangular cast with a metallic shadow (iron nail) embedded within the FB and tissues; C: Post intubation, folded sheets were kept underneath the scapula for better access and vision; D: After proper positioning and draping, lateral entry and exit points were connected; E: A medial based flap was raised to expose the FB. The iron nail was directed inferiorly, which was carefully dissected out; F: Condition of wound post FB removal showing crushing of edges with minimal skin loss; G and H: 30 cm × 5 cm × 1.5 cm dimension wooden FB with jagged edges at both ends and an embedded bent nail within itself; I-K: Healed flap without any evidence of secondary infection or necrosis; L: Near normal shoulder function seen 2 mo after surgery.

TREATMENT

The patient was scheduled for immediate surgery for the removal of the said FB, debridement, and repair in consultation with the general surgeon and anesthesiologist.

Upon arrival, at the operation theatre and after attaching all requisite monitoring, the patient was gently placed in the supine position with the help of multiple pillows supporting the back and head of the patient, leaving a gap in between for the posterior half of the FB protruding out through his back. General anesthesia was administered, airway secured, and the patient was repositioned with pillows

under the right shoulder for better surgical access (Figure 1C).

A vertical incision was made connecting the lateral points of entry and exit wounds (Figure 1D). A medial based flap was raised to expose the FB (Figure 1E). It was found that it had grazed over the superior surface of the clavicle at the entry point and pierced the trapezius muscle at the exit point. The FB also had a bent nail stuck within the muscle-fibres close to the exit point. It was carefully dissected out, with care being taken not to cause any injury to the adjoining tissues. The wooden FB retrieved measured 30 cm × 5 cm × 1.5 cm in dimension with the bent nail embedded within its body (Figure 1G and H). The wound was given a thorough lavage and damaged structures were looked for. Fortunately, none was noticed, and hence the wound was closed in layers (Figure 1F). The patient was reversed from anesthesia with stable hemodynamic and respiratory parameters. Subsequently, he was shifted to high dependency unit for further monitoring. The postoperative course was uneventful, and the patient was discharged after 2 d.

OUTCOME AND FOLLOW-UP

The patient on discharge was put on an arm pouch sling and intermittent shoulder mobilization was started as the glenohumeral joint escaped injury. The flaps healed well without any secondary infection and necrosis (Figure 1I-K). Passive and active range of motion exercises were initiated post suture removal. At the end of 2 mo, he had good recovery with near normal function of his right upper limb. Partial overhead abduction was present due to scarring and contracture which ensued after healing (Figure 1L).

DISCUSSION

Penetration of the body, cavity or region by an elongated object which remains *in situ* is called impalement injury[1]. Eachempati *et al*[4] classified it under two broad categories. Type 1 injuries occur when the human body strikes an immobile object. Usually, it is seen in industrial and car accidents when persons involved are ejected from their automobiles. Type 2 injuries occur due to penetration of a moving object into an immobile human body.

In prehospital management of penetrating injuries, it is of paramount importance that impaled object should not be removed, so that possible vascular lesions can remain buffered by the object, avoiding major bleeding and cataclysmic hemorrhage. High grade thoracic impalement injuries are rare and complex. It holds a high mortality rate due to associated thoracic wall and lung injuries[5]. Impalement injuries traversing the abdomen and injuring multiple organs too have high rates of morbidity and mortality[6,7].

In our case, the site of the injury was peculiar as the wooden FB grazed superiorly over the right clavicle, between the neck and shoulder presenting a horrific picture, a type 1 injury. Understanding the complexity of the injury, the general surgeon was kept on standby. The presence of the bent nail directed caudally into the tissues ameliorated any chances of removing the FB without proper dissection and assessment. The entry and exit points of the FB were not far apart unlike many reported cases. The lateral corners of both the points were connected, and a flap was raised to expose the FB. Being unusually on the right side, above the clavicle and cranial trajectory, the neurovascular bundle escaped unhurt. The above reason also minimized the chances of lung parenchymal injury. Post FB removal, the flap was approximated without any tension, which healed uneventfully.

The patient also presented with difficult anesthesia as the nature of FB orientation precluded a normal supine position[8]. Additional innovative measures had to be taken to place the patient supine by using multiple pillows behind the back and head. This made it difficult to attain the usual position for laryngoscopy and intubation, especially compounded by the presence of a COVID-19 infection.

Despite the difficulties in the management of the surgical removal of this unusual FB, a multi-disciplinary team with proper coordination and comprehension along with innovative ideas to circumvent the problems unique to this case, made it possible for us to achieve a favorable surgical outcome.

CONCLUSION

Impalement injuries are indeed challenging cases which require early mobilization to hospital and multidisciplinary team approach. As our case demonstrated, right sided supraclavicular anteroposterior impalement usually has a good functional outcome without any sequelae.

FOOTNOTES

Author contributions: Kerketta AH and Kumar R contributed equally to this work; Kerketta AH and Sahu S designed the case study; Kumar R, Laik JK, and Rajak MK performed the research; Kerketta AH and Sahu S wrote the manuscript and analyzed the data; all authors have read and approved the final manuscript.

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REFERENCES

1 **Hyde MR**, Schmidt CA, Jacobson JG, Vyhmeister EE, Laughlin LL. Impalement injuries to the thorax as a result of motor vehicle accidents. *Ann Thorac Surg* 1987; **43**: 189-190 [PMID: 3813709 DOI: 10.1016/s0003-4975(10)60394-3]
2 **Paul S**, Lee CL. Trauma case review: survival following impalement. *Crit Care Nurse* 1994; **14**: 55-59 [PMID: 7882691]
3 **Oya S**, Miyata K, Yuasa N, Takeuchi E, Goto Y, Miyake H, Nagasawa K, Kobayashi Y. Impalement injury to the left buttock with massive bleeding: a case report. *Nagoya J Med Sci* 2013; **75**: 147-152 [PMID: 23544279]
4 **Eachempati SR**, Barie PS, Reed RL 2nd. Survival after transabdominal impalement from a construction injury: a review of the management of impalement injuries. *J Trauma* 1999; **47**: 864-866 [PMID: 10568713 DOI: 10.1097/00005373-199911000-00008]
5 **Ruano RM**, Pereira BM, Biazzoto G, Bortoto JB, Fraga GP. Management of severe thoracic impalement trauma against two-wheeled horse carriage: a case report and literature review. *Indian J Surg* 2014; **76**: 297-302 [PMID: 25278654 DOI: 10.1007/s12262-013-0825-4]
6 **Angelopoulos S**, Mantzoros I, Kyziridis D, Fontalis A, Parpoudi S, Konstandaras D, Tsalis C. A rare case of a transabdominal impalement after a fall from a ladder. *Int J Surg Case Rep* 2016; **22**: 40-43 [PMID: 27046102 DOI: 10.1016/j.ijscr.2016.03.011]
7 **Muhammad Afzal R**, Armughan M, Javed MW, Rizvi UA, Naseem S. Thoracic impalement injury: A survivor with large metallic object in-situ. *Chin J Traumatol* 2018; **21**: 369-372 [PMID: 30348473 DOI: 10.1016/j.cjtee.2018.08.002]
8 **Kaur K**, Singhal SK, Bhardwaj M, Kumar P. Penetrating abdomino-thoracic injury with an iron rod: An anaesthetic challenge. *Indian J Anaesth* 2014; **58**: 742-745 [PMID: 25624541 DOI: 10.4103/0019-5049.147172]

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