MAK HILL Publications Research Journal of Medical Sciences

Research Article
doi: 10.59218\makrjms.2023.83.86

OPEN ACCESS

Key Words
Impalement, iron bar, zygomatic arch, penetrating injury

Corresponding Author
Ravi Bhujbal,
Department of Oral and Maxillofacial Surgery, Nanded Rural Dental College and Research Center, Nanded, Maharashtra 431603, India

Received: 19 March 2023
Accepted: 11 April 2023
Published: 17 April 2023

Citation: Ravi Bhujbal, Ruchita Jadhav, Vinay Patil and Janice John, 2023. Unilateral Impalement Injury with Iron Bar over Face: Report of a rare case. Res. J. Med. Sci., 17: 83-86, doi: 10.59218\ makrjms.2023.83.86

Unilateral Impalement Injury with Iron Bar over Face: Report of a Rare Case

[1]Ravi Bhujbal, [2]Ruchita Jadhav, [1]Vinay Patil and [1]Janice John
[1]Department of Oral and Maxillofacial Surgery, Nanded Rural Dental College and Research Center, Nanded, Maharashtra 431606, India
[2]Yashosai Hospital, Nanded, Maharashtra 431603, India

ABSTRACT
Impalement injury occurs when an object penetrates hard or soft tissue and remains within the tissue. Impalement injury is one type of penetrating injury. It is caused due to fixed and elongated objects, which penetrates the body cavity. This is usually a low velocity trauma. This type of injuries can lead to cranial damage, motor and sensory loss and loss of functions. It is associated with higher mortality rate. It is associated with cranial infection and conditions like meningitis. Treatment requires immediate attention with removal of the foreign body. A 48 years old, male reported to emergency department with impalement injury due to iron bar over left side of face. Computed tomogram demonstrated no cranial injury with comminuted zygomatic arch fracture. Removal of foreign body, followed by surgical debridement, open reduction and internal fixation of zygomatic arch was performed using titanium plates and screw. Patient recovered completely and healing was uneventful. Impalement injury can be treated successfully with immediate attention and adequate treatment plan. Neurological consultation is mandatory in any case of neurological injury. Retrieval of foreign body as soon as possible remains the first line of treatment. Parenteral antibiotics plays important role to prevent sepsis and good recovery of the patient.

INTRODUCTION

Impalement injury occurs when an object penetrates hard or soft tissue and remains within the tissue[1]. Impalement injury is one of subtype of penetrating injury. It is caused due to fixed and elongated objects, which penetrates the body cavity. This is usually a low velocity trauma and penetrating object stays inside the patient's body[2]. The causing object have ability to injure the important organs and vasculature, hence named as foreign body[3]. It may cause wound contamination and injury to vital organs. Although, it is very rare in head and neck region.

The primary goal for the resuscitation of patient is removal of the damaging object and the necrosed tissue with minimal bleed. Also, controlling the secondary factors like infection, meningitis and neurovascular damage.

In the present study, we encases a rare case of impalement injury over the face by a rusted iron bar. We have also discussed the management and postoperative recovery of the patient.

CASE REPORT

A 48 years old, countryside male reported to emergency department with rusted iron impalement injury over left side of face (Fig. 1).

On examination, the Glasgow Coma Scale score was 15/15 (E4V5M6). All vitals were found to be stable. There was no active bleed present. No abnormality detected in cranial nerve functions. All the sensory and motor functions were intact. Respiratory examination, cardiovascular system examination and central nervous system examination reveals no abnormality.

A impalement wound measuring 4×1 cm approximately seen over angle region, from where the iron rod was inserted and exits from the temporal region of size 5×1 cm. Tetanus immunoglobulin followed by tetanus toxoid given immediately to the patient. Parenteral dose of antibiotics i.e., Piperacillin-Tazobactam+Metronidazole+Amikacin given. Patient had bruise and edema over left leg for which radiographic examination carried out and left tibia fracture was found.

Plain computed tomogram (CT) of head and neck was demonstrated. Comminuted fracture of zygomatic arch seen along with the iron bar in situ (Fig. 2).

No injury to vital neurovascular structures noted on the radiograph. No injury to brain parenchyma noted. Patient was taken under general anesthesia. After preparing and draping, Incision marking done for preauricular with temporal flap extension. Incision given and deepened through skin, subcutaneous tissue, fat, temporal fascia. Dissection carried out beneath the supratemporal fascia using artery forceps and Iron rod

Fig. 1: Impalement injury with rusted iron bar over face

Fig. 2: Axial section of computed tomogram showing comminuted fractured zygomatic arch along with foreign body in situ

retrieved without causing damage to surrounding structures. It was followed by copious irrigation using betadine and saline (Fig. 3).

Open reduction and internal fixation of the zygomatic arch was performed using titanium plates and screws. A minivac drain was secured and closure done using skin staples and sutures (Fig. 4).

Antibiotics continued for 7 days. Post-operative recovery was uneventful (Fig. 5).

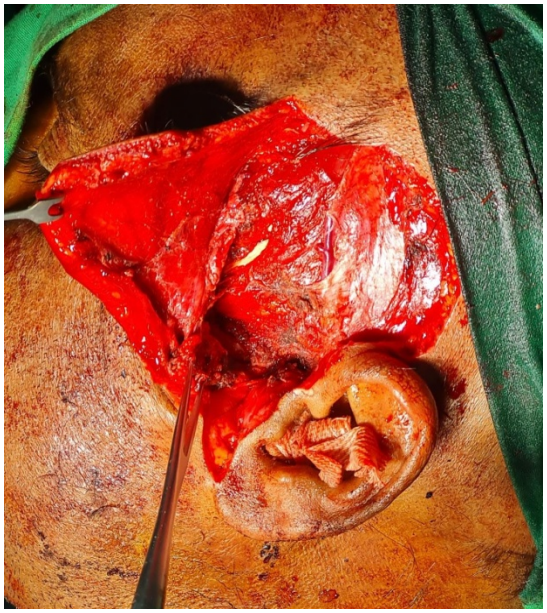

Fig. 3: Dissection through preauricular incision with temporal extension flap

Fig. 4: Skin closure using skin staples and sutures

Fig. 5(a-b): Post-operative photograph of patient with a healed scar

DISCUSSION

Impalement injury depends on the nature of penetrating object, etiology, type of retained foreign body, site of penetration, amount of hampered anatomy of soft and hard tissue[4]. The management of patients with impalement injury starts immediately as they report to the hospital. It comprised of initial clinical examination, which includes the primary airway, breathing, circulation, disability assessment followed by local examination, radiological assessment, parenteral antibiotics-antimicrobial therapy, removal of foreign body, surgical debridement, soft and hard tissue repair[5]. The commonest site of impalement injury is through the fragile superior orbital plate causing orbital roof fracture and leading to frontal lobe contusions[6]. Any cranial access through any skull area leads to injury to brain parenchyma, the neurovascular bundle and meninges, hence these types of wounds are labelled as “Entrance wounds”[7]. However, in our

case the entrance of foreign body is from the masseter region and emerging outwards from temporal region. It is one of the rarest sites of injury. To the best of our knowledge, none of the case like this was discussed before.

The CT head remains the gold standard for initial radiographic assessment. As plain skull radiographs are associated with multiple errors and not able to detect anomalies in more than half of the cases[6]. Plain radiographs exhibits a high failure rate in detecting foreign bodies, fractures and abscess. Also, the status of brain parenchyma cannot be evaluated properly by using plain radiographs. In the present case CT head and neck was taken immediately after initial assessment of the patient to detect the exact location of the foreign body, the status of brain parenchyma, hematoma. The CT is also considered as the central, first line, necessary or ideal radiograph[4].

The CT aids in planning of management of these impalement injuries. This injury can lead to intracranial bleed, hematoma, cerebrospinal fluid leak, cranial nerve dysfunction, neurological disfigurement and death. Angiography is indicated in case of proximity with important vessels in these cases in order to prevent injury to the main vessels during retrieval of foreign body. Partial trauma to the blood vessel leads to "Traumatic aneurysm". Rupture of this type of aneurysm can lead to death of the patient[8,9].

The management starts with right timing of intervention. The ideal time for intervention is within 12 hrs of injury not too early to avoid significant bleeding due to pressure changes[7,8]. The main objective in treating impalement injuries is to maintain neurovascular network and prevent intracranial bleed, hematoma and cerebral hypertension. Tetanus immunization, parenteral antibiotics are included in the management. In maximum cases, surgical exploration and craniotomy, removal of penetrating object with minimal damage to surrounding structures remains the treatment modality[10]. Damage to peripheral vasculature causes infection, meningitis and many other lethal complications. These can be assessed by checking the signs of inflammation. In the present case scenario, removal of foreign body, surgical exploration of wound followed by open reduction and internal fixation using titanium plates and screws of the fractured zygomatic arch was indicated for the patient. Impalement injuries are very rare. Clinical assessment and immediate management plays an important role in treating these injuries and to gain adequate results. However, considering the dearth of literature regarding these types of injuries makes this report unique.

CONCLUSION

Impalement injury results in infection, intracranial damage and injury to major vessels leading to circulatory disturbances. Clinical and radiological examination plays an important role in determining the severity of trauma and prognosis of patient. Immediate actions are mandatory for reliable outcome. The CT remains the gold standard to localize the foreign body and to assess underlying soft and hard tissue anatomy. The present paper described an significant successful outcome of patient with impalement injury and their complete post-operative recovery.

REFERENCES

1. Suh, H.S., J.H. Pak, S.E. Hong and S.R. Kang, 2015. Unusual bilateral impalement injury with rusted iron bars on face and neck. Arch. Craniofacial Surg., 16: 147-150.
2. Diyora, B., N. Kotecha, M. Mulla, S. Dethe, B. Bhende and S. Patil, 2018. Perforating head injury with iron rod and its miraculous escape: Case report and review of literature. Trauma Case Rep., 14: 11-19.
3. Lan, Z.G., A.R. Seidu, J. Li and C. Yang, 2018. Nonprojectile penetrating iron rod from the oral cavity to the posterior cranial fossa: A case report and review of literature. Int. Med. Case Rep. J., 11: 41-45.
4. Oley, M.C., M.H. Oley, A.N. Tangkilisan, N. Limarga and M. Faruk, 2021. Penetrating facial injuries may cause intracranial damage. J. Pediatr. Surg. Case Rep., Vol. 75. 10.1016/j.epsc.2021.102069.
5. Cohen, M.A. and G. Boyes-Varley, 1986. Penetrating injuries to the maxillofacial region. J. Oral Maxillofacial Surg., 44: 197-202.
6. Payami, A. and A.H. Montazem, 2020. Management of penetrating maxillofacial trauma as a result of industrial accident: Report of an unusual case. Craniomaxillofacial Trauma Reconstr. Open, Vol. 5. 10.1177/2472751220949413.
7. Prasetyo, E., M.C. Oley, V. Sumual and M. Faruk, 2020. Transorbital-penetrating intracranial injury due to a homemade metal arrow: A case report. Ann. Med. Surg., 57: 183-189.
8. Agrawal, A., V.U. Reddy, S.S. Kumar, K.V. Hegde and G.M. Rao, 2016. Transorbital orbitocranial penetrating injury with an iron rod. Craniomaxillofacial Trauma Reconstr., 9: 145-148.
9. Zhang, D., J. Chen, K. Han, M. Yu and L. Hou, 2017. Management of penetrating skull base injury: A single institutional experience and review of the literature. BioMed Res. Int., Vol. 2017. 10.1155/2017/2838167.
10. Tabibkhooei, A., A. Aslaninia and K. Anousha, 2019. Childhood transorbital skull base penetrating injury: Report of 2 cases and review of literature. World Neurosurg., 131: 213-216.