CASE REPORT

Jael syndrome: removal of a knife blade impacted in the maxillofacial region under local anaesthesia

Paulo Roberto Domingquete, Bruno Figueiredo Matos, Tufi Neder Meyer, Lucinei Roberto Oliveira

Vale do Rio Verde University,
Três Corações, Minas Gerais,
Brazil

Correspondence to
Professor Lucinei Roberto
Oliveira,
lucinei@yahoo.com

SUMMARY

The presence of retained foreign bodies in the maxillofacial region as a consequence of penetrating injuries from knives is poorly documented in the scientific literature. This manuscript reports the case of a 30-year-old Caucasian with a knife blade lodged in the maxillofacial skeleton. Following clinical and radiographic exams, it was determined that the object had penetrated through the left nostril and nasal septum, in the direction of the right maxillary sinus, and remained impacted without causing injury to important anatomical structures. After systemic assessment and determination of the exact location of the knife blade, the object was removed in an outpatient setting under local anaesthesia. This manuscript aims to report a rare case of a transfacial penetrating injury involving a knife blade that was removed in an outpatient setting while also discussing the proper conduct and treatment options for similar cases in the context of a brief literature review.

BACKGROUND

Retained foreign bodies in the maxillofacial region as a consequence of penetrating injuries from knives may generate anxiety in the professional managing the case. These penetrating lesions can be superficial or deep, and they may be life threatening when the major blood vessels of the face are involved.¹⁻³ Moreover, when such an injury extends to the oral or nasal cavity, excessive bleeding may promote airway obstruction.³ Thus, in these cases, a rapid primary therapeutic approach should be multidisciplinary and sequential. Such an approach should begin with proper airway maintenance and haemodynamic stabilisation, provided by the trauma unit, followed by a careful neurological, ophthalmological and vascular evaluation to prevent life-threatening complications.³ The definitive treatment of these penetrating injuries generally occurs at a separate, later appointment, typically under general anaesthesia.^{2 4-6}

Documented cases of knife wounds in which the object remains impacted in the maxillofacial region are relatively rare in the literature.¹⁻³ These injuries are encountered by oral and maxillofacial surgeons in several occasions, and can present a diagnostic and treatment challenge due to several factors such as the difficult access, the inflammatory response of the around tissues, the size of the object and a close anatomic relationship of the knife to vital structures, which may put patients' lives at risk.

Unlike most reported approaches for this type of case, the present case demonstrates that it is

possible to safely remove a foreign body in the maxillofacial skeleton under local anaesthesia, as long as the clinical condition of the patient is stable and there is a proper diagnosis of the exact anatomical localisation of the foreign body, without a risk of injury to vital anatomical structures. Thus, the aim of this manuscript is to report a rare case of a man with a transfacial penetrating injury involving a knife blade, bilaterally affecting the nasal fossa and the right maxillary sinus, which was removed under local anaesthesia in an outpatient setting. Additionally, along with a brief literature review, we will discuss the appropriate conduct and treatment options for such cases.

CASE PRESENTATION

The patient had their primary care in an outpatient setting in your small neighbouring town where no radiographic examination was done, but he was immediately referred to the Vale do Rio Verde University, with only a prescription of 100 mg nimesulide twice a day. Following primary care, an alert and responsive 30-year-old Caucasian with stable vital signs was brought to the oral surgery department of the University for treatment of a persistent and painful facial lesion resulting from violence involving a knife, which had occurred 5 days previously.

The patient was not afflicted by any systemic disease, and there were neither immediate life-threatening complications nor signs or symptoms

Figure 1 (A) Front view of the patient on clinical presentation. There is a wound in the external nares area and a foreign body inside the left nostril (arrow). (B) Water's x-ray (occipitomental view) showing a metallic blade affecting bilaterally the nasal fossa and the right maxillary sinus (arrow). (C) Normo-lateral x-ray showing the tip of the metallic blade reaching the pterygoid process. (D) Knife blade removed under local anaesthesia with a Mayo-Hegar needle holder (arrow).

To cite: Domingquete PR, Matos BF, Meyer TN, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2013-008839

of altered vision or neurological complications. The extraoral physical examination revealed a painful sutured injury on the skin of the left ala and an unexpected foreign body within the nasal fossa (figure 1A). The clinical examination showed no significant alterations within the oral cavity, and a limitation of mouth opening was not found.

Conventional x-rays on perpendicular planes showed the visualisation of a radiopaque foreign body resembling a knife blade without the handle. These images revealed that the blade had penetrated the facial skeleton, affecting bilaterally the nasal fossa and the right maxillary sinus, with its tip reaching the pterygoid process of the right sphenoid bone (figure 1B,C).

Owing to the urgency of the case, the satisfactory clinical condition of the patient and the anatomical location of the knife blade, the clinical team opted for the immediate surgical removal of the foreign body in an outpatient setting under local anaesthesia. The procedure was explained to the patient, who signed an informed term of consent.

TREATMENT

Infiltrative terminal anaesthesia was performed and the injured area was cleaned and explored, and the blade was then removed from the left nasal fossa. A Mayo-Hegar needle holder was used to remove the blade, which measured 12.5 cm in length (figure 1D). The surgical field was examined, and the soft tissues were abundantly irrigated with saline solution. The team then performed haemostasis, and when no significant bleeding was observed, the wound was sutured. Tetanus toxoid was administered, and additional drugs were prescribed as follows: 500 mg metamizole four times a day; 500 mg amoxicillin three times a day and 100 mg nimesulide twice a day. Postsurgical observation showed complete wound cicatrization.

OUTCOME AND FOLLOW-UP

After 4 years, the patient remains under clinical and radiological follow-up without intercurrents.

DISCUSSION

The term 'Jael syndrome' which is based on the biblical story on the murder of Sisera committed by Jael (Judah IV:21) is utilised in the literature when an intentional wound in the skull-face region was caused by a knife.^{7 8} On the basis of these reports Harris *et al*⁹ defined 'Jael syndrome' as an intentional wound in the craniofacial region caused by a knife.

Reports of penetrating injuries in the maxillofacial skeleton are uncommon in the scientific literature^{3 8} and the occurrence of such injuries in the maxillary sinus is even rarer.^{8 10} These injuries are mainly caused by knives or firearms.^{1-4 8 9}

In our current report the patient was a 30-year-old Caucasian of a low socioeconomic level. The literature suggests that this type of injury is most common among African-American between 15 and 35 years of age with a lower socioeconomic status.^{4 9-12} Our reported case was consistent with the patient profile described in the literature differing only in skin colour.

Primary care given to such patients must include the prevention of fatal complications including maintenance of the airways, control of bleeding and management of the state of shock.¹ Because such injuries can also penetrate the orbit the patient's ocular activity motility and neurological commitment should be examined.^{2 4 11} Postponing treatment is necessary in such cases due to the possible presence of more severe neurological cervical thoracic or abdominal injuries which if present would initially contraindicate this type of surgery.¹³

To identify the trajectory of the object and its relationship to important anatomical structures and/or to exclude the presence of foreign bodies conventional perpendicular radiographs and/or CT should always be performed.² In our described case radiographs were taken anteroposterior and lateral to the skull confirming the downward path of the knife blade. These radiographs also illustrated the blade's presence in both nasal fossa and right maxillary sinus with its tip reaching the pterygoid process while confirming its distance from neurological structures and the carotid arterial system. Although we did not utilise CT in this case CT is indispensable as an auxiliary method for the diagnosis of neurological injuries in more complex cases.² When the patient presents with excessive bleeding or when the foreign object is located near or is suspected to involve large blood vessels such as the carotid arterial system an angiogram is recommended.^{3 4 11}

A foreign body is generally surgically removed through its course of penetration.^{1 4 11} To facilitate the exploration of the surgical site the clinician should extend the incision originated by the object and then retrieve the knife blade with a curved haemostat. Removal generally occurs under general anaesthesia and should be performed carefully to ensure that neighbouring structures are not damaged.^{1-4 10 11} The wound should be thoroughly examined before undergoing haemostasis a process that should be followed by copious irrigation with sterile saline solution and suturing in layers. Moreover, we highly recommend the prescription of preoperative and postoperative antibiotics as well as postsurgical tetanus prophylaxis under^{2 10} systemic condition and were decisive to the author's choice.

Contrary to the commonly reported approaches the outpatient removal of the knife blade under local anaesthesia through the route of entry was a viable option in the present case mainly due to the satisfactory systemic conditions of the patient the delay for the treatment and the favourable anatomical localisation of the foreign body. However, if it had not been carefully planned and executed it is important to highlight that our choice could lead to an uncontrolled bleeding from maxillary artery and/or pterygoid plexus. However, a revision of several cases of retained knife blades in the maxillofacial region showed that the well-planned safe withdrawal of these objects is not commonly associated with unwanted effects, delayed complications or significant sequelae.¹² These favourable observations may be attributed to the typical pattern of object penetration inward and downward which tends to drive the object away from the major vessels and brain.¹²

Learning points

- ▶ The primary care that must be given to patients with penetrating injuries in the maxillofacial region must include the prevention of fatal complications including maintenance of the airways, control of bleeding and management of the state of shock.
- ▶ A foreign body is generally surgically removed through its course of penetration. To identify the trajectory of the object and its relationship to important anatomical structures as well as to exclude the presence of foreign bodies conventional perpendicular radiographs and/or CT should always be performed.
- ▶ In cases of satisfactory systemic conditions and favourable anatomical localisation of the foreign body the outpatient removal under local anaesthesia through the route of entry of the object can be a viable option.

Although the removal of retained foreign bodies within the maxillofacial region is not always straightforward the patient described in this article successfully underwent a careful and thorough removal of a knife blade lodged in the maxillofacial region while in an outpatient setting under local anaesthesia. Thus this type of surgical removal is feasible when radiological interpretations show no risk of vascular injury and the patient is in good systemic health. To manage possible future complications clinical follow-ups are fundamental to the long-term success of such procedure.

Acknowledgements Brazilian National Council for Scientific and Technological Development (CNPq) (470932/2011-2) and to the Vale do Rio Verde University.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Daya NP, Liversage HL. Penetrating stab wound injuries to the face. *SADJ* 2004;59:55–9.
- 2 Chrcanovic BR, Souza LN, Freire-Maia B. Migration of tip knife blade through middle-third facial tissues. *Oral Maxillofac Surg* 2009;13:41–4.
- 3 Meer M, Siddiqi A, Morkel JA, *et al.* Knife inflicted penetrating injuries of the maxillofacial region: a descriptive record-based study. *Injury* 2010;41:77–81.
- 4 Cohen MA, Boyes-Varley G. Penetrating injuries to the maxillofacial region. *J Oral Maxillofac Surg* 1986;44:197–202.
- 5 Cosan TE, Arslantas A, Guner AI, *et al.* Injury caused by deeply penetrating knife blade lodged in infratemporal fossa. *Eur J Emerg Med* 2001;8:51–4.
- 6 Shinohara EH, Heringer L, de Carvalho JP. Impacted knife injuries in the maxillofacial region: report of 2 cases. *J Oral Maxillofac Surg* 2001;59:1221–3.
- 7 Mckechnie J. A severe craniofacial impalement injury (Jael's syndrome). *Br J Oral Maxillofac Surg* 1986;24:258–64.
- 8 Santos Tde S, Melo AR, de Moraes HH, *et al.* Impacted foreign bodies in the maxillofacial region-diagnosis and treatment. *J Craniofac Surg* 2011;22:1404–8.
- 9 Harris AMP, Wood RE, Nortjé CJ, *et al.* Deliberately inflicted penetrating injuries of the maxillofacial region (Jael's syndrome). Report of 4 cases. *J Craniomaxillofac Surg* 1988;16:60–3.
- 10 Pawlak W, Kaczowski H. Unusual foreign body presenting in maxillary sinus. *Dent Med Probl* 2006;43:305–8.
- 11 Olasoji HO, Tahir AA, Ahidjo A, *et al.* Penetrating arrow injuries of the maxillofacial region. *Br J Oral Maxillofac Surg* 2005;43:329–32.
- 12 Grobbelaar A, Knottenbelt JD. Retained knife blades in stab wounds of the face: is simple withdrawal safe? *Injury* 1991;22:29–31.
- 13 Ueek BA. Penetrating injuries to the face: delayed versus primary treatment—considerations for delayed treatment. *J Oral Maxillofac Surg* 2007;65:1209–14.

Copyright 2013 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- Submit as many cases as you like
- Enjoy fast sympathetic peer review and rapid publication of accepted articles
- Access all the published articles
- Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow