



## Case Report

Rigid endoscope guided removal of penetrated embedded neck foreign body<sup>☆</sup>Mark Paul<sup>\*</sup>, Santhi Kalimuthu, Chitra Banu, Shashigopalan Marimuthu*Department of Otorhinolaryngology, Hospital Tengku Ampuan Rahimah, 41200 Klang, Selangor, Malaysia*

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## ABSTRACT

Penetrative neck injury can cause potentially fatal damage to the neck. Removing those fully embedded small foreign bodies secondary to ballistic trauma can be technically challenging. Neck exploration under direct vision may cause more local tissue damage or dislodge the foreign body further. We discussed a case where a small foreign body embedded in the neck caused by ballistic trauma. Successful removal of the foreign body guided by rigid endoscope thru the neck wound was also discussed as a useful tool as it was not ferromagnetic and image intensifier was not available.

## Introduction

Penetrative foreign body in the neck is becoming more frequently seen as we move towards an industrial era. These foreign bodies can be fully or partially embedded. Neck anatomy is complicated with many vital structures in close proximity. Penetrated neck foreign bodies can therefore cause potentially fatal injuries and are technically challenging to remove them. Many methods have been utilised to remove them depending on the extent or location of the foreign body and also the facility status of the hospital [1,2]. It is still possible to remove a small foreign body embedded deeper in the neck in close proximity with important structures with limited technology as seen in our case.

## Case summary

A 30-year-old male with no previous medical illness was brought to hospital several hours after a ballistic trauma: small metallic fragment impacted and embedded into the left anterolateral aspect of his neck while he was working in a factory. There was neither respiratory nor vascular compromise. Examination showed a 5 mm puncture wound at level 3, anterolateral aspect of the neck. No active bleeding seen. No foreign body palpable. X-ray and ultrasound showed the foreign body was impacted at 1.2 cm below skin level. Wound exploration was done under local anesthesia following the trajectory of the foreign body impaction. No foreign body was seen despite limited exploration beyond 1.5 cm depth from skin level. Computed Tomography (CT) was done to locate the foreign body showed it being embedded within left sternocleidomastoid (SCM) muscle, just superficial to the carotid sheath (Fig. 1). Neck wound exploration was done under general anesthesia meticulously. Image intensifier was not available due to logistic reasons. Meticulous dissection of the muscle along the tract of the foreign body impaction was guided with rigid endoscope. The 6 × 3 mm metal fragment was identified with rigid endoscope just short of carotid sheath and successfully removed without any complications.

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**Fig. 1.** Axial CT neck showing the foreign body close to great vessels.

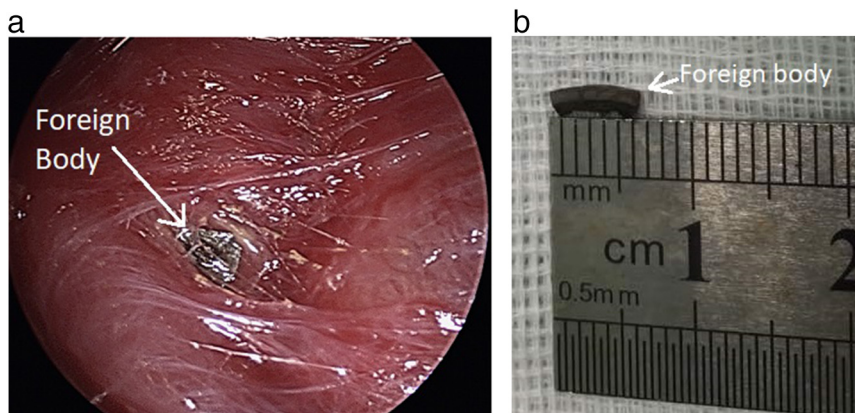
(Fig. 2a & b).

## Discussion

Neck is divided to 3 zones for penetrative neck trauma. Zone 1 is clavicle to cricoid cartilage, zone 2 is cricoid cartilage to angle of mandible and zone 3 is angle of mandible to skull base. Zones 1 and 3 injuries have limited surgical access [3]. This leads to poor outcome. The injury in our patient is at zone 2, which has the higher incidence rate [4].

There are many methods to locate and remove a fully embedded foreign body in the neck. Ferromagnetism and image intensifiers have been successful for this purpose [1,2]. However, these options may not be feasible or available in all health care centres for whatever reasons.

The foreign body fragment was not ferromagnetic and image intensifier was unfortunately unavailable. Due to its location, dissection and splitting of the muscle fiber along the ballistic track with artery forcep may risk dislodging it and pushing it deeper. Carotid sheath lies just deep to it. We advance rigid 0 degree 4 mm endoscope slowly into the ballistic track prior to dissection with artery forcep. Using this method, we were able minimize false-track dissection and visualize an enlarged image on the screen ahead of the artery forcep. This manner led us to the small foreign body fragment tugged in between the SCM muscle fibers just superficial to carotid sheath. We could have missed this fragment and push it deeper and cause more damage if we were to explore the track with just artery forcep and direct vision. The other benefit is no unnecessary radiation exposure to patient, surgeons and nurses from the fluoroscopy in image intensifiers.



**Fig. 2.** a: Foreign body embedded in the fibers of sternocleidomastoid muscle visualized with rigid endoscope. b: The removed foreign body.

## Conclusion

Penetrated embedded neck foreign body especially due to ballistic trauma can have potentially fatal outcome. Locating and removal of it can be technically challenging. Rigid endoscopes can serve as a useful and feasible option.

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## References

- [1] R. Vishwakarma, S.T. Joseph, A. Sharma, R. Gupta, Endoscopic removal of sharp foreign bodies in neck using image intensified television, *Int. J. Head Neck Surg.* 1 (2010) 113–116.
- [2] J. Mathai, S. Ahmed, K.P. Pushpakumari, A.M. Reynolds, Removal of a metallic foreign body in the neck with a magnet: a case report, *Indian J. Otolaryngol. Head Neck Surg.* 59 (2007) 382–383.
- [3] A.M. Shiroff, S.C. Gale, N.D. Martin, et al., Penetrating neck trauma: a review of management strategies and discussion of the 'No Zone' approach, *Am. Surg.* 79 (2013) 23–29.
- [4] J.C. Irish, R. Hekkenberg, P.J. Gullane, et al., Penetrating and blunt neck: 10-year review of a Canadian experience, *Can. J. Surg.* 40 (1997) 33–38.