

Endoscopic Removal of Sharp Foreign Bodies in Neck Using Image Intensified Television

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Abstract

Foreign body impaction in the neck poses life-threatening problems when it is deep and close to vital structures. We report two cases of sharp metallic foreign body impaction in the neck – one of them in the prevertebral space and the other in the intervertebral disk space. A neck exploration and surgical removal of these foreign bodies, as is usually practised in most centers, would have been life-threatening and associated with high morbidity. We removed these foreign bodies using rigid endoscope under image intensified television (IITV) guidance. The patients could be discharged the same day. We suggest that endoscopic removal under IITV fluoroscopy system should be the method of choice in the removal of foreign bodies located in these sites. We also propose a classification of neck into vertical segments which would be useful in the management decision of these cases.

Keywords: Foreign body neck, image intensified television, intervertebral disk space, endoscopic removal of foreign body, industrial injury.

INTRODUCTION

Penetrating neck injuries are present in 5 to 10% of all trauma cases.¹ The overall mortality of penetrating neck injuries in the three different anatomical areas is at the rate of 9 percent.² A sharp foreign body in the neck poses diagnostic and therapeutic challenges when it has penetrated deep with a chance of migration. We report two cases of sharp metallic foreign body impaction in the neck—one of them in the prevertebral space and the other in the intervertebral disk space. Surgical neck exploration for removal of these foreign bodies, as practised in most centers, would have been life threatening with high morbidity and a prolonged recovery period. These metallic foreign bodies were removed at our center using rigid endoscope under guidance of image intensified television (IITV) fluoroscopy system. The patients could be discharged the same day without any major problems.

CASE REPORTS

Case 1

A 21-year-old factory worker was brought to our center with history of accidental impaction of a sharp flying

fragment of metal while at work. He had a history of blood coming in sputum and pain on speaking. Patient had a strained voice. Rapid primary survey and resuscitation was undertaken. The patient was alert and conscious, his airway was not compromised and his breathing was adequate. There was no evidence of cervical spine injury. The pulse rate was 120/minute, BP was 140/80 mm Hg, respiratory rate was 24/minute and the oxygen saturation was 98% on room air. There was a 1 cm long wound on the anterior aspect of neck at the level of thyroid cartilage showing the site of entry of the metal. Indirect laryngoscopy showed congestion of right vocal cord. Both vocal cords were mobile and there was no surgical emphysema of neck. We did an X-ray neck of the patient which showed the radiopaque foreign body in the prevertebral shadow at the level of C5. The patient was taken for foreign body removal under general anesthesia, intubated and standard techniques for anesthesia was used. Image intensified television fluoroscopy system was used to precisely localize the foreign body preoperatively. Congestion of mucosa was noted at the site of entry of foreign body on the posterior pharyngeal wall. The wound



Fig. 1: Clinical photograph of the patient showing the entry wound in the mid vertical segment of the neck



Fig. 2: Preoperative X-ray neck showing radiopaque foreign body in the prevertebral space



Fig. 3: Endoscopic removal of the foreign body using the image intensified television fluoroscopy system



Fig. 4: Sharp metallic foreign body after removal



Fig. 5: Postoperative X-ray of the patient after foreign body removal

was widened a little and the foreign body was removed using direct laryngoscope and forceps. The pharyngeal wall mucosa was sutured using 4-0 vicryl and a Ryle's tube was inserted for feeding. The patient was discharged on the same day and followed up after 5 days for removal of Ryle's tube. The patient had recovered and was fully fit for job by then (Figs 1 to 5).

Case 2

A 24-year-old male with a known history of psychiatric illness was referred to our institution with history of neck pain and odynophagia of two days duration. His relatives informed that he has a history of swallowing metallic objects. Clinical examination revealed nothing significant apart from congestion of pharyngeal mucosa. A plain X-ray of neck



Fig. 6: Preoperative X-ray showing sharp metallic foreign body in the inter vertebral disk space (case 2)



Fig. 7: Postoperative photograph of the patient

showed a sharp metallic foreign body, needle, at the level of C2 and C3, impacted in the intervertebral disk space. The patient was taken for foreign body removal under general anesthesia, intubated and standard techniques for anesthesia was used. Image intensified television fluoroscopy system was used to precisely localize the foreign body peroperatively. Congestion of mucosa was noted at the site of entry of foreign body on the posterior pharyngeal wall, the wound widened a little and the foreign body was removed using direct laryngoscope and forceps. The patient was discharged the same day (Figs 6 and 7).

DISCUSSION

All penetrating neck wounds are potentially dangerous and require emergency treatment because of the presence of vital structures in the neck, which can be divided into the following four groups¹: (i) the air passages: trachea, larynx, lungs; (ii) vascular structures: carotid, jugular, subclavian, innominate and aortic arch vessels; (iii) gastrointestinal structures: pharynx and esophagus and (iv) neurological structures: cranial nerves, peripheral nerves, brachial plexus and spinal cord. Objects penetrating through the neck could damage any of these structures. An open surgical approach in cases of sharp metallic foreign bodies impacted deep in the neck is often difficult due to the small size of the foreign body preventing easy localization. This can be life threatening with high morbidity due to the extensive dissection required and the proximity to vital structures. Also there is increased morbidity, risk of infection and prolonged recovery period. The use of endoscope for removal of such foreign bodies has problems of localization of foreign body and technical difficulties. The use of IITV, as in these cases, is very helpful in the precise localization of such foreign bodies.

A patient presenting with foreign body in the neck should be first assessed for the presence of any injury to airway and vascular structures. These are usually evident from the clinical examination. Assessment of the site and size of the foreign body is very important in deciding the approach for removal of the foreign body. Neck has been divided into three zones based on the level of injury by some authors.^{1,3} This includes zone I (below the level of cricoid cartilage), zone II (the area between the cricoid cartilage and angle of the mandible), zone III (area above the level of angle of mandible).^{4,5} Of these, injuries to anatomic zone II are the most frequently occurring, representing about 42% of neck injuries.⁶ This zone contains the internal and external carotid arteries, jugular veins, pharynx, larynx, esophagus, recurrent laryngeal nerve, spinal cord, trachea, thyroid and parathyroid. Studies have shown that there is no significant difference between clinical examination and angiography for detection of vascular injury in zone II penetrating neck injuries. It is also seen that findings on physical examination are good predictors of arterial injury in patients with penetrating neck wounds and can exclude injury in over 99% of patients.⁷ Exploration of neck is considered mandatory by many surgeons but a selective approach is considered appropriate by others considering the morbidity

and mortality associated with surgical exploration.⁸ Zone II is a large area and we, in our experience, found that this classification is not adequate in all cases while deciding the approach for removal of foreign body. For management purpose we have classified neck into three vertical segments: a mid segment and two lateral segments (Fig. 1). The structures in the mid segment are the airway up to the trachea and the area posterior to it which includes the posterior pharyngeal wall, upper cervical portion of esophagus, retropharyngeal space and the corresponding intervertebral disk area. The area on either side of this segment are classified as right and left lateral segments. Foreign bodies confined to the mid segment can be removed endoscopically under guidance of IITV fluoroscopy system. Foreign bodies in the lateral segments require an open approach for removal. The size of the foreign body should be assessed radiologically. An experienced team of otolaryngologists, anesthetists and support staff is a must for the endoscopic removal of the foreign body with the help of IITV. Post-operatively Ryle's tube feeding is advisable if the size of the wound on the posterior pharyngeal wall is more than 5 mm or the wound is unhealthy.

In trained hands the use of rigid endoscope for removal of penetrating foreign bodies in the neck under IITV guidance is safe, successful and fast, requires less hospital stay and associated with minimal morbidity. The patient can be discharged the same day. The procedure is cost-effective as the number of working days lost is much less. Our experience suggests that this should be the method of choice in the removal of such foreign bodies.

CONCLUSION

Foreign bodies of neck are dangerous due to risk of injury to the vital structures. An open surgical approach in cases of sharp metallic foreign bodies impacted deep in the neck can be life-threatening with high morbidity due to the

extensive dissection required and the proximity to vital structures. The use of IITV is very helpful in the precise localization of such foreign bodies. In trained hands the use of rigid endoscope under IITV guidance is safe, successful, requires less time and hospital stay and associated with minimal morbidity. The patient can be discharged the same day. The procedure is cost-effective as the number of working days lost is much less. An experienced team of otolaryngologists, anesthetists and support staff is essential for these cases. Our experience suggests that this should be the method of choice in the removal of such foreign bodies.

Classification of neck into horizontal segments is inadequate in deciding the surgical approach to removal of penetrating foreign bodies. Classification of neck into vertical segments as proposed in this article is useful in the management decision of these cases.

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