

Injury with a Metal Cutting Wheel Involving Three Anatomical Regions of the Neck

ABSTRACT

Penetrating head and neck injuries are rare but life-threatening injuries. These injuries are classified into 3 regions in the neck. Injuries involving all 3 regions are almost absent in the literature. Appropriate personal protective equipment must be used to protect from such injuries. In this case report, a case remarkable for a foreign body causing injury is presented.

Keywords: Foreign bodies, neck injuries, trauma, arteries, parotid gland

INTRODUCTION

Foreign body (FB) traumas to the head and neck region can be iatrogenic or traumatic.¹ Penetrating neck injuries are presented in 5%-10% of all trauma cases.² Traumatic neck injuries are mostly caused by objects such as bullets, pieces of metal, wood, and knives. Anatomically, penetrating injuries to the neck are classified as 3 groups, including zones I, II, and III. Penetrating injuries to the second region are the most common.³ Injuries can lead to severe clinical conditions by causing damage to the main arteries, veins, and nerves, salivary glands, thyroid gland, and laryngeal structures in the head and neck region. Depending on the injured organs and structures, different clinical situations may occur, and these injuries can be life-threatening.



Figure 1. Blue arrow indicates the FB that caused the penetrating injury to the neck. The FB pushes the skin posteriorly, making it look curved. FB, foreign body.

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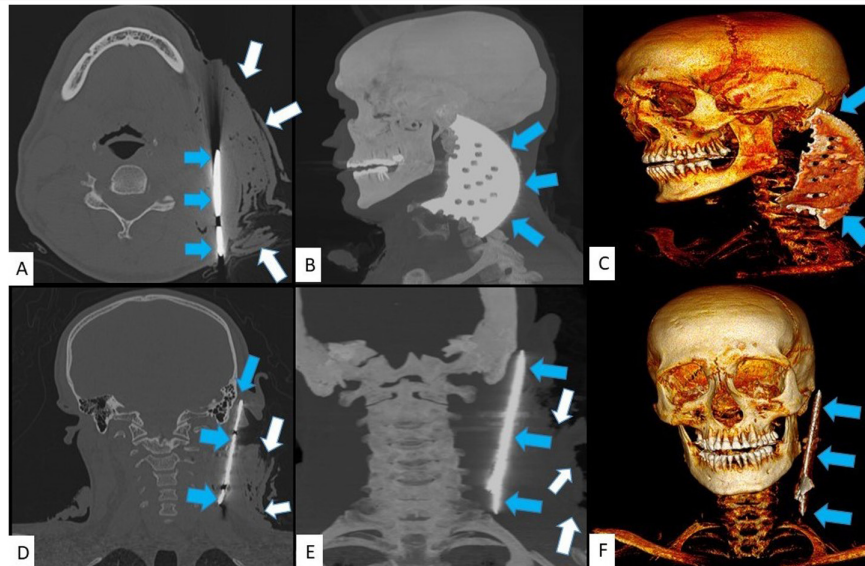


Figure 2. For the brain and cervical region; non-contrast axial (A) and coronal (D), sagittal (B) and coronal (E) reconstructions obtained by maximum intensity projection (MIP) reconstruction. In 3D sagittal (C) and coronal (F) images; view of the cutting wheel in the left half of the neck (blue arrows). It passed through the superficial lobe of the parotid gland and the sternocleidomastoid muscle, extended to level 5 of the neck and settled in the perivertebral space. It was a sickle-shaped structure with sharply pointed ends in the anterior, markedly hyperdense, terminating most distally at the level of C7. The compression dressings placed to stop bleeding are observed around the FB (white arrows).

In this study, we present a case of penetrating injury with a metal FB involving all 3 anatomical regions of the neck.

CASE PRESENTATION

A 32-year-old male patient applied to the emergency service after a piece of iron detached from a machine and got stuck in the left side of his neck while he was working with a cutting wheel machine. The patient's vitals were stable, and he was conscious. The patient's history was unremarkable, except that he smoked 17 packs/year. In the physical examination performed in the emergency service, an incision line with irregular edges, passing over the mandible corpus and extending to the inferior of the auricle, was observed. In addition, a metal FB was detected hidden between the neck fascias, passing through the described incision line (Figure 1). The patient's cranial nerve examinations were intact. The patient did not have gross hemorrhage and had subcutaneous bleeding in the form of leakage. The patient's complete blood count (Hgb:13.6) was normal. Computed tomography of the neck was taken to evaluate the relationship of the

FB to the surrounding tissues (Figure 2). The patient, who had no injury to major vascular structures, was immediately taken for operation with tetanus prophylaxis.

A semicircular metal FB with a diameter of about 15 cm was embedded in the sternocleidomastoid muscle, injuring it obliquely. In order to remove the metal FB, the irregularly circumscribed incision edges were slightly enlarged, and the FB was removed (Figure 3). In the examination performed after the FB was removed, bleeding from the facial and occipital arteries was observed, and these vessels were ligated. Apart from

MAIN POINTS

- Penetrating neck injuries are important injuries due to the vital structures passing through the neck.
- In such injuries, the patient should be evaluated urgently, and life-saving treatment should be started.
- Otolaryngologists should assimilate the approach to other foreign bodies other than classical foreign bodies (bullet, knife, etc.) that can cause penetrating neck injury.



Figure 3. View of the cutting disc wheel after removal from the left neck region.



Figure 4. Image of the patient after incision lines were closed.

this, the masseter muscle was injured, while the submandibular gland remained intact, and only minimal damage was noted to the superficial lobe of the parotid gland. There was no injury to the facial nerve branches, and bleeding points were in the form of leakage in the posterior cervical triangle. After the bleeding points with leakage were taken under control, a hemovac drain was inserted, and the subcutaneous tissues and skin were closed in accordance with anatomical plans as much as possible (Figure 4).

Antibiotic therapy was started in the postoperative period (ceftriaxone sodium, 2×1 g, intravenously). In the postoperative period, the patient's cranial nerve examinations remained intact, and the hemovac drain was removed on the 5th day. Two days after the drain was removed, there was slight swelling in the parotid region, and saliva flow was observed when puncture was performed with an injector. Consequently, a Penrose drain was inserted into the parotid lodge, and a pressure dressing was applied. The Penrose drain was removed 3 days later, and the patient, who was followed up with a pressure dressing for 3 more days, was discharged without any problem. The patient was subsequently followed up without any complaints in the third postoperative month. A written informed consent form was obtained from the patient for this case report.

DISCUSSION

Anatomically, penetrating injuries to the neck are classified as involving 3 regions. Zone I is the horizontal area, including the thoracic outlet structures, between the clavicle, the suprasternal notch, and the cricoid cartilage level. The proximal carotid, vertebral artery, subclavian artery, trachea, esophagus, thoracic duct, and thymus are located in zone I. Zone II is the area between the cricoid cartilage and the angle of the mandible. It includes the internal and external carotid arteries, jugular veins, pharynx, larynx, esophagus, thyroid, recurrent laryngeal nerve, spinal cord, trachea, and parathyroid glands. Zone III is the area

between the angle of the mandible and the base of the skull. It includes the distal extracranial carotid and vertebral artery.⁴ Penetrating injuries are most common in zone II (60%-75%).³ Penetrating injuries involving all 3 regions are rarely observed in the literature. In our case, the FB penetrating the neck caused injury to all 3 regions. Our case is noteworthy as the object came from a large cutting wheel, unlike more common FBs such as knives and bullets.

Physical examination performed at the first attendance of the patient is important to determine which complex neck structures are affected or which ones are damaged. Damage to laryngeal-tracheal, esophageal-pharyngeal, carotid artery, jugular vein, spinal cord, brachial plexus, and cranial nerves should be evaluated in detail.⁵ In our case, the safety of the patient's airway was evaluated first. Since oxygen saturation was normal and there was no larynx-tracheal injury, there was no indication of tracheotomy or intubation. Then, after the patient's vitals were stable, neck computed tomography was taken to determine the relationship of the FB with the surrounding anatomical structures. After evaluating the position of the FB in the neck, the patient was taken for surgery to remove the FB.

In our case, the injury in zone III caused superficial injury to the parotid gland. The facial artery was damaged adjacent to the parotid gland. Injuries involving the parotid gland may also lead to complications such as sialoceles, cutaneous fistulas, and facial paralysis.⁶ However, none of these complications were observed in our case except sialocele. Complications such as sialocele, salivary fistula, and infection may occur within a few days to a few weeks after the event. Sialocele is the accumulation of saliva in subcutaneous tissue, and a fistula may develop as a result of this accumulation.^{6,7} In our case, after the removal of the Hemovac drain placed in the parotid lodge, a Penrose drain was placed in the same area due to the development of sialocele, and the patient was followed up with a pressure dressing. In our case, a salivary fistula did not develop. In the current case, we planned antisialagogue drugs, the use of botulinum toxin, tympanic neurectomy, parotidectomy, or combinations of these treatments in case of fistula development.⁸⁻¹⁰

In conclusion, the approach to penetrating neck injuries should prioritize airway safety, then hemostasis should be ensured, and detailed evaluations of the main artery, vein, and cranial nerve in the head and neck should be performed. Computed tomography is a logical option to determine the location of the FB and its relationship to the surrounding structures. After the FB is removed, organ, vessel, and nerve repair, if required, should be performed in the same session. We also believe that primary prevention is the most important factor in preventing such injuries. Therefore, individuals engaged in hazardous work must use personal protective equipment.

Informed Consent: Written informed consent was obtained from the patient who agreed to take part in the study.

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