

Penetrating Injury to the Neck Which was Caused by a Heavy Knife: A Case Report

JAYANTA BAIN, MANOJ BHARGAVA, PUSHPENDRA SHUKLA, ATUL KUMAR SINGH

ABSTRACT

A neck injury that extends deep into the platysma is called a penetrating injury of the neck. It is a diagnostic and a therapeutic challenge to the treating surgeon, because a number of important structures are densely packed in a small area, and the injury to any of these structures may immediately cause a life threatening situation. We are describing an interesting case, where a 40-year old woman presented with a penetrating neck injury which was caused by a heavy knife, which ran transversely from the left to the right side of the neck at zone-I. On presentation, she

was found to have stable vitals and no active bleeding from the wounds; but, right ulnar nerve monoplagia was found on examination. Bilateral exploration of the neck was done. The knife passed between the trachea and the oesophagus from the left side to reach up to the right supraclavicular fossa and it rested over the brachial plexus. The weapon was retrieved under direct vision. Surprisingly, there were no injuries to any vital structures of the neck. The patient made an uneventful recovery.

Key Words: Bilateral exploration, Brachial plexus, Ulnar nerve monoplagia, Zone-I

INTRODUCTION

Penetrating neck injuries represent approximately 5%-10% of all the trauma cases [1]. Mostly they are from fire arm or stab injuries. Though the course of the stab wounds may be more limited than that of gunshot wounds, in the neck, number of vital structures are densely packed and so a stab injury can still have a clear potential to cause one or multiple major structural damages. The management should start with the Advanced Trauma Life Support (ATLS) protocol. Necessary investigations along with prompt medical and surgical therapies would minimize the morbidity and the mortality which are associated with such injuries.

CASE REPORT

A 40-year-old female presented with a history of being stabbed in the neck 3 hours back. She was conscious and oriented; her pulse rate was 96/minute with a BP of 106/66 mm of Hg. 2 stab wounds were seen in Zone I of her neck. The 1st wound which was of size 3x2cm, was present over the anterior aspect of the left side of the neck, just lateral to the cricoid cartilage and the knife had penetrated through this wound. 2nd wound was of size 3x3cm was seen over the right side of the neck, just lateral to the cricoid cartilage. There was a 4x4cm hard swelling in the right supraclavicular area, but it did not expand in size or pulsate [Table/Fig-1]. She complained of severe pain in the neck during any neck movement and during talking or swallowing. The pulsation of the carotid, superficial temporal, brachial and the radial arteries was intact and it was symmetrical bilaterally. On neurological examination, right ulnar nerve monoplagia was noted. The expansion of the chest and the bilateral air entry in the chest were normal. No oronasopharyngeal bleeding, no active bleeding from the wound, no expanding haematoma and no subcutaneous emphysema were seen.

The patient was started on intravenous fluids and was given antibiotics, and tetanus prophylaxis. A blood specimen was collected for haemogram, blood grouping and blood chemistry

studies. The cervical anteroposterior and lateral radiography showed a pointed foreign object which penetrated from the left side of the neck at the C4/C5 level, which directed medially and downwards; crossed the midline; and reached up to midclavicular line in the right supra-clavicular fossa. A tracheal deviation towards the right side was also seen [Table/Fig-2].

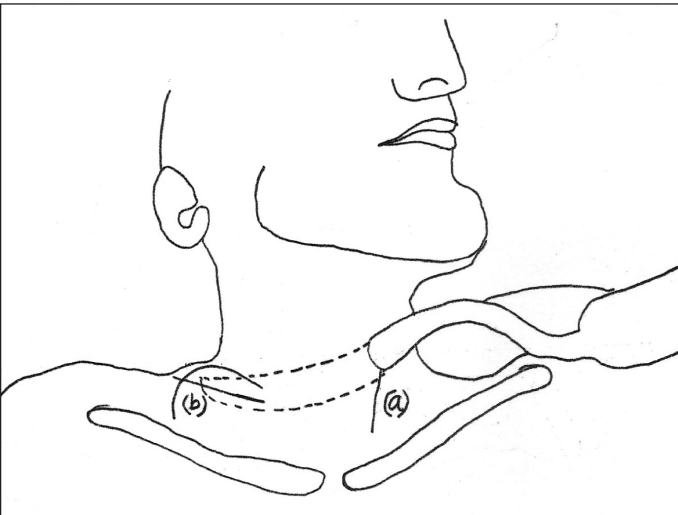
Exploration of the neck was done under general anaesthesia with endotracheal intubation. An oblique incision was made by extending the left sided entry wound downwards along the medial border of the left sternocleidomastoid muscle, up to the clavicle. On sharp and blunt dissection, the knife was found to be passing between the trachea and the esophagus. The right side of the neck was then explored with an oblique supra clavicular incision which was made directly over the swelling [Table/Fig-3]. On dissection, the weapon was found to pass below the right sternocleidomastoid and the curved tip was found to point towards the swelling. The weapon was then gently dislodged and retrieved under direct vision. After the removal of the weapon, there was no active bleeding



[Table/Fig-1]: Patient on presentation, through the first wound the knife is penetrating in the neck, second wound seen over right side of neck. Note a swelling in the right supraclavicular area.



[Table/Fig-2]: Cervical radiograph showing, a pointed foreign object penetrating the neck at C4/C5, crossing the midline to reach up to right supra-clavicular fossa. Note tracheal deviation towards right side.



[Table/Fig-3]: On the left side the entry wound is extended downwards (a) along with the medial border of left sternocleidomastoid muscle and on the right side an oblique supraclavicular incision (b) was placed directly over the swelling.

and all the major structures on either side of it were found to be uninjured [Table/Fig-4]. The brachial plexus was also found to be uninjured. Both the right and the left sided wounds were thoroughly cleaned and closed in 2 layers over a Penrose drain. Intra-operative laryngoscopy, bronchoscopy and oesophagoscopy were done by using a rigid endoscope. revealed normal findings.

Post-operatively, the patient was continued on IV fluids, intravenous antibiotics and analgesics. The drain was removed on the third postoperative day. The patient had an uneventful recovery and there was no residual neuroplagia.

DISCUSSION

The management of a penetrating neck injury should start with the Advanced Trauma Life Support (ATLS) protocol. After the stabilization of the patients' condition, the workup should proceed in a timely manner. An immediate exploration is warned against, in the presence of an active bleeding with signs and symptoms of shock, or an expanding haematoma [2]. Probing or local exploration of the neck to remove the foreign body should not be attempted in the emergency department, because the injuries in the major vessels may be tamponated by foreign bodies or a clot. Therefore, the blind removal of the objects may dislodge the clot and may initiate a life threatening haemorrhage [3]. In stable patients, preliminary laboratory tests like evaluation of haemoglobin and the haematocrit level to determine the degree of blood loss, that of the glucose and electrolyte levels and toxicologic screening



[Table/Fig-4]: Left sided entry wound after removal of the knife

are also carried out. A chest and neck radiograph is very useful to evaluate the position of the foreign body; any vertebral injury; and free air in the prevertebral or the deep neck spaces, which are suggestive of an aerodigestive tract injury.

For analyzing wounds based on their craniocaudal locations, the neck is divided into 3 zones by using anatomic landmarks [4]. Zone-I is the horizontal area between the clavicle/suprasternal notch and the cricoid cartilage; Zone-II is the area between the cricoid cartilage and the angle of the mandible; Zone-III is the area between the angle of the mandible and the base of the skull. Each zone has a group of vital structures that can be injured and this zonal division may determine the kind of trauma management which has to be given.

In our case, there was no clinical sign of any vascular injury and the X-ray findings were not suggestive of any injury to the aerodigestive tract. So we decided to explore the neck without any further delay. We explored the neck bilaterally, because firstly, on its long path, the knife had a clear potential to injure many structures; secondly, to confirm the nature of the swelling whether it was a haematoma or the projected tip of the knife or anything else; and lastly, to find out the cause of ulnar nerve monoplagia. On the left side, we followed the standard neck incision which was parallel to the medial border of the sternocleidomastoid muscle and on the right side, an oblique supraclavicular incision was made, because it could provide a good exposure and vascular control at the root of the neck [5]. On dissection, the swelling was found to be the projected tip of the knife and not a haematoma and the brachial plexus was also found to be uninjured. The cause of the ulnar monoplagia was probably the local compression and the inflammation which were caused by the knife.

If an aerodigestive tract injury is suspected clinically before the neck exploration or if it is found during the exploration, intraoperative triple endoscopy (laryngoscopy, bronchoscopy, and oesophagoscopy) should be performed, because the early diagnosis and the management of the oesophageal injuries decreases the chances of devastating complications like mediastinitis [6]. So, with a high suspicion of aerodigestive tract injury, we performed an endoscopy and the findings were normal.

Postoperatively, the patients are monitored closely in intensive care units with serial examinations to identify any missed injuries. Parenteral broad-spectrum antibiotics are the standard treatment and if no evidence of leak is present, drains and feeding tubes are discontinued and oral feeding is started.

CONCLUSION

To conclude, in a penetrating neck injury, where a large sharp foreign body enters the neck from one side and points on the opposite supraclavicular fossa, bilateral exploration of the neck should be done without further delay, because it gives the best opportunity to assess the whole injury tract visually and to manage such injuries properly.

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