

Management of twenty patients with neck trauma in Khartoum ENT Hospital Nagat Abdalla Elawad*

Abstract:

Background: Neck trauma is a great surgical challenge, because there are multi organ and systems involved.

Objective: To study the clinical presentation, management and outcome of twenty patients presented to Khartoum ENT Hospital with neck trauma.

Methods: This is a prospective study conducted in Khartoum ENT Hospital, Sudan during the period 1998- 2008. A total number of 20 patients presented to our unit with neck trauma were included in the study. All patients were admitted to the hospital, assessed and managed according to the magnitude of trauma.

Results: The age varied from 5 to 40years, with mean age (\pm SD) 28 years (\pm 9). Male to female ratio was 2:1. Most of the patients presented to the Hospital between 1-6 hours after trauma. The mechanism of neck trauma was blunt trauma in 16(80%) patients and penetrating wound in 4(20%) patients. The distribution of injuries in neck zones were 17(85%) patients in zone II, 2(10%) patients in zone III and one patient in zone I. Tracheal injury and pharyngeal injury were seen in 4(20%) patients each, laryngeal injury in 5(25%) patients, and salivary gland injury in 1(5%) patient.

Surgical exploration and tracheostomy were done in 4(20%) patients. tracheostomy alone was performed in 7(35%) patients with blunt trauma. Conservative management without surgical intervention was done in 9(45%) patients. The common complications in this study were vocal cord paralysis and subglottic stenosis in 2(10%) patients each, while surgical emphysema and haemothorax was seen in one patient.

Conclusion: Zone II injuries were the commonest injuries. Early presentation and proper management of patients with neck trauma carry good prognosis.

Key words: neck trauma, clinical presentation, management.

In neck trauma, upper aero-digestive organs and the neck vessels are at risk; with consequent airway obstruction and hemorrhage which are the most immediate risks to life¹. A clear understanding of the anatomic relationships within the neck and the mechanisms of injury is important for diagnosis and treatment. For clinical purposes, the neck is divided into three zones.

Zone I: is demarcated by the thoracic inlet inferiorly and the cricoids cartilage superiorly.

The structures which are at risk in this zone are the great vessels trachea, esophagus, lung apices, cervical spine, spinal cord, and cervical nerve roots.

Zone II: from the cricoids cartilage to the angle of the mandible. Important structures in this region include the carotid and vertebral arteries, jugular veins, pharynx, larynx, trachea, esophagus, cervical spine and spinal cord. Zone II injuries are likely to be the most apparent on inspection. Most carotid artery injuries are associated with zone II injuries.

Zone III: is bounded by the angle of the mandible and the base of the skull. The salivary glands, vertebral bodies, carotid arteries, jugular veins, and major nerves (including cranial nerves IX-XII)

* Dr. Nagat Abdalla Elawad, Assistant professor, Department of Otolaryngology, Faculty of medicine, University of Khartoum, Sudan.
E. mail: nagatelawad@yahoo.com

traverse this zone. Injuries in zone III may prove difficult to surgical access^{1,2}.

Patients and methods:

Twenty patients presented to the casualty of Khartoum ENT Hospital with history of neck trauma. The study was approved by Khartoum ENT hospital Ethics committees. All patients were admitted to the hospital and Informed consent was taken from them. The initial assessment consists of determining airway patency and adequacy of circulation. The neck was systemically examined, looking for damage to vital contents.

Following resuscitation, routine investigations such as CBC, electrolytes, chemistry levels, blood grouping and cross matching were ordered. Imaging studies requested included cervical, chest radiography and CT scan and MRI according to the pattern of trauma. Endoscopic examination as laryngoscopy, bronchoscopy, pharyngoscopy, and esophagoscopy was performed for the assessment of the aero digestive tract. Tracheostomy when indicated was immediately done to secure the airway. Chest tube was inserted in one patient with haemothorax and removed within seven days. Surgical exploration was done in four patients with penetrating trauma presenting with signs and symptoms of shock and continuous haemorrhage from the neck wound. Under general anesthesia the wound was inspected, injured structures were identified, bleeding was secured and the mucosa was closed with continuous suture after inserting a nasogastric tube (NGT). Pharyngeal, laryngeal and tracheal injuries were repaired. The submandibular salivary gland was removed in one patient; the skin was closed by interrupted sutures after wound drainage and the drain was removed 48 hours later. Postoperative antibiotics and analgesics were given. The postoperative recovery was uneventful. Stitches and nasogastric tubes (NGTs) were removed after seven and 10 days respectively. Removal of NGTs was preceded by thin barium swallow. All patients were discharged in good health within two weeks, after removal of the tracheostomy tube. Patients with blunt neck trauma were

admitted for observation and discharged from the hospital after 3-5 days. Regular follow up was done for any post traumatic complications.

Results:

Twenty patients were admitted with history of neck trauma. Their ages vary between 5 - 40years with a mean (\pm SD) age 28 (\pm 9) years. Male to female ratio was 2:1. Most of the patients presented to the hospital 1- 6 hours after trauma. The mechanism of neck trauma and distribution of injuries in neck zones were shown in Fig 1 and Fig 2 respectively.

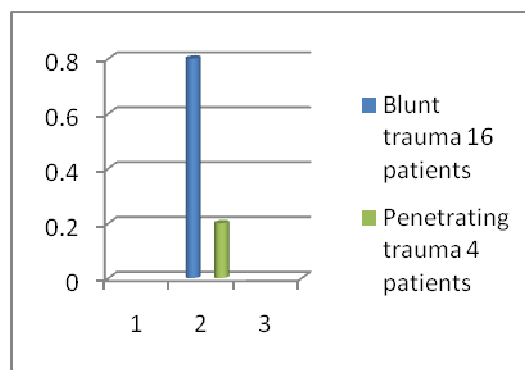


Fig. 1: Mechanism of neck trauma.

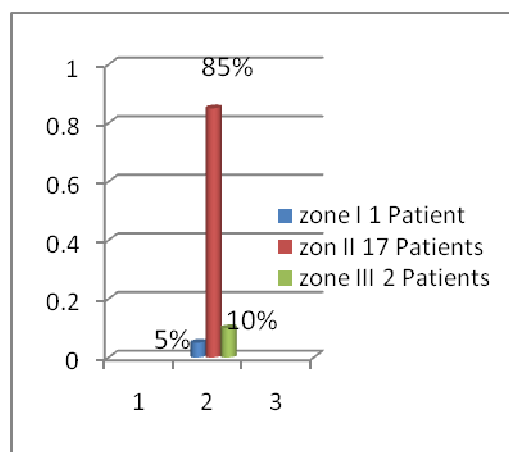


Fig. 2: Sites of neck injuries

Most of blunt trauma in this study was caused by accidents due to national Sudanese dressing such as Toub, Scarves and Imma which are usually wrapped around the neck. Immediate surgical exploration and tracheostomy was done in 4(20%) patients with penetrating trauma. Tracheostomy was done in 7(35%)

patients with blunt trauma presenting with difficulty in breathing and/or neck swelling. No surgical intervention was needed in 9(45%) patients with blunt trauma.

During surgical exploration and endoscopic examination different organs were found to be involved, but no major vascular injuries.

The common complications in this study were seen in Table 1.

Table 1: Complications of neck trauma

Complication	No of patients
Vocal cord paralysis	2 (10%)
Subglottic stenosis	2 (10%)
Surgical emphysema	1 (05%)
Haemothorax	1 (05%)

Discussion:

Neck injury is caused by penetrating and blunt trauma. Penetrating neck wounds represent approximately 5-10% of all trauma cases that present to the emergency departments³. In contrast in this study penetrating neck wounds represented about 20% of cases presenting to the emergency department.

More than 95% of penetrating neck wounds result from gunshot wounds and sharp knives, and less than 5% is the result of motor vehicle accidents, household injuries, industrial accidents and sporting event^{2, 4-7}. However, all penetrating injuries in our study resulted from sharp knives.

It was reported that neck injury is not considered penetrated unless it has penetrated the platysma muscle layer^{1,2}. All penetrating injuries penetrated the platysma muscle in our study.

In a previous study, patients with gunshot wounds (GSW) sustain greater injury than those with stab wounds, as bullets penetrate deeper and cause cavitations, thus damaging structures lying outside

the tract of the missile⁸. Moreover high-velocity bullet wounds (>2000-2500 ft/s) tend to follow a direct and predictable pathway, while low-velocity bullets travel a more erratic pathway. In this study we have no gunshot penetrating wounds.

Vascular injuries of the neck and thoracic inlet were studied by many authors⁹. The later noticed that most of the vascular injuries arising from penetrating wounds resulted in partial or complete transection of the vessels, induced formation of arteriovenous fistulae, or pseudo aneurysms. Moreover, injury to blood vessels can also result from external compression or mural contusion⁹. Nevertheless, in our study no major vascular injuries were encountered.

Most of blunt traumatic neck injuries can be managed conservatively^{1, 2}. However, in our study emergency tracheostomy was needed in seven patients with blunt trauma presented with difficulty in breathing due to massive cervical swelling but no surgical intervention was needed in the remaining nine patients with blunt neck trauma.

The gold standard care for patients presenting with signs and symptoms of shock and continuous haemorrhage from neck wounds is surgical exploration. The type of incision depends on the neck zone and the structures at risk. However, the following specific sites should be sought and treated during neck exploration, carotid artery and vertebral artery injuries, jugular vein injury, laryngotracheal injuries, esophageal injuries, nerve injuries, thoracic duct injuries and thyroid injuries.^{1, 10, 11, 13} In this study, tracheal and pharyngeal injuries amount to a 20%, laryngeal injuries to 25% and salivary gland injury was seen in 5% of patients. These viscera are located in zone II where most of injuries are encountered in our study.

Laryngotracheal injuries are not uncommon and amount up to 10% of cases of penetrating neck trauma.

Tracheal injuries can be repaired primarily by one layer of sutures. On the other hand interposition of adjacent omohyoid or sternocleidomastoid muscles should be performed when esophageal repair is needed in order to prevent fistula formation. In severe laryngotracheal injuries, tracheostomy is usually indicated. Its performance through the site of surgical repair should be avoided and soft intralaryngeal stent is inserted in extensive disruption of the cartilaginous support of the larynx^{11,13}.

Blunt trauma to the neck usually results from motor vehicle accidents, but it also occurs in sports-related injuries, strangulation and assaults^{1,12}. However, most of blunt trauma in this study was caused by accidents due to national Sudanese dressing such as Toub, Scarves and Imma which are usually wrapped around the neck.

Conclusions:

In our series males were affected more than females. Zone II injures are the commonest. Sudanese community should be oriented of the danger of our national dressing near motor vehicle or when operating machinery.

Acknowledgement:

I would like to thanks Professor Khalid Shamboul who revised this manuscript.

References:

1. DemetriadesD, Salim A, Brown Cet al. Neck injuries. *CurrProbl Surg.* 2007; 44(1):13-85.
2. Phrampus PE, Walker L. Danger zone. The prehospital assessment and treatment of blunt and penetrating neck trauma. *JEMS* 2002; 27(11):26-38.
3. Mattox K, Feliciano DV, Moore EE. Penetrating and blunt neck trauma. In: *Trauma.* Appleton and Lange; 1999; 4thed :437-450.
4. Mandavia DP, Qualls S, Rokos I. Emergency airway management in penetrating neck injury. *Ann Emerg Med.* 2000; 35(3):221-5.
5. Demetriades D, Asensio JA, Velmahos G. et al. Complex problems in penetrating neck trauma. *SurgClin North Am.* 1996; 76(4):661-83.
6. McConnell DB, Trunkey DD. Management of penetrating trauma to the neck. *Adv Surg.* 1994; 27:97-127.
7. Carducci B, Lowe RA, Dalsey W. Penetrating neck trauma: consensus and controversies. *Ann Emerg Med.* 1986;15 (2):208-15.
8. Kupcha PC, An HS, Cotler JM. Gunshot wounds to the cervical spine. *Spine.* 1990; 15(10):1058-63.
9. Nunez DB, Torres-Leon M, Munera F. Vascular injuries of the neck and thoracic inlet: helical CT-angiographic correlation. *Radiographics.* Jul-2004; 24(4):1087-98.
10. Ngakane H, Muckart DJ, Luvuno FM. Penetrating visceral injuries of the neck: results of a conservative management policy. *Br J Surg.* 1990; 77(8):908-10.
11. Bhojani RA, Rosenbaum DH, Dikmen E. Contemporary assessment of laryngotracheal trauma. *J ThoracCardiovasc Surg.* 2005; 130(2):426-32.
12. Reece GP, Shatney CH. Blunt injuries of the cervical trachea: review of 51 patients. *South Med J.* 1988; 81(12):1542-8.
13. Stassen NA, Hoth JJ, Scott MJ, et al. Laryngotracheal injuries: does injury mechanism matter? *ASurg.* 2004; 70(6):522-5.