

Management of Penetrating Neck Trauma

A R ARSHAD T MAHMOOD M N ASLAM A KAMRAN A ZAMAN M H MAJEED

Department of General Surgery, Allied Hospital, Faisalabad.

Correspondence to Dr. Abdul Rauf Arshad.

A retrospective study of 20 cases of penetrating trauma to neck is presented. Ten patients had zone 1 injury, 8 had zone II injury and 2 had zone 3 injury. All the patients with zone II injuries were explored. There were two negative explorations and one mortality, 8 patients with zone 1 injury were explored having evidence of vascular, visceral or neurological injury on clinical examination. All the patients with Zone III injury were managed conservatively. Larynx was the most commonly injured viscera. Infection was the most common complication. Penetrating neck injuries can be managed selectively. Clinical examination is very reliable in detecting vascular, visceral and neurological injuries if performed repeatedly

Key Words: Neck trauma, penetrating.

The neck is an anatomically complex region that acts as a conduit for multiple structures, including vital components of the vascular, neurological, respiratory and digestive systems. The first case of penetrating neck injury was reported by Ambrose para in the 1 6th century¹. The frequency of serious injury and the diagnostic challenge that neck trauma presents has generated considerable controversy regarding the best diagnostic approach.

Before World War II, the treatment of penetrating wounds of the neck was largely non-operative unless major bleeding or injuries to deeper structures were obvious². Reported mortality was 18% in 188 cases in the Spanish American war and 11 % in 594 cases in world war I³.

In the Word War II the mortality rate fell to 7% probably because of a variety of factors including earlier tracheostomy, more frequent and expedient surgical exploration, antibiotics and improvement in surgical and anaesthetic techniques⁴.

Material and Methods

This is a retrospective study of 20 patients presented in emergency ward of Mayo Hospital Lahore with penetrating neck trauma. Patient having abdominothoracic trauma, maxillofacial injury or blunt trauma neck were excluded from the study. Upon arrival in the emergency all the patients were initially managed with neck stabilization, care of airway, breathing and circulation, i/v access, analgesia and antibiotics. Complete blood count, urinalysis, X ray chest PA views, X ray neck performed where indicated. MRI, CT scan and angiography not performed due to lack of facilities.

All the patients with Zone II injuries were explored. In Zone I and III, the decision of exploration was based only on clinical assessment large size of cervical hematoma, bleeding, presence of shock and hemoperitoneum. Similarly injury to the airway was anticipated from surgical emphysema or hoarseness of voice. The indications of exploration also included increasing tachycardia, hypotension and deterioration of conscious level.

Horizontal neck incision was used routinely except in

cases of vascular injury when longitudinal incisions were added.

Tracheostomy was added in all those patients with laryngotracheal injury as a therapeutic procedure. Laryngotracheal injury was repaired using absorbable vicryl No.0. All the wounds were drained after exploration. Patients remained admitted till the removal of stitches and tracheostomy tube and were followed for at least 3 months after the injury.

Regarding the management of penetrating injuries to the neck, the region has been divided into three zones⁵. *Zone I:* Extends from clavicle to the cricoid cartilage. *Zone II:* Extends from the cricoid cartilage to the angle of the mandible. *Zone III:* Extends from the angle of mandible to the base of skull.

Results

Twenty patients with an age ranging from 15-60 years with the mean age of 32 years were admitted. There was a male to female ratio, of 7:1. The cause of penetrating neck trauma is shown below (Table 1)

Average time of presentation was two hours after the injury. Bleeding from the wound site and surgical emphysema were the commonest presenting symptoms. The distribution of neck injuries is shown in Table 2.

All vascular and visceral injuries occurred in Zone I and II. Mode of treatment is shown below (Table 3)

Table 1.

Cause of injury	No. of patients
Firearm injuries	10
Stab neck	7
Accidents	1
Cut throat	2
Total	20

All the patients with Zone II injuries were explored. Zone I injuries explored where indicated and all the patients with Zone III injuries were managed conservatively.

Various complications occurring are shown in table 4

Discussion

The management of penetrating wounds of the neck

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provides several decision making steps that remain controversial, some recommend that all wounds deep to

Table 2

Zones	No. of patients
Zone I	10
Zone II	8
Zone III	2
Vascular	
Internal jugular vein	3
Common carotid artery	1
Visceral	
Pharynx	2
Larynx	7
Trachea	3
Esophagus	3
Thyroid	2
Cricothyroid/thyrohoid membrane	3
Vagus nerve	2
Cervical cord	1
Thoracic duct	1

Table No. 3.

Mode of treatment	No. of patients	Remarks
Exploration	16	All the Zone II (8) and 8 Zone I injuries
Observed	4	All the Zone III (2) and 2 Zone I injuries

Table 4. shows the complications

Complication	No. of patients
Cellulitis	3
Surgical emphysema	2
Subcutaneous infection	5
Secondary haemorrhage	2
Hematoma	3
Chest infection	4

the platysma should be hospitalized⁶, others advocate that selective neck exploration should be based on a battery of tests to identify the injuries. Proponents of mandatory exploration of neck wounds contend that delays in treatment result in increased mortality rates. Also delays caused by diagnostic testing results in rapid exsanguination of patients who might otherwise have been surgically salvagable. These factors along with the potential for undetected injuries and associated complications including false aneurysm and mediastinitis favor mandatory exploration⁸.

Selective neck exploration has gained popularity in some centers because of lower negative explorations rates associated with this treatment while comparable mortality rates are achieved^{9,10}.

Physical examination is very reliable in picking up vascular injuries but may not be of much help in visceral injuries as the later are often difficult to diagnose^{11,12,13}. We have no facility of arteriography or rigid esophagoscopy in emergency, so we have to rely on our

clinical examination. Angiography is a safe and effective diagnostic and therapeutic modality in hemodynamically stable patients with Zone III injuries where surgical access is often difficult¹⁴.

Most of our patients had Zone I injuries, and second commonest region was Zone II. We explored all the Zone II injuries. Zone I injuries were explored if there was evidence of vascular, visceral or neurological injuries. All the patients with Zone III injuries were managed conservatively. We have one mortality, the patient belonging to Zone II, having internal jugular vein injury. He died immediately after exploration possibly due to air embolism. We have two negative explorations in Zone II injuries, which showed that, even the Zone II injuries can be managed selectively.

Despite the abundant blood supply in the neck region, infection remained quite common and it resulted in secondary hemorrhage from tracheostomy site as well as chest infection, which prolonged the hospital stay of 4 of our patients.

We recommend that selective policy should be adopted in penetrating trauma of neck. Clinical examination is very reliable if performed repeatedly. Wound should be explored if there is evidence of vascular, visceral or neurological injury.

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