Penetrating Neck Injury: Mandatory Exploration Versus Conservative Approach

M H MAJID M AYYAZ F FAHIM
Department of Surgery, Mayo Hospital/King Edward Medical college, Lahore
Correspondence to Dr. Muhammad Hamid Majeed, Senior Registrar Surgery Email: hamidfellow@yahoo.com

This study is designed to investigate the outcome of patients managed on both conservative as well as operative protocols and then compare the two groups for morbidity and mortality. It is a comparative study comparing the groups of patients with operative and non operative intervention done for penetrating neck trauma at Mayo Hospital Lahore for a period of six years from September 1995 to August 2001. All patients of age more than 12 years of age presenting with penetrating cervical trauma in our emergency were included in study. In patients with multiple injuries mortality and morbidity of only cervical trauma was compared. Neck was divided in to three zones according to recognized anatomical landmarks. In conservative group 38.9% developed complications where as in other group 46.4% developed complications .This difference was not significant (p=0.05) Mean hospital stay was 10 days in the conservative group where as 4 days in other group which was statistically significant. Hence we conclude that patients with penetrating neck injuries who are clinically stable can be managed conservatively after appropriate investigations.

Key words: Penetrating neck injury, cervical trauma, conservative management

Trauma remains a leading cause of death, particularly among young adults[1]. In addition, traumatic injuries have a profound impact on society, owing to resultant temporary and permanent disabilities. Neck injuries comprise a significant proportion of the overall trauma[2]. This usually occurs during the course of a personal assault.

Penetrating neck trauma may be managed operatively or no operatively[3], depending on precise anatomic location. Conservative management of these injuries is currently an issue under debate. Controversy exists regarding the optimal approach for treatment of penetrating neck injuries[3,4].

Proponents of operative intervention cite the possibility of a missed injury, with its perceived higher morbidity and mortality. In addition to this the possible delay in treatment may lead to a higher morbidity and mortality like rapid exsanguination leading to loss of salvageable patients[4]. Even with an apparently successful conservative management patient may later develop complications like mediastinitis or false aneurysm.

However mandatory exploration can lead to an increased hospital stay and morbidity in case of a negative exploration. Improvements in diagnostic modalities allowing evaluation of potentially injured structures coupled with better predictive capability due to a larger database and its better analysis make the option for a less aggressive approach viable[5]. This would allow for a more selective approach toward exploration.

Purpose of study

This study is designed to investigate the outcome of patients managed on both conservative as well as operative protocols and then compare the two groups for morbidity and mortality.

Material and methods

This is a series comprising patients admitted to a general surgical unit in a tertiary level teaching hospital for a period of six years from 1st September 1995 to 31st August 2001. Ours is one of the four surgical units receiving all major trauma so our series comprise a quarter of all the cervical trauma patients presenting to the hospital.

All blunt trauma patients were excluded from the study. For all the patients with multiple injuries or with maxillofacial / abdominothoracic trauma who also had cervical trauma, only morbidity and mortality directly attributable to the neck injury was taken into account. Patients under 12 years were excluded from this study.

The neck injuries were classified according to their anatomical location into Zone 1, Zone 2 and Zone 3 [5].

In addition they were also divided into two groups i.e. those superficial to the platysma and those penetrating the platysma.

Upon arrival to the emergency the patients without penetration of platysma were sutured after infiltration of local anaesthesia and subsequently discharged. The rest of the patients were admitted for observation or otherwise. All patients were managed according to the Advanced Trauma Life Support principles of Airway, Breathing and Circulation. Neck stabilization, large bore IV cannulas, analgesia and antibiotics were instituted. Blood grouping

and cross matching were done for all admitted patients. A simultaneous rapid primary survey and later a more detailed secondary survey are also done.

Appropriate investigations were instituted like CBC, Blood Sugar, BUN and Creatinine. Chest X rays and X ray cervical spine AP and lateral views were obtained in all cases and odantoid view in selected cases. For suspected oesophageal injuries, contrast studies using Gastrograffin swallow was done. In a few cases we did IV and oral contrast CT scan where contrast X ray studies were not informative or helpful. We do not have facilities to perform bronchoscopy in emergency. Angiography cannot be done in our emergency setup hence suspected cervical vascular injuries were treated with clinical evaluation and definitive treatment.

All these imaging studies were however performed on clinically stable patients and all hemodynamically unstable patients or those with compromised airway needing a surgical airway are immediately rushed to the theatre for exploration.

The patients were divided into two groups: Group 1 comprised patients who had strong clinical indication for exploration and were immediately explored. These indications being shock unresponsive to fluid resuscitation, worsening consciousness and severe upper airway injury. Group 2 were the patients placed on conservative management which included surveillance of vital signs and other clinical signs of injury. A smaller sub group of these patients had to be explored later as a result of an injury revealed later due to delayed clinical signs and/or investigations.

All patients with laryngotracheal injuries had tracheosotomy done and hence remained admitted until removal of stitches and tracheostomy. A follow up of two years was done and any additional delayed complications were recorded.

The information was collected using a standardized performa which recorded all the relevant data for these patients. The data was then analysed using SPSS and various relevant statistics were generated.

Results

Data was collected on a total of 53 patients. However seven of those patients were lost to follow up and hence were excluded from the study. So the total number of patients included in the study was 46. Group 1 had 28 patients while Group 2 had 18 patients.

The age range of these patients was from 13 years to 71 years with the mean being 24years. Separately the patients in the groups 1 and 2 had mean ages of 21years and 27years (p=0.05, NS=Not Significant).

There was an overwhelming preponderance of male by a ratio of 6.3 to 1. However the younger age group of below 21 years had exclusively male patients.

Mechanisms of injury include firearm injury 22(48%), Stab 11(24%), road traffic accident 5(10.8%), kite string injury 5(10.8%), cutthroat 3(6.5%).

Group 1 and 2 both had a distribution of injury in all the three zones of the neck. Some had posterior neck injuries, which can be classified as a separate zone (2) but that is not widely recognized at present and they are classified under one of the three zones of the neck.

The major presentation was external haemorrhage closely followed by shock in Group 1 and hoarseness in Group 2 (Table 1).

The organs injured included all the varied organs found in the neck with some patients suffering from more than one organs injured concomitantly. (Table 2)

Table 1. Primary presentation

	Group 1	Group 2
External haemorrhage	27	15
Shock (SBP<80mmHg)	11	0
Haematoma	3	2
Thrill &/or bruit	2	0
Hoarseness	7	6
Surgical emphysema	12	2
Wound alone	0	3
Quadriplegia	1	2

Table 2. Injuries

	Group 1		Group 2	
	n=	%age	n=	%age
Trachea/larynx	7	17.1	0	0
Esophagus	1	2.4	2	15.3
Thyroid Cartilage	1	2.4	1	7.7
Cricothyroid Memb.	0	0	3	23
Ext. Jugular V.	4	9.7	0	0
Common Carotid Art.	3	7.3	0	0
Int. Jugular V.	5	12.2	0	0
Vagus N.	0	0	1	7.7
RLN*	0	0	1	7.7
Thyroid Gland	9	21.9	0	0
Cervical Spinal Cord	1	2.4	2	15.3
Cervical Skeleton	10	24.4	3	23

*RLN=Recurrant Laryngeal Nerve

In all the patients with tracheal injuries tracheostomy was done. Of the group that was kept on conservative management, six of the patients had to be operated for various reasons, which include late development of signs of injury to viscera like esophagus, infected hematoma resulting in abscess formation etc. (Table 3: Complications). 13(46.4%) out of a total of 28 patients in group 1 developed early and late complications, while only 7(38.9%) from group 2 developed complications. This difference was not clinically significant (p=0.05).

The mean hospital stay in was 10 days and 4 days in group 1 and group 2 respectively. This was found to be significant.

Table 3. Complications

	Group 1		Group 2	
	n=	%age	n=	%age
Mediastinitis	0	0	1	5.8
Esophageal stenosis	1	3.7	0	0
Chest infection	9	33.3	4	23.6
Hemoptysis	0	0	1	5.8
Cellulitis/wound infection	6	22.2	3	17.6
Tracheolaryngeal stenosis	2	7.4	0	0
Haemorrhage	4	14.8	2	11.8
AV fistula	0	0	1	5.8
Hematoma infection	4	14.8	3	17.6
Chage of voice	1	3.7	2	11.8

Discussion

Neck trauma is a fairly frequent presentation in any traumatology unit. It is most prevalent in the younger age group. This is probably because of the active lifestyle and non observance of safety rules and regulations. The mean age in our group was 24years which is in accordance with the pattern found in the international literaterature[7]. However an overwhelming male preponderance was an unusual feature reflecting the active outdoor occupation of males as opposed to the fact that majority of females remain indoors most of the time.

More than 75% were crimes of violence; reflecting perhaps the increasing trend towards lawlessness in the society at large[8]. Only a minority had accidental causes like a roadside accident or a kite string injury.

Among the patients in the operative group thyroid gland, closely followed by tracheolaryngeal injuries were the most frequent organs injured. This is due to the prominent exposed position of these organs in the neck. Nearly a fourth of the patients had cervical skeletal trauma.

The complication rate in both Group 1 and Group 2 was different and slightly higher in the first group but this did not appear clinically significant. This was coupled with the significantly decreased hospital stay for the conservative group. These findings lead us towards the inference that other things being equal, non operative management of such patients without obvious signs of organ injury and without shock is at least equal or superior to the operative management [9]. Hence pending confirmation by other studies we may give a preliminary conclusion that for stable patients with penetrating neck injuries the choice of management modality may be conservative [10,11].

References

1. Penetrating neck trauma: an overview of management. J Oral Maxillofac Surg 2002 Aug;60(8):918-23
2. Computed tomography in the evaluation of penetrating neck trauma: a preliminary study. Arch Surg 2001 Nov;136(11):1231-5
3. Fools rush in? Airway management in penetrating neck trauma. J Emerg Med 1993 Jul-Aug;11(4):479-80
4. Helical Computed Tomographic Angiography in Penetrating Neck Trauma. Emerg Radiol 1997 Jul-Aug;4(4):200-206
5. Washington Manual
6. Continued experience with physical examination alone for evaluation and management of penetrating zone 2 neck injuries: results of 145 cases. J Vasc Surg 2000 Sep;32(3):483-9
7. Penetrating neck injuries. South Med J 2000 Jun;93(6):567-70
8. ATLS
9. Diagnosis of arterial injuries caused by penetrating trauma to the neck: comparison of helical CT angiography and conventional angiography. Radiology 2000 Aug;216(2):356-62
10. The management of penetrating neck injuries. Int Surg 2001 Apr-Jun;86(2):82-9
11. Penetrating neck injuries: analysis of experience from a Canadian trauma centre. Can J Surg 2001 pr;44(2):122-6