
Gunshot Injuries Of The Chest

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Summary

This is a study of 33 gun-shot injuries of the chest. Average age was 23.5 years. The most frequent causes were accidental and homicidal injuries (42.4% each). Rifle was the most frequently used weapon. Haemothorax occurred in 14 cases and there were 8 thoraco-abdominal injuries. A high percentage of patients (23 cases : 69.7%) were managed by tube thoracostomy alone. Only 2 out of these 23 patients developed empyema which required late thoracostomy. Ten patients needed only local debridement and dressing as they had only soft and superficial tissue injuries. The diaphragmatic injuries in 8 patients were repaired through abdominal approach. No complication or death occurred post-operatively.

Methods and Material

All patients with gun-shot injuries of the chest admitted in the surgical "A" unit of Postgraduate Medical Institute, Lady Reading Hospital, Peshawar during the period extending from 1st September, 1986 to 31 May, 1987, were received in the casualty department by our surgical team consisting of house surgeons & registrar, while senior registrar and other consultants were available if needed.

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After full resuscitation of these patients, they were x-rayed to confirm haemotherax and other injuries. The operations were carried out in the emergency operation theatre under general or local anaesthesia. After recovery of the patient from anaesthesia, they were shifted to the main ward where they stayed until discharge home.

Record was maintained at many levels. The Casualty medical officer registrar was the first level of recording the data. If the patient had filed an F.I.R. with the police, the case was also entered into the medicolegal registrar with more detail of the injuries. On receipt of the patient into the casualty surgical ward, the nurse entered the case in the admission register and the house surgeon took the detailed history and examination. Finally on shifting to the main surgical ward, once again the case was entered into the ward register.

**TABLE-I
AGE INCIDENCE**

Age Group (Years)	No. of Cases	Percentage
0 - 10	2	6.1%
11 - 20	12	36.3%
21 - 30	11	33.3%
31 - 40	5	15.2%
41 - 50	3	9.1%
Total	33	Average: 23.5 years

**TABLE-II
SEX RATIO**

Sex	No. of Cases	Percentage
Male	28	84.8%
Female	5	15.2%
Total	33	

**TABLE-III
TYPE OF INJURY**

Injury	No. of Cases	Percentage
Accidental	14	42.4%
Homicidal	14	42.4%
Suicidal	1	3.1%
Stray bullets	4	12.1%
Total	33	

**TABLE-IV
TYPE OF WEAPON**

Type of Weapon	No. of Cases	Percentage
Rifle	13	39.4%
Hand gun	9	27.3%
Shot gun	3	9.1%
Bomb blast	1	3.0%
Not known	7	21.2%
Total	33	100%

**TABLE-V
HOSPITAL STAY**

Type of Injury	Average	Range
Thoracic Inj. alone	7.6 days	01-52 days
Thoraco-abd.Inj.	15.0 days	01-30 days
Combined	6.7 days	01-52 days

**TABLE-VI
CLINICAL PRESENTATION**

Type of Injury	Stable	Shocked
Thoracic injuries	21	4
Thoraco-abd.injuries	12	6

**TABLE-VII
BLOOD TRANSFUSION**

Blood Transfusion	No. of patients
Zero	13
One pint	10
Two pints	7
Three pints	3
Total	33

**TABLE-VIII
LESIONS**

Type of Lesion	No. of Cases	Percentage
Haemothorax alone	14	42%
Haemo-pneumothorax	1	3%
Diaphragm injury (abd. injury + haemothorax)	8	24%
Mediastinal injury	2	6%
Soft tissue (non penetrating)	10	31%
Spinal injury (paraplegia)	4	8%

TABLE-IX

MANAGEMENT

Management	No. of Cases	Percentage
Chest intubation alone	15	45.5%
Intubation + laparotomy	8	24.2%
Conservative	10	30.3%
Immediate thoracotomy	0	0
Late thoracotomy	2	6.0

TABLE-X

COMPLICATIONS

Complications	No. of cases	Percentage
Wound infection	3	9.1%
Clotted haemothorax	2	6.1%
Empyema	2	6.1%
Breast injury	1	3.0%

Discussion

Gun-shot injury is a calamity of the young and male members of the society. Although no age is exempt, fetal period to late eighties have been recorded, the average age does not differ much from study to study^{9,10,16}. Our average age for gun-shot injuries was 23.5 years which conforms to the general rule. The predominant age group affected is 11.30 years (Table-I). Some of them lose their lives and most of the rest are permanently crippled¹⁰. This is not only a loss to the state, it also means usually the start of a blood feud which is passed on from one generation to the other.

Although our study shows accidental gun-shots as the most frequent cause of such injuries, the authenticity of the histories was doubtful. Anyhow, the homicidal attempts make equally the largest group of about 42% (Table-III). This increase in violence¹⁹ should be a matter of concern to all the authorities. It is a challenge for law enforcing agencies as for social reformers.

The free availability of all sorts of guns in this province (N.W.F.P.) should make no weapon predominant in causing injuries. But people have their own facies for guns. Rifle, due to its long range and high velocity of its missiles was the most frequently used weapon (39.4%) (Table-IV). The wounding potentials are not only directly hitting the victim. Because of high velocity, the bullet goes very high in air. On returning back to the ground, it has gained sufficient kinetic energy to wound the target. Stray bullets are always from rifles which injured about 12% of our study population (Table-III).

The modern ballistics are very complex. The entry and exit wounds with high velocity missiles are equally perplexing^{6,14}. Moreover, bullets know no anatomy; they follow strange paths. The consensus is now that from entry and exit wounds alone, it is difficult to establish the type of gun and bore of weapon¹⁵. We could not identify the weapon used in 21.2% of all the cases (Table-IV).

Shotgun injuries are relatively common abroad as compared to our study. These are more devastating in respect of soft tissue loss and infection rate. Due to large number of pellets dispersed in the tissues, there is increased damage with higher incidence of infection. Although the mere presence of pellets usually has no consequences, fistulae have been reported as long as 50 years later⁷. Fortunately, we received more of the long range type I and II injuries rather than the point blank range type. In other studies type II injuries are the commonest¹³.

Soft tissue injuries from close range are extensive and need immediate debridement¹³. A thorough search should be made for the presence of wadding and early closure attempted. Non-operative approach i.e. clearance of wound and growth of granulation tissue does nothing other than prolonging hospital stay and inviting ugly scarring. Any defect left at primary closure can be subsequently dealt with by partial thickness skin grafting or plastic reconstruction⁴.

The only patient with type III injury which we received was a young married lady. She was shot by her husband in the left side chest. She had haemothorax and her left breast was almost shattered. We passed a chest tube and debrided the chest wound. A lot of pellets and the wadding were removed. In a week's time, the wound was healthy and plastic reconstruction was done by flap rotation.

The concept of ambulance service has not yet been adopted here. In advanced countries, mortality from gunshot injuries so far has been reduced by shortening the time between the injury and arrival at the specialised hospital and improving the first aid provision. The time duration from injury to the arrival of ambulance has almost universally been brought to under ten minutes. The ambulance then takes less than half an hour on the average to reach the trauma centre¹². The average time which lapsed between the injury and receiving of any medical aid was 25.8 hours in our study. Some of the patients were kept at home or treated by quacks until complications developed. They were brought to us as long as 30 days after injury. Very few patients were treated by any qualified doctor before reaching the hospital. Although the organisation of a graded trauma centre is costly, human life is far more precious and sacred. A life saved can contribute a lot to the state in return¹.

Gunshot injuries pose not only an economic strain on the state in the form of loss of working hours, they also consume a large part of the hospital facilities. The hospital beds that they occupy could be utilised by other needy patients. In our study, the patients with gunshot injuries spent on the average 6.7 days in hospital, ranging from 1 to 52 days (e.g. 6.5 days by Somy & Ashis¹⁶, Table- V). The blood bank pays a larger share of its storage to these victims. All these factors combined, these injuries are actually a great burden on the hospital facilities and the tax-payers.

Most of the chest injuries were stable when presented to us. On the other hand most of the thoraco-abdominal injuries were in shock but they all were saved (Table-VI). Blood is scarce here as people are illiterate and refuse to donate blood. The average amount of blood transfused per patient was one pint (Table-VII). In places where the availability of blood is no problem, more and more is being transfused. In World War II, the average amount of blood given by the British per patient was 0.18 pint; in Korean War 0.9 pint; and much more now¹⁸.

Chest Injuries

Thoracic injuries universally carry very high mortality³. This is because of close approximation of vital structures¹⁷. So naturally many present in an unstable state. The situation was reversed in our study where we received 10 patients in shock and still no patient died out of the 33 chest injuries (Table-VI). The reason is that those who are fatally injured never reach us. We received only those who were stable enough to stay alive until they reached the hospital. We did not have any patient requiring immediate thoracotomy (Table-IX). On the other hand most of the thoraco-abdominal cases came earlier and were in a state of shock. Out of 8 such injuries, 6 had no palpable pulse or recordable blood pressure (Table-VI). We were able to resuscitate and they underwent surgery without any fatality.

A high percentage of patients with chest injuries are manageable by tube thoracostomy alone. Thus haemo-or pneumo-thorax is the only clinical state in which most of them come¹⁶. Tension pneumothorax is not a common presentation where needle aspiration of air is both diagnostic and curative. Simple pneumothorax does not present as a dire emergency. An X-ray of the chest can be awaited. Clinical diagnosis is also not difficult. Dyspnoea, dull percussion note and absent breath sounds are easy clues to the diagnosis of haemothorax. Finally a needle tap is confirmatory.

Haemothorax accrued in 14 of the chest injuries. One additional haemo-pneumothorax came who had traumatic thoractomy. Along with the 8 thoraco-abdominal injuries, 23 (69.7%) cases were managed by chest intubation alone (Table-IX). This figure is in agreement with most of the other studies (80% by Sony and Ashis¹⁶ and 75% by Nazar and Hikmat¹¹). Tube thoracostomy not only rapidly evacuates the pleural cavity of blood and air, it also is a mean of measuring intrathoracic bleeding. Rapid expansion of the lung seals the air leak spontaneously¹⁶ and stops bleeding from the lung⁸.

Another large sector of chest injuries was confined to soft and superficial tissues. Ten patients needed only local debridement and local dressing (31.0%). Comparing this figure to the 59% conservative approach in shotgun injuries of the chest by Lewis⁹ is significant.

Many of the mediastinal injuries require immediate thoractomy⁵. We had only two patients in whom the bullets were radiologically localised in the superior mediastinum (Table-VIII). They were stable and did not need any active intervention.

The prognosis of stable chest injuries is good in the long run. The morbidity is also less. Although the risk of empyema formation and failure of lung expansion is always there, precautions against its development prevents these complications. Prophylactic use of antibiotics, adequate analgesia, early removal of chest tube and breathing exercises are rewarded. Thus out of 23 patients with tube thoracostomy only two developed (Table-X) empyema which required late thoracotomy (6.1%) (Table- IX). All the authors agree that if the haemothorax clots, it should be evacuated by early open thoracotomy¹⁶. It may be our failure to perform thoracotomy earlier that empyema developed in these two cases. Other late complications are rare in chest injuries¹⁶. Wound infection was a more frequently encountered complication, 9.1% in our study (Table-X) and this was uniformly so in shotgun injuries.

We came across a significant number of paraplegics in our series. Four patients, who had predominantly chest injuries, also had paraplegia on first presentation. The missile was either localised radiologically in thoracic spine or it had gone out through the spine. None of them recovered from the neurological deficit. The complication has not been mentioned in the literature to our knowledge (Table-VIII).

Chest and abdominal injuries involving diaphragm carry a high morbidity. In spite of rising incidence, the diagnosis is still frequently missed or made only late. Low degree of clinical awareness accounts for missing the lesion². Plain X-ray of chest and search at the time of laparotomy are points for its early detection and treatment. Thoracoscopy has offered good result when carried out in the first 24 hours of injury. Later, pleural adhesions hamper visualisation². We encountered 8 diaphragmatic injuries and the diagnosis were clinical, radiological and operative: 24% of all chest injuries (cf. 11% by Nazar and Hikmat)¹¹. All of them were repaired through abdominal approach as recommended for acute injuries^{2,7}. No complication or death occurred post-operatively.

In superficial chest wall injuries, prevention of infection is most important task. The risk is more with shotgun injuries at close range,

particularly when the wadding is also embeded in the wound. Out of 10 patients with such superficial injuries, 3 developed gross infection of the wounds.

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