Missile Diaphragmatic Injuries: Kashmir Experience

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Abstract:

Background: Importance of repairing a diaphragmatic tear due to a missile injury cannot be overemphasized.Even a small diaphragmatic rent should be repaired because of morbidity and mortality caused by subsequent herniation and strangulation.

Methods: Fifty-three cases with diaphragmatic injuries caused by penetrating missiles were studied from January 1997 to January 2007. All the patients were primarily explored either for thoracic or abdominal penetrating trauma; the diaphragmatic injury was an associated incidental intraoperative finding. Thoracotomy was performed in 18 patients, Laprotomy in 33 patients and in two patients combined thorocoabdominal approach was utilised for managing associated visceral injuries.

Results: Overall mortality was 37.7%.Mortality was dependent on associated injuries of thoracic and abdominal viscera. Most patients died due to associated injuries and septicaemia. None of the patients had any sequelae of diaphragmatic repair.

Conclusion: Immediate repair of diaphragmatic injury is of paramount importance to prevent subsequent complications of herniation and strangulation.

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Introduction

Missile diaphragmatic injuries are not infrequent occurrences in Kashmir. During past two decades Indian Kashmir has witnessed an armed conflict between separatists and Indian security forces resulting in large number of causalities, mostly civilians. Majority of the missile injuries are caused by high velocity gun shot wounds (AK 47 assault rifles) and secondary missile from blasts, grenades and improvised explosive devices. This has provided us a unique opportunity to study missile induced diaphragmatic injuries in our institute the only tertiary care hospital in Kashmir valley. There were 23,480 missile and blast injuries admitted in this hospital during this period, of these 53 (0.2%) had missile diaphragmatic injury.

The first recorded injury of diaphragm was as early as 1541 by SENNERTUS. [1] In 1578, AMROSE PARE [2] described autopsy findings of French captain who died with the loops of colon in chest herniated through a small rent in diaphragm .In 1853, BOWDITCH [3] reported first antemartum diagnosis of diaphragmatic hernia. Traumatic diaphragmatic hernia is relatively rare. [4-10]

Methods

Fifty three cases with diaphragmatic injuries caused by penetrating missiles were studied from January 1997 to January 2007. All the patients were primarily explored either for thoracic or abdominal penetrating trauma; the diaphragmatic injury was an associated incidental intraoperative finding. Thoracotomy was performed in 18 patients, Laprotomy in 33 patients and in two patients combined thorocoabdominal approach was utilised for managing associated visceral injuries.

Results

Thoracotomy was performed in 18 patients, laparotomy in 33 patients and two patients had thoracoabdominal incisions. Table (1) shows operative findings in patients with diaphragmatic injuries were exploratory thoracotomy or laparotomy was done.

Table (1). Operative findings in our patients.

Operative findings	No. of patients
Lung contusion	12
Lung laceration	10
Multiple rib fractures	10
Cardiac injuries	2
Aortic injuries	1
Small gut perforations	15
Stomach perforations	8
Splenic tear	4
Liver tear	6
Large gut perforations	2
Other organ injury	1

Table (2) shows cause of death in patients of missile diaphragmatic injuries. More than one organ was injured in many patients having missile diaphragmatic injury. Herniation of abdominal contents into the chest was present in 15 patients. Herniation was more common on left side (13 cases). Omentum was the most common content followed by small gut and stomach respectively. Spleen was hernial content in one patient. Only two patients had herniation on right side with omentum as hernial content.

Fortyeight patients (90.56%) were managed by simple suture using 2-0 prolene.4 patients needed muscle flap cover and one patient needed a mesh repair.20 patients died postoperatively solely due to causes other than diaphragmatic injury as shown in Table (2).

Table (2). Cause of death in patients.

Cause of death	No. of patients
Hypovolumic shock	10
Sepsis	7
Cardiac and aortic injuries	3

Discussion

Penetrating diaphragmatic injury by missiles is most common type of diaphragmatic injury in Kashmir due to armed conflict and war like situation in Kashmir. A similar pattern has been recognised in other published series. [11,12,13] The importance of repairing diaphragmatic tear or defect cannot be overemphasised. Even a small diaphragmatic injury that appears benign must be repaired. Gravier and Freak [6] reported a missed diagnosis with fatal outcome. Ebert [5] pointed out that careful initial exploration of diaphragm in suspected cases should be performed to avoid future fatal complications of herniation and subsequent strangulation. Diaphragmatic lacerations tend to remain open because of pressure difference between chest and abdomen (Neilson et al). [14,15]

In our series left sided herniation was more common than right side possibly because of buffering effect of liver. This observation is in consistent with other series. Mansour [16] et al also reported higher incidence of left sided hernias. Herrington [17] in his review of 72 cases found somewhat similar observation. Association of diaphragmatic injuries with aortic injuries has been noted by many investigators. [18,19] In our series one patient had associated aortic injury.

Conclusion

Penetrating diaphragmatic injuries are either approached either through transthoracic or transabdominal routes depending upon the trajectory of missile and expected associated injuries of other organs.Both transthoracic and transabdominal approaches are equally good for repairing diaphragmatic rents. Herniation was more common on left side than right side because of buffering action of liver on right side. Omentum was the most common hernial content. Most common surgical procedure performed was simple suture by prolene. Mortality solely depend upon the associated injuries of other visceral injuries especially lung and cardiac injuries.

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