

ORIGINAL ARTICLE

Management and Outcome in patients with Bomb Blast Injury

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ABSTRACT

Objective: The aim of the study was to evaluate the different lines of management and outcome in Bomb Blast Injury patients.

Study Design: Descriptive retrospective study.

Place and Duration: Department of cardiothoracic Surgery Post Graduate Medical Institute Lady Reading Hospital, Peshawar from 1st may 2007 to 11 February 2010.

Material and Methods: Our study include all bomb blast injuries in NWFP, PAKISTAN, all patients which drained into lady reading hospital Peshawar were included in our study. Patients were screened and the patients only with thoracic injuries were included irrespective of their age and sex. Those patients who had chest trauma due to fire arm injury, stab injury, road traffic accident, blunt injuries and iatrogenic were excluded from study. All the patients were received in mass trauma unit and than shifted to thoracic trauma centre.

The patient were individualized on the basis of clinical parameters and grouped as stable and unstable, after hemodynamic stabilization decision regarding surgical intervention was made on the basis of clinical features and radiological examination.

Results: Out of 67 bomb blasts in NWFP, Pakistan from 1st may 2007 to 11th February 2010 there were 2382 casualties reported in mass trauma unit Lady Reading Hospital Major injuries in these patients were lung laceration, foreign bodies, flail chest, injuries to major vessels and diaphragmatic injuries. Morbidity was 37 including air leak, wound infection, clotted hemothorax and empyema. Mortality was 7.

Conclusion: The management of Bomb Blast Injury patients is a challenging task. Adequate initial line of management of Bomb Blast Injury patients will minimize life threatening complications. Early thoracotomy has definite role both in emergency situations and for various complications resulting from Bomb Blast Injury.

Key words: Bomb Blast Injury, Thoracotomy.

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INTRODUCTION:

Bombings and explosions directed against innocent civilians are the primary instrument of global terror, resulting in death, injury, fear and chaos. With the lessening of full-scale military conflicts, terror has become a prominent feature in modern life, as realized by the tripling of the number of serious terror incidents in recent years.

Explosions can produce unique patterns of injury seldom seen outside combat. When they do occur, they have the potential to inflict multi-system life-threatening injuries on many persons simultaneously. The injury patterns following such events are a product of the composition and amount of the materials involved, the surrounding environment, delivery method (if a bomb), the distance between the victim and the blast, and any intervening protective barriers or environmental hazards. Because explosions are relatively infrequent, blast-related injuries can present unique triage, diagnostic, and management challenges to providers of emergency care. Severely injured patients from explosions usually suffer from a combination of blast, blunt, penetrating, and burn injuries.^{1, 2} Primary blast damage is almost always seen only in gas-containing organs: the ears, respiratory system, and GI tract. A study including 828 victims from explosions reported immediate fatalities with mixed patterns of injuries including head, chest, and secondary missile injuries.³ In 17% of the victims, however, lung damage were the only postmortem finding.³ In another study from Northern Ireland, pathologic evidence of primary blast lung injury (BLI) was found in 45% of the victims who died at the site of the explosion.⁴ BLI was a major cause of death in patients who survived initial resuscitation, accounting for nine deaths. Among 23 injured persons, 1 and BLI occurred more often in explosions in a confined space than in explosions that took place in the open.⁵⁻⁷ Death and injuries from explosive substances or devices occur in both civil and military circumstances, though the later now includes a considerable proportion because of terrorist activities rather than conventional wars, as in Afghanistan, Iraq, Pakistan, and Sri Lanka.^{8, 9}

Material and Methods:

Our study include all bomb blast injuries in NWFP, PAKISTAN, all patients which drained into lady reading hospital Peshawar were included in our study. Patients were screened and the patients only with thoracic injuries were included irrespective of their age and sex. Bomb blast from 1st may 2007 to 11 February 2010 was included.

Those patients who had chest trauma due to fire arm injury, stab injury, road traffic accident, blunt injuries and iatrogenic were excluded from study. All the patients were received in mass trauma unit and than shifted to thoracic trauma centre. All these patients were resuscitated and evaluated on arrival to the hospital. The patient was individualized on the basis of clinical parameters and group as stable and unstable. After hemodynamic stabilization decision regarding surgical intervention was made on the basis of clinical features and radiological examination. In this manner patient were grouped as those requiring conservative management or surgical intervention. Most of the patients with chest trauma presented with penetrating or blunt injury to the chest, bleeding from chest wound, shortness of breath, chest pain and haemoptysis (TABLE 3).Radiological findings in these patients were pneumothorax, haemothorax, pneumomediastinum, surgical emphysema and flail chest

RESULTS:

Out of 67 bomb blasts in NWFP, Pakistan from 1st May 2007 to 11th February 2010 there were 2382 casualties reported in mass trauma unit lady reading hospital Peshawar, 370 dead bodies were received from Peshawar only. (Table 1). As distinct blast mortalities were taken to their local hospitals .the major cause of mortalities were injury to vital organs and severely burned injuries.654 patients with thoracic trauma received alone and in combination with other injuries. Out of 654 patients 312 were male, 205 female and 137 were child, age range from 2-75 years with a mean age of 28 years (table 2, 3). All of the patients received in mass trauma unit were cat initially resuscitated and were individualized on the basis of clinical parameters and group as stable and unstable (table 4). And were evaluated for haemothorax or pneumothorax, 167 patients with minor chest injuries were treated conservatively without chest intubations and surgery.442 patients were chest intubated alone, 32 patients were operated in a joint session with surgical unit on call, and 13 patients were operated alone for major thoracic trauma (table 5).

Major injuries in these patients were lung laceration, foreign bodies, flail chest, injuries to major vessels and diaphragmatic injuries. Morbidity was 37 including air leak, wound infection, clotted haemothorax and empyema. Mortality was 7.

Discussion:

Terror bombings mandate hospital preparedness for limited or full-scale multiple casualty incidents with pre-established protocols that can be activated promptly. The location of the terrorist bombing bears upon the hospital's preparation and protocol activation. A remote site allows the admitting hospitals more time to prepare and collect relevant data before the arrival of the first patient. However most suicide bombings have occurred in urban areas near medical centers, and there, sometimes, the arrival of the first victim even precedes the alert... Immediately after the explosion, the chaos phase starts and family members, bystanders and passing vehicles evacuate 6%–10% of the injured to the nearest hospital. When trained medical personnel arrive at the scene, the evacuation of the most severely injured patients to the nearest hospital can overwhelm it because at this point it is crowded with patients evacuated in the chaos phase. Over-triage compounds this situation and could lead to the death of patients reaching the hospital alive and otherwise deemed salvageable. Thus, triage protocols for multiple casualty incidents differ from those of other trauma situations and all local and regional hospital facilities are recruited to handle the large volume of injured patients. In the emergency department, the Triage Officer is the first medical professional caring for the victim in the hospital, with the objective to sort patients according to their severity of injury. We have learned that a well-trained and knowledgeable surgical resident can handle this critical task properly until senior staff arrives. Important information regarding the nature of the event, the exact mechanism (explosion in confined or open space), and most importantly, whether all injured have been evacuated should be communicated via the emergency medical services coordinator. When the understaffed emergency department is overloaded, new patients should be diverted to other facilities. Trauma-oriented teams are assembled as trained trauma staff becomes available, and they attempt to create a microcosm in which Advanced Trauma Life-support (ATLS) guidelines can be followed. The minimum accepted treatment for each patient is ATLS standards. Our protocols provide for the

team to remain with the patient from initial evaluation throughout imaging, surgery, if indicated, and transfer to the final destination, to minimize information loss. A senior surgeon should supervise the care of the lightly injured, to recognize under-triage and late manifestations of blast injury.

If manpower is insufficient to follow ATLS guidelines, or if operating theaters or other resources are deficient, the Medical Director should declare the medical center a Triage Hospital. Then, only life-threatening injuries are treated and all other patients are transferred to nearby hospitals after initial evaluation.

Implementation of the Trauma Team concept has allowed establishing and adhering to the principle of unidirectional patient flow. This is implemented upon declaration of a multiple casualty incident, as the emergency department is immediately emptied of its patients and thereafter all bombing victims that are seen and consequently transferred from the ED and does not return to it. When the acute emergency phase ends, it is crucial to conduct a tertiary survey of all admitted patients. The tertiary survey team differs from the admitting team, usually consisting of an attending surgeon with trauma experience, an orthopedic surgeon, a plastic surgeon, a nurse and a psychiatrist. While mostly only minor injuries were discovered during the tertiary survey, in one event two patients had vascular injuries that were recognized in the tertiary survey when already in intensive care for other severe injuries.

Conclusion:

The management of Bomb Blast Injury patients is a challenging task. Adequate initial line of management of Bomb Blast Injury patients will minimize life threatening complications. Early thoracotomy has definite role both in emergency situations and for various complications resulting from Bomb Blast Injury.

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TABLE I
BOMB BLAST PATIENTS RECEIVED IN ACCIDENT & EMERGENCY
DEPARTMENT

S. No	Bomb Blast Places	Dated	Received	Dead	Injured
1.	Marhaba Hotel	01/05/2007	36	08	
2.	Bannu	01/10/2007	03		
3.	Parachinar	01/10/2007	05		
4.	Sher Pow		57		
5.	Jehangir Pura	17/01/2008	37	13	
6.	Nahki	09/02/2008	45		
7.	Parachinar	17/02/2008	25		
8.	Swat	29/02/2008	15		
9.	Dara Adam Khail	02/03/2008	32	02	
10.	Mardan	18/05/2008	06		
11.	Bannu	24/07/2008	06		
12.	Kohat Bus Stand Kohat	12/08/2008	27	15	
13.	Zangali Badaber	06/09/2008	71		
14.	Bajuar	12/09/2008	12		
15.	Orakzai Agency	10/10/2008	25		
16.	Mardan	31/10/2008	06	01	
17.	Bajuar	06/11/2008	05		
18.	Qayum Stadium	11/11/2008	17	03	
19.	Dairy Shubqudar	14/11/2008	05		
20.	Hashtnagri Peshawar	24/11/2008	09		
21.	Mattani Peshawar	26/11/2008	03		
22.	Qissa Khwani bazar	05/12/2008	151	15	
23.	PMS Warsak Road	22/12/2008	05		
24.	Pandoo Police Station	20/01/2009	08		
25.	Momin Town, Peshawar	11/02/2009	09	01	
26.	Bazid khil badabir	17/02/2009	21	03	
27.	Afridi abad Road tana badabir (police mobile)	7/03/2009	6	01	05
28.	Namak Mandi Peshawar	11/03/2009			
29.	Jamrud	27/03/2009	22	04	
30.	Bara Qadeem Check Post	5/05/2009	06	02	
31.	Swat victims	9/05/2009	04		
32.	Swat victims	10/05/2009	13		
33.	Bannu	11/05/2009	13		
34.	Speena Thaana Dara Adam Khail Kohat Road	11/05/2009	13	03	
35.	Kakshal Peshawar city	16/05/2009	45	11	
36.	Gora Bazar Peshawar Saddar	16/05/2009	6		
37.	Cinema road Khyber bazaar Peshawar city	22/05/2009	86	10	

38.	Swat Bomb Blast	24/05/2009	05		
39.	Kabari bazaar Peshawar city	28/05/2009	110	07	
40.	Sara Khura Police post	28/05/2009	8	02	
41.	Pc Hotel Peshawar City	09/06/2009	75		
42.	Ring Road(Police Mobile) Peshawar	11/06/2009	16		
43.	Yaqatoot (Police Station)Peshawar	02/07/2009	6		
44.	Chacha Younas Park Peshawar		15		
45.	Shubqudar (Petrol Pump)Bomb Blast Peshawar	17/08/2009	14		
46.	Momin Town bomb blast	23/08/2009	18	02	16
47.	In Front Of Green Shahdi Hall Fakhr-E-Alam Road Peshawar Cantt	26/09/2009	73	09	
48.	Soekarno Chowk Khyber Bazar Peshawar	09/10/2009	238	58	
49.	Gulshan Rehman Colony Kohat Road Peshawar	15/10/2009	15	01	
50.	Swati phatak CIA police Peshawar	16/10/2009	22	13	
51.	Shubqudar Bomb Blast Dist Charsadda	23/10/2009	06		
52.	Pepal Mandi Bomb Blast	28/10/2009	293	112	
53.	Adizai Chowk Matani Peshawar	08/11/2009	60	17	
54.	Pathang Chowk Ring Road Peshawar	09/11/2009	08	05	
55.	Farooq Azam Chowk Charsadda	10/11/2009	83	06	
56.	Artillery Road Near Army Stadium Peshawar	13/11/2009	50	06	
57.	Pushtakhara Chowk Bara Road	14/11/2009	10	03	
58.	Badabir bomb blast	16/11/2009	34	03	
59.	Judicial Complex Pesh	19/11/2009	71	23	
60.	Session Court Pesh	07/12/2009	58	11	
61.	Press Club Peshawar	22/12/2009	27	04	
62.	In Front of PIA Building Pesh	24/12/2009	16	02	
63.	Laki Marwat bomb blast	01/01/2010	19	02	
64.	Ghandab Muhammad Agency	14/01/2010	02	01	01
65.	Dalazak Ring road sheikh jalal Colony Peshawar	20/01/2010	05		
66.	Dir (School) bomb blast	3/2/2010	02		02
67.	Police Line Bannu	11/02/2010	04		04
		Grand Total		370	

TABLE 2

PRESENTATIONS OF THORACIC TRAUMA PATIENTS

N=654

	No	%age
Chest pain	654	100
Shortness of breath	176	26.9
Combine	175	26.7
Haemoptysis	78	11.9
Flail chest	7	1.07
Foreign bodies	64	9.78

TABLE 3

N=654

DEMOGRAPHY

Gender	No	% Age
Male	312	47.7%
Female	205	31.34%
Child	137	20.94%

Age range; 2yrs-75 yrs

Mean age; 28yrs.

TABLE 4

N=654

CLINICAL PARAMETERS

STABLE 459

(GCS more than 14/15
Bp >90/60mmhg,
Pulse <100/min adults
<120/min child
Respiratory rate <25/min adult.
<30/min child)

UNSTABLE 195

(GCS less than 14/15
Bp <90/60mmhg,
Pulse >100/min adults
>120/min child
Respiratory rate >25/min adult.
>30/min child)

TABLE 5

Procedures on thoracic trauma patients

N=654

<u>PROCEDURE</u>	N=
Conservatively without chest intubations	167
Chest intubations	442
Operated in joint session	32
Operated alone	13