

Injuries among victims of mass suicidal bombings



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INTRODUCTION:

Modern day terrorism is becoming an increasing threat to global security especially in civilian population. During the past decade there has been a great rise in suicidal bombing incidents in the world and it has been estimated that these suicidal blasts took place in about 30 countries with hundreds of blasts in civilian and military forces causing thousands of casualties [1]. Pakistan has been under constant threat of terrorism. From the year 1995-2013, Pakistani citizens became victims of 382 suicidal attacks resulting in 5608 fatalities and 14702 injuries [2]. Blast injuries are classified into four types. Primary blast injuries are caused by direct pressure effects of the blast waves. Secondary blast injuries result from flying projectiles, tertiary injuries result from either structural collapse or people thrown from the blast wind and whereas quaternary injuries burns, asphyxia and inhalation of toxic inhalants [3]. Abdominal blast injuries remain a significant cause of mortality and morbidity. The incidence and clinical presentation varies according to the patient and the nature of the blast [4]. Liaquat National Hospital is a tertiary care centre in Karachi and receives a great load of trauma especially in circumstances of violence and mass suicidal bombings in Karachi and all over Pakistan. A mass casualty bombing according to Riganault and Deligny is defined as bombings which claim 30 or more casualties [5]. We therefore would like to share the pattern of abdominal injuries presented to our hospital in 5 mass suicidal bombing incidents that took place in Karachi over the past 8 years.

METHODS:

This was a retrospective study that was conducted at the Liaquat National Hospital and Medical College, Karachi, Pakistan. The hospital Health Information and Management Services (HIMS) department maintains a record of the cases that were admitted as victims of mass suicidal bombing incidents that took place in Karachi over the period of 5 years between January 2005 and December 2010. During the study period there were many suicidal bombing incidents that took place in Karachi but only the incidents mentioned below, having the mortality toll greater than 30 were considered as defined by Riganault and Deligny [5]. This was done keeping in mind that with smaller number of injuries, the victims end up getting scattered into various hospitals, as there is no proper established system of ambulances for evacuation. Most people prefer private hospitals in Pakistan while few underprivileged end up in government services, this is mainly because of the facilities which are available there in private sector. Hence very few victims would have been available to study the aftereffects of bombings. These incidents were.

1. Blast at a Shia Mosque in Karachi on 30-May-2005.
2. Blast at Nishtar Park, Karachi on 11 April 2006.
3. Blast that occurred in crowd welcoming Benazir Bhutto (Former Prime Minister of Pakistan) on 18 October 2007.
4. Blast that occurring in a Procession on 28 December 2009.
5. Blast that occurring in a Procession on 5 February 2010.

Data was collected from the special records present for these incidents from HIMS database. Patient's charts, demography, type of injuries and

intraoperative findings were recorded and patient's outcomes were assessed. All the patients brought dead on arrival were excluded and although being aware of the fact, that psychological suffering can cause long term disability, victims of initial emotional distress were also excluded from the study, as their presences was over-whelming.

Results:

There were total n= 228 bomb blast victims out of them n= 30 patients sustained abdominal injuries. All the patients were males except n= 1 patient who was female. Mean age of patients was 24. 33 years (between 15-38 years). Associated injuries to the groin were found in n= 3 patients, chest in n= 7 and n= 17 had associated extremity injuries. Superficial injuries were found in n= 14 patients. Out of them only n= 3 patients had foreign body removal, wound debridement and closure of skin while the rest of the patients had simple wound dressings and were discharged from the ER. Deep Penetrating injuries were found in n= 16 patients. All the patients had metallic shrapnel injuries and n= 1 patient also had penetrating injuries due to stones. All the patients had routine clinical assessment followed by a FAST ultrasound. There were n= 6 patients who presented with shock that were positive in FAST. Sites of bleeding in these patients were, n= 3 patients had retro-peritoneal bleeding, n= 1 patient had massive hemo-peritoneum and n= 1 patient had a sigmoid colon bleed. These patients were immediately taken to OR while the rest of the patients underwent a CT scan for further assessment. CT scan findings were consistent with intestinal perforations and co-related with the intraoperative findings discussed below. All the patients underwent laparotomy within 6 hours of presentation.

The alimentary tract was the most common injured region. Small bowel injuries were found to be involved in $n= 10$ patients. Most common site of injury was the ileum in $n= 8$ patients of which $n= 7$ patients had perforations and $n= 1$ patient had adhesions with jejunum. Duodenal injuries were found in $n= 2$ patients, jejunal injury in $n= 1$ patient and $n= 1$ patient had an injury to the posterior wall of the stomach. All of these patients underwent exploratory laprotomy as show in *Table 1*.

Large bowel injuries were found in $n= 6$ patients. Majority of injuries were perforations in the transverse colon in $n= 4$ patients among which $n= 1$ patient had sigmoid bleeding and $n= 2$ patients had injuries to the cecum. All these patients underwent exploratory laprotomy as shown in TABLE 2.

Combined small and large bowel injures were found in $n= 3$ patients.

Liver laceration was noted in $n= 1$ patient and $n= 1$ patient had a diaphragmatic tear. Associated vascular injuries were found in $n= 4$ patients. Of them $n= 1$ patient had IVC laceration who died on table due to uncontrollable bleeding, $n= 2$ patients had iliac vein ruptures that were repaired by venorrhaphy, $n= 1$ patient had femoral artery rupture which was repaired by a PTFE graft and $n= 1$ patient had injury to mesenteric vessels who underwent bowel resection.

Outcomes:

Among all the patients who underwent surgical intervention for blast abdominal injuries $n= 1$ patient developed peritonitis, $n= 1$ patient had an Enterocutaneous fistula and $n= 1$ patient found to have acute abdominal pain which on re-look laprotomy showed adhesion of bowel loops. Tissue

culture were positive in n= 3 patients. Of them n= 2 patients recovered E. Colli on culture and n= 1 patient grew *Pseudomonas aeruginosa* and *morganella* species. Mortality was n= 3 patients (10%).

TABLE 1: Operative procedures along with exploratory laprotomy in patients with small bowel and associated injuries.

Resection N=
of bowel 2

Primary N=
repair 3

Ileostomy N=
formation 7

TABLE 2: Operative procedures along with exploratory laprotomy in patients with large bowel and associated injuries.

Right N=
hemicolecto
my 1

Exterminati N=
on of colon 1

Primary N=
repair 2

Primary N=

anastomosis	2
Colostomy	N= 5
Anal reconstruction	N= 1

Discussion:

Blast injuries due to detonation of explosive devices constitute a unique spectrum of injuries especially in the setting of mass casualty incidents. Pakistan unfortunately has become victim of such terrorist activities. These activities taking place among large crowd cause colossal mortalities and morbidities. Each bombing is unique and has its own pattern of causing injury [6] Even though, no two events can be compared, but if more studies into the various injury pattern, are made, they can help enhance the secondary management and tertiary prevention, in case of any new incident taking place, as a similar need of research was concluded by Peleg et al at the end of his research [7]. In this study we have focused on abdominal injuries as abdomen constitutes a variety of solid and hollow organs being prone to multiple injuries.

In our series majority of the patients are males. The reason is that males are dominant in eastern society and the sole bread earners in most of the

families another reason that males become the targets because of their increased participation in gatherings, sports and other activities.

The mean age of hospitalized survivors was 24 years, similar to mean age seen in victims of Madrid bombings [8], of 32 years. A long period research in Hadassah Hospital, Jerusalem, Israel also established that when correlated with other forms of trauma; bombings victims are usually younger and badly injured with a 3-fold higher mortality rate [9]. A plausible reason could be that terrorists make sure; that the bombing has caused detrimental and adverse long lasting effects, which is achieved by targeting the economically active and young productive population.

Zukerman described four different mechanisms play the role in inflicting injuries during a bombing:

- blast (from changes in atmospheric pressure),
- penetrating injuries (caused by shrapnel),
- blunt (consequence of body displacement caused by expanded gases),
- burns and inhalation injury.[10]

The spectrums of injuries presented to our setup are secondary injuries caused mostly by penetrating metallic shrapnel from the explosive devices. This could be due to improvisation of the explosive devices and targeting large audience in open surrounding rather than a closed one

The main presentation of our patients with abdominal injuries was penetrating injuries due to metallic shrapnel. All the patients with deep penetrating injuries underwent laprotomy. All these patients had undergone routine clinical assessment and FAST in emergency room. It was noted in our <https://assignbuster.com/injuries-among-victims-of-mass-suicidal-bombings/>

study that none of the patients had negative laprotomies. These laprotomies were mostly done due to perforations of intra-abdominal organs caused by secondary blast injuries. In a study conducted by *Almogy et al* it was noted that by assessment of clinical predictors, FAST, CT scan findings there were more therapeutic laprotomies and lesser number of negative laprotomies. This study also suggested that external signs along with imaging should be incorporated as markers of injury severity and hence included in trauma assessment protocols [11]. This also contrasts with reports of London Bombings and Madrid Bombing incidents which showed a higher incidence of negative laprotomies.

In our study 13% of patients were seen to receive abdominal injuries in the bombings which is a significant rise when compared to Madrid bombings where only 5% of patients were seen with abdominal visceral injuries and 10% seen in Hadassah Hospital, Jerusalem, Israel. Intraoperative findings of our study showed that the alimentary tract was the most affected region by blast injuries and all injuries were due to penetrating shrapnel's. This is consistent with the findings of Bala et al in their study on secondary abdominal blast injuries. A similar pattern of less number of liver injuries and no splenic trauma is also close to findings of this study. This can be attributed due to bony partial bony shelter to the liver and spleen [9][8]. In a study done by *Yasin et al* on blast injuries in Rawalpindi (Pakistan) showed that majority of the gastrointestinal injuries comprised of small bowel injuries particularly the ileum. Our study shows consistent findings of majority (62.5%) being small bowel injuries of the total injuries sustained by the

gastrointestinal region and ileum being most commonly affected in 43.75% of the cases [6]

Comparing our findings to primary blast injuries, in a study done in a neighboring country by *Wani et al* it can be noted that our study shows intestinal perforation in 53.33% compared to 37.66% in primary blast type. Despite of small bowel and ileum being the most common affected regions, our study showed that small bowel injuries were 62.5% and large bowel injuries 37.5% as compared 31.16% and 6.49% respectively. This shows that secondary blast injuries carry a higher risk of penetrating trauma as compared to primary blast injuries [12].

Compared to Primary Blast Injuries Garner established that the number of survivors, is usually exceeded by Secondary and tertiary injuries [13] which can further be verified by the findings of, C. Owers's review that only 3% of people suffered with primary blast injury [14] whereas in our study calculated, that there were almost 13% of people who suffered with secondary blast injuries and if taken in account only the people with abdominal injuries. These results can be taken in account to point that terrorists are continually working towards their goal to improvise the bomb-making such that it targets more people and cause more severe injuries.

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