MEDICAL CHANNEL

Original Article

PENETRATING INJURY TO SOLID ABDOMINAL ORGANS

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ABSTRACT:

Background: Trauma is leading cause of death in young adult in UK. Penetrating abdominal injury implies either Gunshot wound or stab wound. Stabbing are more common than Gun Shot. Stabbing involves the transfer of low level of energy, with damage confined to the course of the wound track; tissue away from the tract is unaffected unless transaction of neurovascular supply occurs.

Methodology:

Study Design: Prospective Descriptive

Setting: Department of Surgery at Liaquat University of Medical & Health Sciences, Jamshoro.

Sample Size: 50 patients of penetrating abdominal trauma followed up for 3 months.

Results: The age of the patients ranged from 7 to 65 years with mean age of 30 years. Out of these 50 patients, 4 (8%) patients were females and 46 (92%) male. Majority of the patient had firearm injuries 68% while stab injuries were only seen in 32% of cases (Table I). Mean lapse time between trauma and surgical intervention was 4.25 hours. A total of thirteen patients (26%) were having hepatic injury with other associated injuries to other abdominal organs. Out of these, eleven patients (22%) had gunshot injuries, and two (4%) got stab injury. Hepatic trauma varied from a small laceration to complete shattering of the liver lobe

Conclusion: Liver is the most commonly injured solid organ in which coupting suturing is sufficient in 50% of the patients. Splenectomy still is safe option to deal with splenic trauma in our set up. In cases of pancreatic trauma peri-pancreatic drainage is an acceptable and safe option. Resection of the pancreas is not a desirable emergency procedure.

Keywords: abdominal injury, gun shot, stab wound, visceral injury

INTRODUCTION

With advancing mechanization and increasing lawlessness in society, extensive trauma has emerged as a serious health hazard.[1] Incidence of penetrating trauma to the abdomen has increased significantly in the last few years due to increased terrorism in our society. Previously, penetrating injuries were occurring in rural areas of the Pakistan due to tribal clashes resulting in gunshot. But now firearms are increasing in urban areas too, due to spread of high velocity weapons after Afghan War.[1, 2]

Healthy young males are the usual victims of such type of violence. These injuries result in the loss of precious lives, hard earned money and many working hours of potentially the most useful member of the society.[2] Penetrating trauma to the abdomen is a potentially lethal injury and requires high level of suspicious, early diagnosis and appropriate management. Even when the patient with penetrating abdominal injury reaches the hospital, controversy exists in the management and up to now the trauma surgeons have not decided whether exploratory laparotomy is mandatory or not.

A quick swift diagnosis of internal injuries and their prompt treatment remains a major

challenge for the attending surgeons in case of penetrating injury of the abdomen because current diagnosis pre-operatively in relation to the extent of internal damage is not possible frequently. Surgeons started operating on abdomen more regularly at the end of 19th and early 20th century but in cases of trauma such operations were associated with frightful mortality of up to 80%.[3] Results of laparotomy improved after world war-II because of the experience gained to deal with war injuries. In recent years, there is marked improvement in the management of abdominal trauma not only because of improved safety of surgery and aftercare but also because of availability of better diagnostic tools. Despite these advancements the incidence of preventable deaths is not uncommon following penetrating abdominal trauma.[4] The aim of this study was to evaluate the pattern of various injuries to solid organs sustained by patients of penetrating abdominal trauma.

MATERIAL AND METHODS

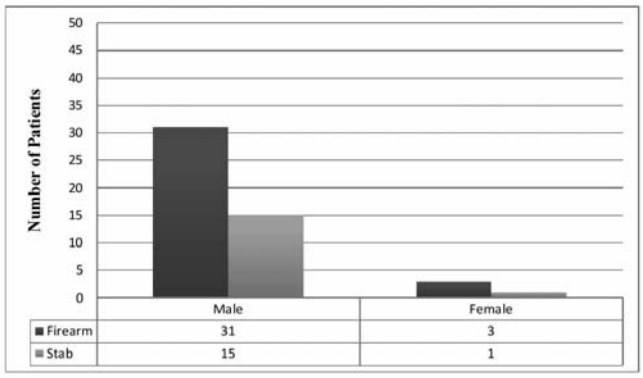
This prospective descriptive study comprises a total of fifty (50) patients with abdominal trauma who were brought to the Department of Surgery from casualty department of Liaquat University Hospital Jamshoro / Hyderabad from January 2009 to December 2010. Patients were received in the emergency department where the injuries were assessed and resuscitation immediately started according to the Advanced Trauma Life Support guidelines. The resuscitative measures included provision of two venous accesses with 18 G I/V canula and infusion of crystalloids like Ringer lactate, 0.9% isotonic saline and Colloids e.g. Haemaccel and transfusion of fresh blood. Once the patient become haemodynamically stable, then they were shifted to surgical unit there they were also resuscitated and blood sample was drawn for blood grouping and cross matching. A detailed history along with thorough examination of patient was carried out in ward in every case. Baseline investigations including blood CP, blood sugar, urea, creatinine, electrolytes, plain x-ray abdomen, ultrasound abdomen and peritoneal tapping were performed. Patients having no clinical and diagnostic evidence of peritoneal penetration or visceral trauma were closely monitored. While patients with signs of peritoneal irritation, peritoneal breach on wound exploration, intraperitoneal blood loss, evisceration and free gas beneath diaphragm underwent for laparotomy.

RESULTS:

The age of the patients ranged from 7 to 65 years with mean age of 30 years. Out of these 50 patients, 4 (8%) patients were females and 46 (92%) male. Majority of the patient had firearm injuries 68% while stab injuries were only seen in 32% of cases (Table I). Mean lapse time between trauma and surgical intervention was 4.25 hours.

One patient (3.3%) of firearm injury with suspected visceral injury underwent laparotomy but no visceral injury was found to any viscus because peritoneum was not breached and the bullet

FIGURE / TABLE 1 CAUSES OF PENETRATING ABDOMINAL TRAUMA N = 50



FIGURE/ TABLE II: COMPLICATIONS

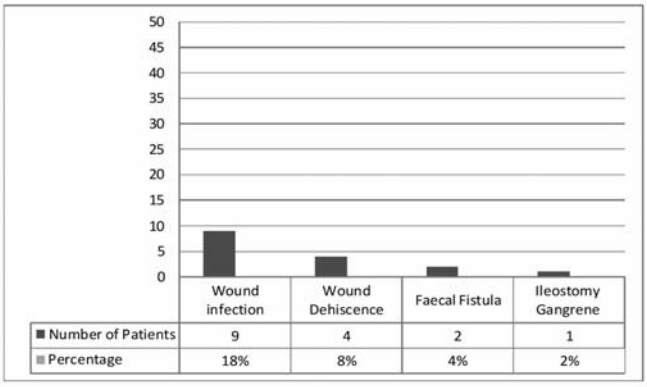


TABLE III: DISTRIBUTION OF HEPATIC INJURIES N=13

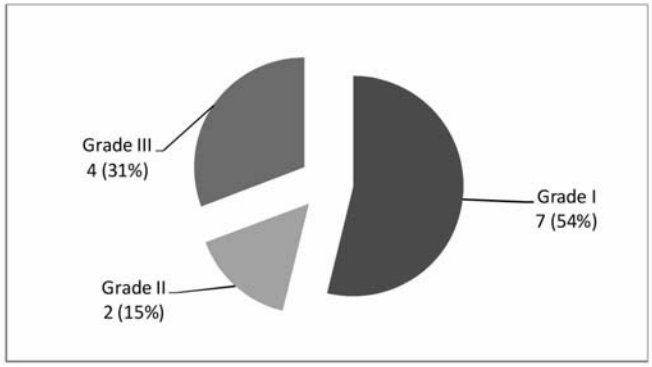
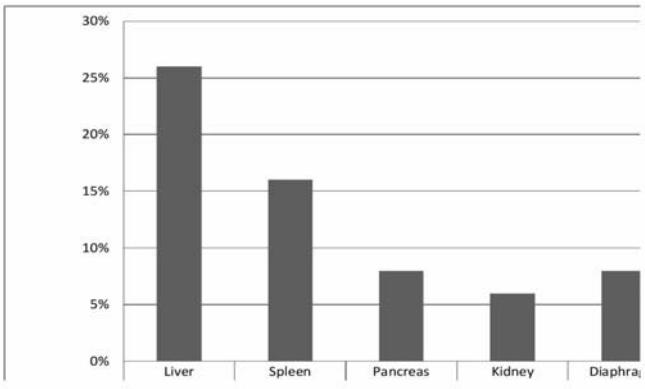


TABLE IV: SOLID ORGAN INVOLVEMENT



had passed through anterior abdominal wall. Another one case (3.3%) with firearm injury had a suspected hepatic injury and on USG; there was minimal fluid around the liver with no subcapsular hematoma or echo texture difference of liver parenchyma. This patient was treated conservatively and patient did well and was discharged afterwards, he also had associated right-sided pneumothorax for which chest intubation was done. Tube was removed after 72 hours. Nine patients (18%) developed wound infection. Four patients (8%) had abdominal dehiscence. One patient (3.3%) developed gangrene of the ileostomy and two (4%) developed faecal fistula that was of low output and successfully healed conservatively in four weeks (Table II). The average hospital stay was 9 days in those who presented early and were operated within 6 hours of injury. The patient who presented late had more prolonged convalescence and the average hospital stay in those patients increased to 16 days.

A total of thirteen patients (26%) were having hepatic injury with other associated injuries to other abdominal organs. Out of these, eleven patients (22%) had gunshot injuries, and two (4%) got stab injury. Hepatic trauma varied from a small laceration to complete shattering of the liver lobe. (Table III) Grade I injuries were observed in 7 (54%) patients, there was no vigorous hemorrhage and patients were managed by simple coopting sutures. Grade II injury were found in only 2 (15%) patients and he was managed by applying figure of eight suture starting from depth and reinforced by gelatin sponge. Grade III injuries were seen in 4 (31%) patients, liver was partially shattered in all cases and they were managed by removal of all devitalized tissue by finger fracture method and suture ligation of the bleeding vessels was done.

Right sided pneumothorax was found in one case due to gunshot injury to right hypochondriac region, ultrasound revealed free fluid around the liver, no subcapsular hematoma or echo texture difference of liver parenchyma. The patient was haemodynamically stable and was treated conservatively; chest intubation was done for pneumothorax. Three patients (6%) had renal injury due to firearm (Table IV). Out of these one patient required surgery and 2 had through and through penetration of bullet from the middle and lower 1/3 of the right kidney. Debridement & Pyelonephrostomy was performed in these cases. Four patients (8%) had injury to pancreas due to firearm. Tail of the pancreas was injured in one (2%) patient, distal pancreatectomy and splenectomy was performed in this patient. Another patient had an injury to the body of pancreas left to the mesenteric vessels and was managed by suture and lesser sac was drained with tube drain. Another 2 (4%) patients had also injury to the tail of pancreas which were managed conservatively Four patients (8%) had firearm injury in the left hypochondriac region; on investigation left hemi-diaphragmatic perforation was found in all cases. Two of these patients had associated hepatic and gastric injuries. In these patients diaphragms were repaired by interrupted non absorbable sutures. Eight patients (16%) were reported with history of splenic injury due to gunshot trauma injury. In all these patient spleen was badly shattered. Splenectomy was performed in all the cases including 5 patients having associated injury of transverse colon in 2 cases, in which exteriorization of colon was done in the form of colostomy and 3 patients with jejunal perforation which were repaired primarily.

DISCUSSION

The age frequency in the current study ranges from 7 to 65 years with mean age of 30 years that is almost similar with a study by Udobi et al in 2001[4] they reported a figure of 30 years. While it is lower i.e. 23 years in a study by khoury et al in 1996 in USA[5]. More recently another study conducted at Department of General Surgery, University Hospital Girona, Spain by Rodríguez-Hermosa JI, has given a median age of 35 years. [6]

In this study one patient had negative laparotomy because bullet passed through the anterior abdominal wall without breaching the peritoneum. One patient with firearm injury was treated conservatively as he was haemodynamically stable and did not reveal any evidence of visceral injury, the most important thing in the conservative management of the patient was repetitive examination and continuous eye on the vitals and abdominal signs of the patient. His duration of stay in hospital was 4 days; shorter than the patient with negative laparotomy i.e. 7 days.

In this study 48 patients (96%) underwent for laparotomy which is almost same as compared to studies reported by Ijaz Ahmad [1] in 1992 in which of 148 cases (98%) were operated and AFA Khan [7] in which 73 cases (96%) in 1999 were operated. Liver injuries constituted the main bulk of injuries 26.6% (n=13) to the solid organs whereas A.K Leppaniemi et al [5] in 1999 in a series of 209 cases depicted a figure of 22% while in other study by I.M. Bain et al[50] in 1996 calculated a figure of 30%, 29.1% and 30.7% in their small series of 10, 24 and 13 cases respectively. However AFA Khan et al [7] in their study of 37 cases noted 14.5% liver injuries.

Our approach is comparable with Athar et al [8] who observed that finger fracture technique in some and perihepatic packing in rapidly exsanguinating patients are the viable options for injured liver. However on the contrary few authors recommends that although non-operative management of liver injuries has been common practice a management plan that involves a multimodal surgical strategy is essential.[3,6]

Splenic injuries constituted 16%. The incidence is lower 7.2% in study of A F A Khan et al[7] in 1999 and just 7% in a study by Ijaz [1]. As we did Splenectomy in all patients we think operative procedure for the management of splenic trauma requires some more efforts towards salvage.

Pancreatic trauma constituted 8% of the injuries. Madiba et al [9] in 1995 quoted the incidence of about 10% of the abdominal injuries but Ijaz et al in 1996 mentioned a figure of 6.1%. Gupta et al [10] in 2008 in India mentioned a figure of 1-12% as the pancreas is surrounded by major abdominal organ and blood vessels, associated injuries are consequently frequent. In current study all the pancreatic injuries are coupled with other abdominal organ injuries (100%). In pancreatic trauma improved evaluation and more aggressive surgical intervention is desired than exploration and drainage. [11]

The pattern of internal organ injuries in our study is comparable with the other series. The Similarity among these depicts the pattern of injury depending upon the site and depth of organ and the trajectory of the missiles. Prevalence of injuries to small gut, colon, liver and spleen can thus be explained.

CONCLUSION

Intestine, liver, spleen and stomach found to be most frequently injured abdominal organs in this study. After debridement simple reconstructive procedure of repair are adequate in most of the cases. The delay between the time of injury and the initiation of treatment is responsible for the unfavorable outcome. Persistent sepsis is responsible for higher mortality.

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