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Original Research Paper

General Surgery

A CLINICAL STUDY ON SPECTRUM OF INJURIES DUE TO BLUNT TRAUMA ABDOMEN REQUIRING LAPAROTOMY AND IT'S OUTCOME ATTENDING A TERTIARY CARE HOSPITAL OF WEST BENGAL

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ABSTRACT

Background: Trauma is the curse of modernization. Road traffic accidents are increasing day by day. Abdomen is commonly involved in blunt trauma but often missed clinically. Therefore, we choose to study the effect of blunt trauma and its outcome in an institute with limited resources.

Methods: A prospective cross-sectional observational study was done. Data were collected in a suitable proforma mentioning patients demographics. Intra-operative findings and post-operative events were documented. Outcome of patients were noted.

Results: Total 50 patients were included in the study. Males were affected in 92% cases. Sixty percent of the patients were operated within 10 hours of injury. Associated extra abdominal injuries had been found in 28 cases that was 56%. The most common were head injuries (20%), followed by thoracic injuries (14%). Liver was involved in 16 (32%) patients followed by small bowel (22%), spleen (16%), mesentery (14%), large gut and combined injury (both 6%), duodenum (4%). Eleven patients died due to various post-operative complications.

Discussion: Road traffic accident was the most common mode of injury. Hence measures should be taken to prevent it. Morbidity and mortality remained high at large. The reason for this could be due to the long time interval between trauma and hospitalization, delay in diagnosis, post-operative complications and associated trauma especially to head, thorax and extremities.

KEYWORDS :

INTRODUCTION

Trauma has been called the neglected disease of the modern society despite its huge importance[1]. It is estimated that by the year 2020, injuries from road traffic accidents will be the third most common cause of disability worldwide and the second most common cause in the developing world[2].The abdomen is a diagnostic black box[3]. It is most commonly involved following blunt trauma. Motor vehicle accidents accounting for 75 to 80% of blunt trauma of abdomen.[4]

Blunt abdominal trauma is usually not obvious. Hence, often missed, unless, repeatedly looked for. Due to the inadequate treatment of the abdominal injuries, most of the cases are fatal. Morbidity and mortality remain at large very high.

In this study we will discuss the spectrum of different injuries due to blunt trauma abdomen in patients who needs immediate or delayed surgical intervention and its outcome in terms of morbidity and mortality.

MATERIALS AND METHODS

This was a prospective observational study done in the department of surgery of Calcutta National Medical College and Hospital. All the patients with blunt abdominal trauma requiring operative intervention from March 2013 to February 2014 were taken. It was a cross-sectional study and the patients were taken purely on the basis of complete enumeration.

Standard exploratory laparotomy technique was followed. The peritoneal cavity would be meticulously inspected and where necessary, retroperitoneal viscera would be mobilized for adequate exposure.

Data were collected in a suitable proforma mentioning patient's demographics . Detailed history and clinical examination findings were noted. Intraoperative findings as well as their management were documented. Post-operative events such as, wound infection, wound dehiscence, fever, intraperitoneal collection, paralytic ileus, deep vein thrombosis (DVT) etc. were recorded. Outcome of patients in terms of morbidity and mortality were noted.

Patients with penetrating injury and blunt trauma abdomen treated with conservative management were excluded from the study. All recorded data were analyzed with suitable diagrams, figures, tables, and findings would be discussed.

Ethical clearance for the study was obtained from the institutional Ethics committee.

RESULT AND ANALYSIS

From March 2013 to February 2014, the total number of blunt trauma abdomen emergency operations carried out by various General surgical Units in Calcutta National Medical College and Hospital was 50. In this series, majority of the patients belonged to 21-30 years age group. The total no of male patients were 46 (92%) and 4 patients were female i.e. 8% only. So, in this area males are more prone to injuries.

Latent period is the interval between the time of injury to the time of surgery.

Table 1: Number and percentage of patients in respect of Latent Period

LATENT PERIOD	NO OF PATIENTS	PERCENTAGE (%)
<10 HOURS	30	60%
<20 HOURS	15	30%
>20 HOURS	5	10%

It was observed that average latent period was less than 10 hours where 60% patients had been taken to surgery.

Associated extra abdominal injuries had been found in 28 cases that was 56%. The most common were head injuries (20%), followed by thoracic injuries (14%) which was mostly rib fractures. Orthopedic injury, combined injury and maxillofacial injury were 10%, 8% and 4% respectively.

Table 2: Organs involved in blunt-trauma abdomen

ORGANS	NO OF PATIENTS	PERCENTAGE (%)
LIVER	16	32%

SPLEEN	8	16%
SMALL BOWEL	11	22%
LARGE GUT	3	6%
MESENTRY	7	14%
DUODENUM	2	4%
COMBINATION	3	6%

From the above observation we found that in our institute the most common organ involved following blunt trauma abdomen was liver (32%). In our study we could not find cases of urogenital injury, retroperitoneal hematoma, pancreatic and gastric injury requiring laparotomy.

Four quadrant aspiration was done in 36 cases, out of which 4 cases were negative. We found in our institute that four quadrant aspiration of abdomen was a very good tool for diagnosis and further management, as we didn't have investigations like FAST and emergency CT scan at the time of study. As we didn't have the emergency Ultrasonography investigation in our institution, only 7 patients had the Ultrasonography examination before the laparotomy. Two patients came with USG report before admission and other 5 were done after admission as the patients were hemodynamically stable at that time. 2 out of 7 reports showed solid visceral injury. CT scan was done in 3 cases only, as that facility was not available in our institute. Those 3 patients could afford and their conditions permitted them to be shifted to a scanning center to underwent CT scan.

Liver injuries were usually graded as I and II, and treated by hepatorrhaphy. Out of 9(one was combined injury of liver and spleen with jejunal gangrene) patients with splenic injury, all patients underwent splenectomy except one patient, who was treated by splenorrhaphy. Bowel perforations were treated with 2 layered closures, with 8 patients requiring resection and anastomosis. Mesenteric injuries were treated by simple suturing and ligating the bleeding points. In the present series of 50 cases, 2 cases of duodenal perforation were found which were simple and were closed by 2 layered closures. We could not find any case of disruption of the biliary tract and pancreatic injury in this series.

Table 3: Different post-operative complications

COMPLICATIONS	NO. OF PATIENTS	PERCENTAGE (%)
WOUND DEHISCENCE	5	10%
WOUND INFECTION	11	22%
BILIARY FISTULA	2	4%
RESPIRATORY COMPLICATION	7	14%
ACUTE RENAL FAILURE	1	2%
FAECAL FISTULA	5	10%
INTRA ABDOMINAL COLLECTION	3	6%

Total 50 patients were taken in this study, out of which 11 patients (22 %) died due to various post-operative complications. 39 patients were discharged from the hospital with complete recovery or mild wound infection.

DISCUSSION

We conducted the study with 50 patients who had developed abdominal organ injury due to various blunt trauma and brought to Calcutta National Medical College & hospital, Kolkata. 92% of the victims of the blunt trauma abdomen were male while only 8% were females. The most common age group was 21-30 years of age. Similar findings were also found in other study by **Davis et al**[6] where male was 70% victim and by **Chintan Patel et al**[7] ,where male produced majority of number.

In this study it was seen that the most common cause of blunt trauma abdomen was road traffic accident (70%). Other studies from Indian groups showed the similar data[7,8,15-19]. While **Davis et al** have found that in western countries road traffic accidents were culprit in nearly 2/3 cases of solid organ injuries which was more than the findings of Indian studies[6].This may be due to the rapid development in technology in all fields including automobile industry where the first priority has been given to speed rather than safety and lack of consciousness about the traffic in majority of people. **Chaudhary et al.**[5] and **Suresh Kumar *et al***.[14]also found that most of the road traffic accident victims were (34.5%) two-wheeler riders and 23% were pedestrians.

Signs and symptoms in abdominal injuries are notoriously unreliable and are often masked by concomitant head injuries, chest injuries and pelvic fractures. Significant injuries to the retroperitoneal structures may not manifest signs and symptoms immediately and be totally missed even on abdominal X-rays and DPL predisposing the patients to grave consequences of missed injuries. In **Davis et al**[6] study, 43% of patients had no specific complaints and no signs or symptoms of intra-abdominal injury when they first presented to the emergency room. But 44% of those patients eventually required exploratory laparotomy and 34% of patients had an intra-abdominal injury. This emphasizes the importance of careful and continuous observation and repeated examination of individuals with blunt abdominal trauma.

60% of patients were taken for surgery in less than 10 hours and 30% of patients in less than 20 hours of injury. This time lag is due to the site of accidents, which are usually rural, and the time taken to transport them to the hospital. In our institute most of the surgeries were done in less than 10 hours of accident most probably due to improvement in transport.

Associated extra abdominal injuries were found in 28 cases. The common extra abdominal injuries were head injury, followed by thoracic injury (rib fractures) and then orthopaedic injury. It is different from other studies. One Indian study showed majority orthopaedic injuries[8] 27% then thoracic injuries 24% while in a study by **Davis et al**[6] showed maximum thoracic injuries 27% then orthopaedics injury in 15% and **N. Howes et al**[9] showed maximum orthopaedics injury, 97 cases out of 926 cases.

Most common organ involved was liver followed by small bowel and then spleen. It is contrary to the international series where spleen is the most common viscera injured. Liver was involved in 32% of cases, followed by small bowel (22%), and spleen (16%). **N. Howe's et al**[9] showed that liver injury was most common. It was also supported by **N Bayapa Reddy et al**[4] that the most commonly injured abdominal solid organ was liver (32.6%)[4], which was an autopsy-based study. But some studies also contradict the above fact. In our study we could not find cases of urogenital injury, retroperitoneal haematoma, pancreatic, gastric injury requiring laparotomy.

Four quadrant aspiration was done in 36 cases, out of which 4 cases were negative. Contrary to the other studies which rely on DPL some author also suggested four quadrant aspiration for rapid assessment[10]. However, negative result does not rule out hemoperitoneum. In the present study, all 36 patients were subjected to four quadrant aspiration as against 44% in **Davis et al**[6] study. 22 cases were found to be positive and 39 cases were negative in a study by **Patel et al** [7]. This major difference may be due to the fact that in this study we only dealt with the patient requiring laparotomy.

Ultrasound is more reliable in detecting solid organ injuries and free fluid in the abdomen. Emergency Ultrasonography and most importantly CT scan were found to be highly accurate and reliable mode of detecting solid organ injuries and hemoperitoneum[11]. Laparotomy was more common in our

study due to unavailability of better imaging and risk of missed injuries[7].

In the present study hepatorrhaphy was done in 36%, splenectomy was done in 16%, resection anastomosis and mesenteric repair done in 14% cases, small bowel repair done in 8% cases. Primary duodenum perforation repair and ileostomy both were 4%. In **Khanna et al**[8] study closure of bowel perforation was done in 13 patients, colostomy in 2 patients, repair of mesentery in 9 patients, splenectomy in 4 patients, splenorrhaphy in 1 patient and hepatorrhaphy in 6 patients.

In post-operative period wound dehiscence occurred in 10% and wound infection occurred in 22%. Respiratory infection was one of the important post-operative complications(14%). Biliary fistula was 4%, acute renal failure was 2%, faecal fistula was 10%. Majority of the patient died following fistula and 2 patients died due to hypovolemic shock after operation. Eleven patients died in the post-operative period, majority of them due to peritonitis and septicemia. Therefore, the mortality in the present study was 22%. Mortality rate in **Davis et al**[6] study was 13.3% and **Di Vincenti et al**[12] study (1968) was 23%. **Cox et al**[13] study reports a mortality rate of 10%.

CONCLUSION

From this study we can conclude that males mostly of the age group of 21-30 years which form the young and productive group were predominantly affected. Road traffic accident was the most common mode of injury. Hence measures should be taken to prevent these accidents and for care of the victims at the accident site. Measures for early transport of the patients from the accident site to the trauma center should be undertaken. Associated extra abdominal injuries like head, thoracic and orthopaedic injuries were found in 28 cases in the present study. These greatly influenced the morbidity and mortality of the patients. Post-operative complications like wound infection, dehiscence, respiratory infections and faecal fistula were common in blunt abdominal trauma. Mortality rate was 22% in the present study.

In spite of the best techniques and advances in diagnostic and supportive care, the morbidity and mortality remained high at large. The reason for this could be due to the long time-interval between trauma and hospitalization, delay in diagnosis, inadequate or lack of appropriate surgical treatment, post-operative complications and associated trauma especially to head, thorax and extremities.

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