Original Research Article

Abdominal trauma – A clinical study

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Abstract

Introduction: Trauma increase in incidence may be the price marking paying for the increased sophistication of industrialization and various paying for the increased sophistication of industrialization and various rapid transport systems.
Aim: The aim of the study was to evaluate the incidence of abdomen trauma, clinical presentation, morbidity, and mortality.
Materials and methods: This prospective clinical study was carried out on patients admitted for a period of 1 year in 120 cases of abdominal trauma treated in our hospital. After admission, data for the study were collected by detailed history, thorough clinical examination, and relevant diagnostic investigations performed over the patient.
Results: Most common age group were 21-30 (43.3%) with a mean age group of 29.5 years. In present study, there were 98(81%) male and 22(19%) female with a ratio of 4.5:1. Most of them were operative management. There were 87(73%) cases of homicide, 23(19%) cases were suicide and 10(8%) were accidents. Injury pattern showed that 51(42.5%) cases had entry wound in umbilical region followed by right iliac, right lumbar. Intra-abdominal injuries included small intestine (n = 41, 34.17%), stomach (n = 24, 20%) and Ileum (n = 17, 14.17%). It was found that average drain output was 60ml/day for small bowel perforation and patient started oral feeding on POD 5, removal day of drain was averaging sixth day after starting orally.
Conclusion: A thorough and repeated clinical examination and appropriate diagnostic investigations lead to successful treatment in these patients.

Key words

Injury abdomen, Mortality, Road traffic accidents.

Introduction

The incidence of trauma as a whole seems to be increase as a cause of morbidity and mortality. This increase in incidence has been explained in various ways, thus it may be the price marking paying for the increased sophistication of industrialization and various paying for the increased sophistication of industrialization and various rapid transport system. But beyond these non-human causes there is a human element also. Violence has been a major method of settling scores in certain areas. The preponderance of such violence is a cause of trauma in certain areas. The preponderance of such violence as a cause of trauma in certain areas of rayalaseema makes one feel whether this can be even considered as an endemic here in the broad sense of that term.

The increasing frequency of abdominal trauma makes trauma as one of the leading causes of acute abdomen in the day surgical practice. The trauma is usually classified as penetrating or non-penetrating trauma based on, whether the integrity of peritoneum has been violated or not. In addition to these another special group of abdominal trauma can be added because of its peculiar circumstance and effects. This is iatrogenic injuries to the abdominal organs following various invasive diagnostic and therapeutic procures for e.g. Liver biopsy various endoscopic procedures like laparoscopy, Gastroscopy and cystoscopy etc. [1, 2].

A high degree of suspicion of intra-abdominal injuries, even in cases following minor trauma will prevent the diagnostic errors. Blunt abdominal trauma generally leads to higher mortality according to various series reports. The diagnosis if intra-abdominal injuries in non-penetrating trauma are rather difficult in certain cases. This is more so, if the patient presents in a shocked and unconscious state with multiple associated injuries like head injury, thoracic injury in skeletal injuries. The picture may become much more complicated if the patient end or was already given some narcotic analgesics. Although increasingly sophisticated non-invasive techniques are described for facilitating rapid and accurate diagnosis, they are not yet widely available. The diagnosis and decision for surgery depends mainly on careful and repeated clinical examination with the aid of basic investigation the management must be individualized [3].

The management of abdominal trauma depends to a great extent on co-operation and understanding between surgery and other departments. The management depends basic understanding of radiology anesthesia, fundamental principles of wound treatment shock, blood replacements, multiple injuries to kidneys, bladder, chest, blood vessels and finally handing of mass casualties.

Systematic approach to pre-operative diagnosis and preparation intraoperative inspection and repair, post-operative care and observation for complications is essential for the successful management of individual cases. The aim of the study is to evaluate the incidence of injury abdomen, clinical presentation, morbidity, and mortality.

Materials and methods

It was a prospective clinical study carried out on patients admitted at Department of Surgery on cases of abdominal trauma treated in our hospital during the period of 1 year in department of surgery at Gandhi medical college from January-December in 2011. The total hospital admissions during this period were taken out of which 120 cases are of abdominal trauma in general surgical wards. Patient admitted with a history of abdominal trauma, undergoing surgical intervention, or treated by non-operative management were included in the study.

Patients with penetrating injuries and gunshot injuries were excluded from the study. Detailed history was obtained and Clinical findings with relevant diagnostic investigations performed over the patient. After initial resuscitation of the

patients, thorough assessments for injuries were carried out in all the patients.

History, clinical findings, diagnostic test, operative findings, operative procedures, and complications during the stay in the hospital and during subsequent follow-up period, were all recorded on a proforma specially prepared.

Demographic data collected included the age, sex, occupation, and nature and time of accident leading to the injury. After initial resuscitation and hemodynamic stability, all patients were subjected to careful examination, depending on the clinical finding. The decision for operative or non- operative management depended on the outcome of the clinical examination, hemodynamic stability, and contrast- enhanced computed tomography abdomen. Patients selected for non-operative or conservative management were placed on strict bed rest and were subjected to serial clinical examination which included hourly pulse rate, blood pressure, respiratory rate and repeated examination of abdomen and other systems. Appropriate diagnostic tests, especially ultrasound of abdomen were repeated as and when required. In those who are operated, the operative findings and methods of management are recorded. Cases are followed up till their discharge from the hospital. If patient expired, post mortem findings are noted. Post- operative morbidity and duration of hospital stay were recorded. The above facts are recorded in a pro forma prepared for this study.

Results

Out of the 120 cases 98 patients were males and 22 patients were females. 66 patients suffered with penetrating injuries and 54 patients suffered with non-penetrating injuries as show below. Out of the total mortality of 26 cases, 17 cases succumbed to penetrating injuries and 9 cases to non-penetrating trauma. The total mortality rate is 21.5% it is 26 % for penetrating 16.5 per cent for non –penetrating trauma. Of these, one case each of penetrating and non-penetrating violence was casualty deaths due to severe shock due to multiple injuries. Mortality rate has been found to be low in non-penetrating injuries in our series. This could be because most of these suffered only parietal injuries. Most common age group were 21-30 (43.3%) with a mean age group of 29.5 years (**Figure – 1**).

In present study there were 98(81%) male and 22(19%) female with a ratio of 4.5:1. Most of them were operative management. In total 120 cases 66(55%) are Penetrating injuries and 42(45%) are Non-penetrating injuries (**Table – 1**).

In present study there were 87(73%) cases of homicide, 23(19%) cases were suicide and 10(8%) were accidents (**Figure – 2**).

In present study injury pattern showed that 51(42.5%) cases had entry wound in umbilical region, followed by right iliac, right lumbar. Intra-abdominal injuries, included small intestine (n = 41, 34.17%), stomach (n = 24, 20%), Ileum (n = 17, 14.17%), Jejunum (n = 9, 7.5%), Transverse colon (n = 7, 5.84%), Caecum (n = 7, 5.84%), Liver 4(3.34%) and Kidney (n = 5, 4.16%) as per **Table - 2**.

In present study it was found that average drain output was 60ml/day for small bowel perforation and patient started oral feeding on POD 5, removal day of drain was averaging sixth day after starting orally, for hemoperitoneum post op day and drain (**Table – 3, 4**)

Discussion

Present study most common age group were 21-30 (43.3%) with a mean age group of 29.5 years. Hardik Dodia, et al. [4] observed that mean age group 21-30 (41.70%) patients were from 21-30 years age group Ari Leppaniemi, Jarmo Salo and Reijo Haapiainen [5] reviewed 172 cases of penetrating chest and abdominal trauma the mean age group involved was 33 years (range, 15 - 83). Results were found comparable Penetrating

abdominal injury. Results found similar to my study.

In present study there were 98(81%) male and 22(19%) female with a ratio of 4.5:1 (**Table - 1**). Ari Leppaniemi, Jarmo Salo and Reijo Haapiainen [5] reviewed 172 cases of penetrating chest and abdominal trauma 144 (83.73%) cases were male and 28 (16.27%) cases were female with ratio of 5.14:1 which is found similar to my study.

Figure - 1: Age distribution in study.

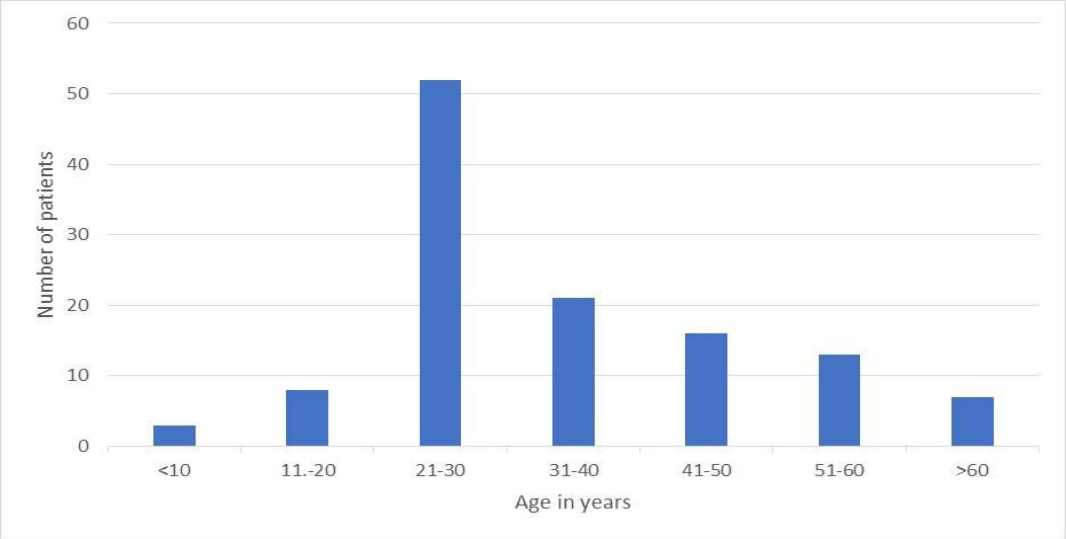

Table - 1: Distribution of penetrating and Non-penetrating injuries.

Sex	Penetrating	Non-penetrating	Total
Male	56	42	98
Female	10	12	22
Total	66	54	120
Conservative	5	35	40
Operative	60	20	80
Total	65	55	120

Figure - 2: Mode of injury.

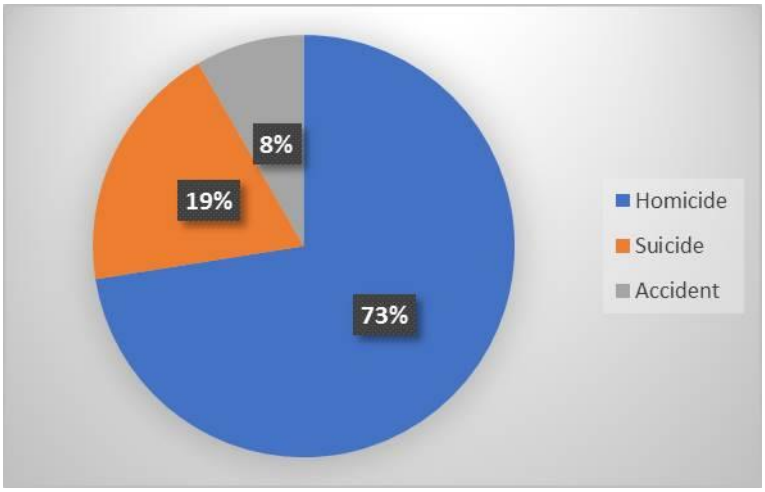

Table - 2: Areas involved in study.

Areas involved	**No of cases**	**%**
Umbilical	51	42.5
Rt Lumbar	14	11.6
Lt Lumbar	5	4.16
Epigastrium	10	8.3
Hypogastrium	4	3.33
Rt Iliac region	25	20.8
Lt Iliac region	6	5
Rt Hypochondrium	3	2.5
Lt Hypochondrium	2	1.67
	120	100
Organs involved		
Stomach	24	20
small intestine	41	34.17
Ileum	17	14.17
Jejunum	9	7.5
Transverse colon	7	5.84
Caecum	7	5.84
Liver	4	3.34
Kidney	5	4.16
Ureter	3	2.5
Pancreas	2	1.67
Lung parenchyma	1	0.83

In present study there were 87(73%) cases of homicide, 23(19%) cases were suicide and 10(8%) accidents, Homicide accounting for maximum (**Figure - 2**). Hardik Dodia study 19(76%) cases of homicide, 2(08%) cases were suicide and 04(16%) cases were accident. Ari Leppaniemi, Jarmo Salo and Reijo Haapiainen [5] reviewed 172 cases of penetrating chest and abdominal trauma 120(69.74) cases were homicidal rest wounds were self-inflicted in 52 cases (30.26). It is commonly seen in society that penetrating mode of injury is associated with homicidal attempt, most commonly practiced is stabbing in Bullgore injuries [6].

In present study injury pattern showed that 51(42.5%) cases had entry wound in umbilical region, followed by right iliac, right lumbar (**Figure - 2**). Hardik Dodia study showed that 9(36%) cases had entry wound in umbilical region, followed by right iliac, right lumbar and lateral chest with 4(16%) cases each. In AnisUzZaman, et al. study most entry wounds were found on ventral abdominal wall (57%), involving the right upper quadrant in majority (31.6%) of patients.

In present study injury pattern showed that 51(42.5%) cases had entry wound in umbilical region, followed by right iliac, right lumbar. Intra-abdominal injuries, included small intestine (n = 41, 34.17%), stomach (n = 24, 20%), Ileum (n = 17, 14.17%), Jejunum (n = 9, 7.5%), Transverse colon (n = 7, 5.84%), Caecum (n = 7, 5.84%), Liver 4(3.34%) and Kidney (n = 5, 4.16%)(Table-2). Hardik Dodia [4] study 6(24%) patients had jejunal injuries, followed by tranverse colon, Liver and Kidney 2(8%) cases each. No cases were associated with major thoracic vessel and heart. J.E. Pridgen and A.F. Heriff [7] reviewed 776 cases of penetrating abdominal wounds and found colonic injuries in 15.33%, gall bladder rupture in 2.9% and mesenteric injuries in 3.47% of cases. Vascular injuries, involving aorta were present in 0.5% and iliac vein in 0.64% cases. The other injuries include- 2.57% bladder injuries, 4.12% pancreatic injuries, 13.14% stomach injuries, 22.8% liver injuries and 21.26% small bowel injuries. Anis UzZaman [8], analysis of 99 cases study retrospectively reviewed the records of 99 patients and found Intra-abdominal injuries, included liver (n = 14, 17.7%), spleen (n = 12, 15.2%), kidney (n = 4, 5.1%), pancreas (n = 4, 5.1%), stomach (n = 12, 15.2%), small bowel (n = 34, 43%) and large bowel (n = 35, 44.3%).

In present study it was found that average drain output was 70ml/day for small bowel perforation and patient started oral feeding on POD 5, removal day of drain was averaging sixth day after starting orally, for hemoperitoneum post op day and drain.

The present work is a prospective study of 120 cases of abdominal trauma which were in our hospital during the period 3 years. Various aspects of these cases such as nature and cases of injure methods of management, the final outcome were statistically analyzed. Twelve of

these cases were presented in detailed illustrating the various types of lesions complications and treatment. The pathology and various mechanisms of abdominal trauma and its diagnostic procedures and treatment were comprehensively discussed.

Table - 3: Operative Findings and Procedure done.

Operative findings	**Number of cases**	**Percentage**	**Procedure done**
Jejunal/ ileal perforation (multiple through and through or involving mesentry)	26	21.67	Resection and anastomosis of affected segment
Tranverse colon perforation multiple mesentry involvement	48	40	Resection and anastomosis of affected segment
Liver parenchymal injury	5	4.17	Closure (hepatorrhaphy) and Abgel packing
Renal parenchymal injury	5	4.17	Primary repair (renorrhaphy) and abgel packing
Ureteral injury	25	20.83	Primary repair and DJ stenting
Gastric Perforation	5	4.17	Primary repair
Retroperitoneal Hematoma	3	2.5	Lavage and Closure
Hemoperitoneum (Anterior abdominal wall bleeding)	3	2.5	Drainage and Lavage
	120	100	

Table - 4: Postoperative management For laparotomy.

Procedure done	**Average drain output/ day**	**Drain on day 6 removal**	**Oral feeding started on day**
Jejunal perforation primary repair	60ml/day	6	5
Resection and anastamosis of small bowel perforation	60ml/day	7	5
Gastric perforation primary repair	50ml/day	7	5
Tranverse colon resection and anastamosis	60ml/day	7	5
Drainage and lavage	30ml/day 100ml/day	5	3
Renal parenchymal and ureteral injury	100ml/day	5	2
Liver parenchymal injury	100ml/day	5	5

In the present medical literature, there are various areas of controversy regarding different aspects of management of various types of abdominal trauma. For example, in the management of stab injuries there are advocates of routine exploration of all stub injuries while other prefer selective conservation. In case of liver injuries, there is a varied spectrum of surgical procedures each of these is a controversy by itself. Similar in splenic injuries although splenectomy is still riding high, there are those who suggest more conservative outlook and suggest various modalities of preserving traumatized spleen.

Conservative management requires manpower and machine power for constant monitoring of the patient. Where these facilities are not available in many centers to constantly monitor the patient, then it is better to open and see than wait and see otherwise valuable time will be lost and we may lose the patient. In spite of adequate and efficient management if the patient dies even due to unrelated problem there is every possibility of the patient's attendants approaching consumer redressal forum om the grounds that their patient is not given proper treatment i.e., surgery. Hence it is better to open and see in cases of stab wounds and in cases of blunt abdominal trauma where clinically surgery is indicated. However, some laparotomies may be negative. Treatment of pancreatic and duodenal injuries is another field of uncertainties. In the management of retro perineal hematomas some suggest simple conservatism while other strongly favor routine exploration of retroperitoneal hematomas claiming that this procedure will not in any way add significantly to mortality or to the operative time. We feel it is better not to routinely explore retroperitoneal hematoma unless there is indication to explore.
Generally, it is said that blunt trauma carries mortality than penetrating trauma and it request careful observation and management too get good results.

In the present series, we found that penetrating trauma constituted 55% of the cases and the rest due to non-penetrating trauma. These are the cases where the weapon has failed to enter the peritoneal cavity. This high incidence of penetrating or attempted penetrating trauma with sharp weapon is explained by wide prevalence of faction and feuds fuelling the violence in their regions.

Conclusion

Most common age group were 21-30 (43.3%) with a mean age group of 29.5 years. In present study there were 98(81%) male and 22(19%) female with a ratio of 4.5:1. Most of them were operative management. In present study there were 87(73%) cases of homicide, 23(19%) cases were suicide and 10(8%) were accidents. In present study injury pattern showed that 51(42.5%) cases had entry wound in umbilical region, followed by right iliac, right lumbar. Intra-abdominal injuries, included small intestine (n = 41, 34.17%), stomach (n = 24, 20%) and Ileum (n = 17, 14.17%). It was found that average drain output was 60ml/day for small bowel perforation and patient started oral feeding on POD 5, removal day of drain was averaging sixth day after starting orally, for hemoperitoneum post op day and drain.

Broadly speaking, this involves a change is various aspects like socio-economic standards, literacy rate certain rate and certain important aspect of human behaviors which are the root cause for the human violence. Technically speaking, shortened period of transportation, rigorous measures of resuscitation, early diagnosis and decision for surgery, good radiological and bool bank facilities careful exploration and perfect technique of surgery and meticulous post-operative follow-up well all aiding reducing thee mortality.

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