



CLINICAL STUDY OF PENETRATING INJURIES OF ABDOMEN IN A TEACHING HOSPITAL IN RAYALASEEMA REGION

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ABSTRACT

Background & Objectives: The incidence of trauma is increasing as a cause of morbidity and mortality. A prospective study of patients presenting with penetrating injuries to the abdomen at Kurnool medical college and government general hospital during 2014-2016 above 10 years are included. The incidence regarding age, sex, weapons, pattern, clinical presentations, post operative morbidity and mortality are studied.

Patients and Methods: This is a clinical study comprising of 50 patients of penetrating injuries of abdomen who attended casualty in Government General Hospital, Kurnool over a period of 2 yrs.

Results: There were total 50 cases. The penetrating abdominal trauma is most common in age group 21- 40 (39%) years with male predominance (M:F:9:1). In present study injury pattern showed that 92% of penetrating injuries abdomen are caused by homicidal injuries. Most common presenting symptom is abdominal pain. In my study 17(26.5%) patients had jejuna injuries, followed by transverse colon, liver. Most common complication found is surgical site infection 12% followed by seroma. In present study the mortality rate was 16%.

Interpretation & Conclusion: The young to middle aged males are most commonly prone to penetrating injuries of abdomen. Most cases are injured by stab with knife. Small bowel is most common organ involved followed by transverse colon. Liver is the most common solid organ injured. The most common post operative complication is surgical site infection.

KEYWORDS : Penetrating injuries Abdomen Teaching hospital

INTRODUCTION

Kurnool General Hospital caters the needs of the people of Kurnool, Anantapur, Cuddapah and some areas of Mahaboobnagar and Prakasam Districts. Many a time we find the root cause for this trauma is running feuds between families or political rivalries. This being so, we find armed people moving around in a state of constant alert. Any minor quarrel in this charged atmosphere at some places results in the appearance of a crop of cases of Trauma of varying severity in our casualty.

In this study, various mechanisms and pathological basis of abdominal trauma by penetrating injury, its diagnosis and management were briefly discussed. A detailed clinical study of fifty cases was made. A retrospective study and analysis of fifty cases of penetrating abdominal trauma that admitted in this hospital over a period of 3 years from October-2014-2016 was undertaken with a review of the medical literature.

AIMS OF THE STUDY

A prospective study of patients presenting with penetrating injuries to the abdomen at Kurnool Medical College and Govt. General Hospital, Kurnool during the period of October 2014-2016. All cases penetrating the peritoneal cavity aged above ten years are included in the study.

1. The general incidence of penetrating injuries to the abdomen, sex incidence, weapons used, various clinical presentations are studied.
2. Patterns of injury that occurs in penetrating injuries are studied.
3. Methods of evaluation, management and Post-operative course of these patients are studied with special reference to factors that affect the morbidity and mortality.

MATERIALS AND METHODS

An analysis of fifty cases which were admitted to Government General Hospital /KMC, Kurnool between October -2014 to October- 2016.

These included cases due to stab injury and firearm injury and injury by other objects. Cases, which died on the spot and brought dead to the hospital were not included in the study.

In each case age, sex, history regarding the type of weapon, nature of injury, time of injury etc were taken. A thorough examination dictated by the general condition of the patient was done and necessary resuscitative and investigative procedures done.

Where there were positive findings (i.e shock, evisceration, peritonitis, pneumoperitoneum) laparotomy was done.

Where the findings were equivocal i.e an injury was there but penetration into peritoneal cavity could not be ruled out clinically because of local guarding etc, wound is explored under local anaesthesia in the operation theatre. If there was penetration of the peritoneal cavity a formal laparotomy was done to rule out internal injury and managed accordingly.

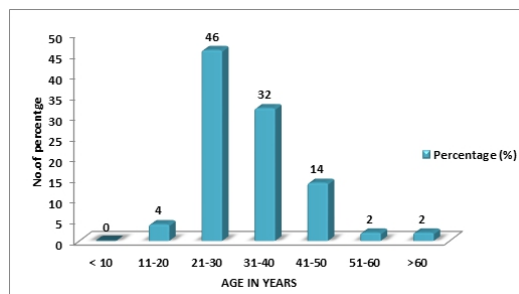
All cases were started on antibiotics preoperatively to reduce infective complications. Tetanus prophylaxis was provided by giving a dose of tetanus toxoid to all patients.

OBSERVATIONS AND RESULTS

In present study 50 cases of penetrating abdominal trauma has been studied and following are the relevant observations and discussions

Table-1 : Age Incidence

Age (years)	Present study (n=50)	Percentage (%)
< 10	00	0
11-20	02	04
21-30	23	46
31-40	16	32
41-50	7	14
51-60	01	02
>60	01	02
Total	50	100



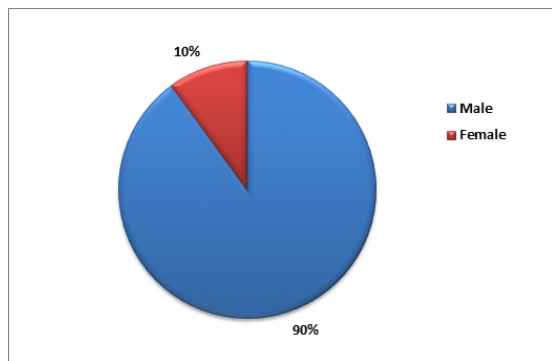
In present study 0 (0%) patient less than 10 years, 02 (08%) were from 11 to 20 years, 23 (46%) were from 21 to 30 years, 16 (32%) were from

31 to 40 years, 07 (14%) were from 41 to 50 years, 01(04%) from 51 to 60 years and 01 (02%) more than 60 years. It is observed that 39(78%) patients were from 21-40 years age group with a mean age group of 29.5 years.

Table 02: Sex Incidence

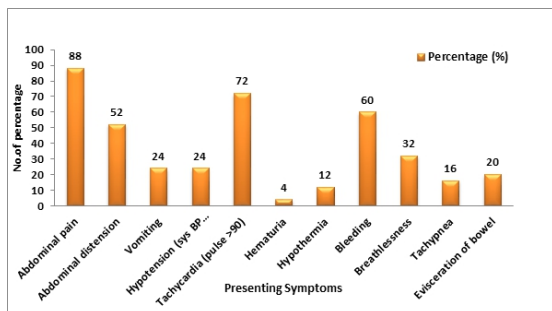
Sex Incidence	Present study (n=50)	Percentage (%)
Male	45	90
Female	05	10
Total	50	100

In present study there were 45(90%) male and 5(10%) female with a ratio of 9:1



Presenting symptoms:

In my study 22 (44%) patients presented with abdominal pain and 5(10%) patients had history of evisceration of bowel, 6 (12%) patients had vomiting, 15(30%) patients had history of bleeding from local site, 13 (26%) patients presented with abdominal distension, 6(12%) patients were in hypotension and 18 (36%) patients had tachycardia at the time of presentation, 8 (16%) patients had associated chest pain and breathlessness while 1(02%) patient had history of unconsciousness.



Angle of entry centring midline

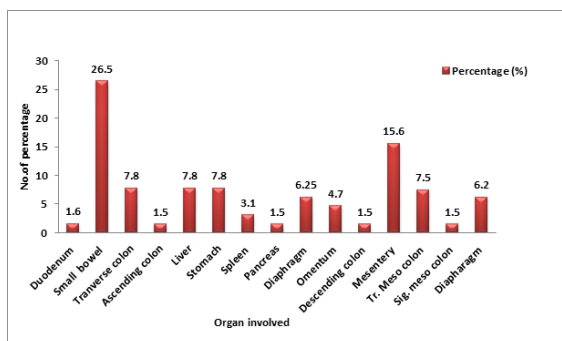
My study showed 20(80%) patients had acute angle wound centring midline, 4(16%) patients had direct right angle entry wound and 1 patient had obtuse angle. This states that wound impacted were most of the times directed toward

In present study injury pattern 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. Lt iliac, Lt lumbar, hypogastrum and central chest showed least impact

Table-3: Organs involved

Organ involved	No. of Injuries	Percentage (%)
Duodenum	1	1.6
Small bowel	17	26.5
Tranverse colon	5	7.8
Ascending colon	1	1.5
Liver	5	7.8
Stomach	5	7.8
Spleen	2	3.1
Pancreas	1	1.5
Diaphragm	4	6.25
Omentum	3	4.7
Descending colon	1	1.5
Mesentery	10	15.6

Tr. Meso colon	5	7.5
Sig. meso colon	1	1.5
Diaphragm	4	6.2
Total	62	100



In my study 17(26.5%) patients had jejunal injuries, followed by tranverse colon, Liver (7.8%) cases.

Table-4: Operative Findings and Procedure done

Operative findings	Number of cases	Procedure done
Jejunal/ ileal perforation (single)	15	Primary closure of perforation
Jejunal/ ileal perforation (multiple through and through or involving mesentery)	2	Resection and anastomosis of affected segment
Tranverse colon perforation multiple mesentery involvement	5	Resection and anastomosis of affected segment
Liver parenchymal injury	2	Closure (hepatorrhaphy) and Abgel packing
Spleen	2	Splenectomy
Gastric Perforation	5	Primary repair
Diaphragm	4	Primary repair
Mesentery	10	Primary repair

In present study most common peroperative finding was hemoperitoneum which was treated by drainage and lavage, followed by jejunal perforation (single) treated by primary repair, then followed by multiple small bowel perforation treated by resection anastomosis of affected segment, tranverse colon and liver came next in incidence which were repaired primarily

Table 5: Complications and morbidity

Complication/ Morbidity	Number Of early complications in present study (n=50)	Number of complications in study by AnizZaman (n=79)
SSI	6 (12%)	30.6 %
Seroma	4 (8%)	12.8%
Dehiscence of wound	1 (2%)	6.3 %
Pneumonia	4 (8%)	-

Most common complication found was SSI (Surgical Site Infection) accounting for 6(12%) cases followed by seroma and pneumonia accounting for 4 (8%) cases each.

In present study it was found that mortality rate was 16 percentage Hemorrhage leading to DIC and Shock are the most common cause of death worldwide in cases of penetrating trauma. Amount of blood loss before presenting to hospital and blood loss during surgery accounts maximum. First factor cannot be controlled that is blood loss before reaching to hospital but second factor can be controlled by proper resuscitation and definite surgery. In cases damage control surgery may be required, where control of bleeding is primary aim and definite surgery at later time. In emergency set up surgeries are carried out in night hours and many comorbidities are not optimized, moreover due to lack of expertise and setup limitations there is very high risk of complications including mortality. Ventilator associated pneumonia is most common cause of death inpatients on ventilator support. Septicemia is common cause of death in patients with peritonitis which

was found in one of my patient with biliary peritonitis due to penetrating injury which is unavoidable complication. Antibiotics according to organism and culture report, and life supports forms the mainstay of treatment.

Table 6: Hospital stay

Hospital stay	Present study (n=50)	Percentage (%)
≤ 5 days	18	36
6-10 days	22	44
11-15days	4	8
≥ 16days	6	12

Table 7: Outcome

Outcome	Present study	Percentage
Survival	42	84
Death	8	16
Morbidity	15	30
Total	50	100

Overall survival rate was 84 % with mortality 16 %.

DISCUSSION

Penetrating injuries are the leading cause of mortality and morbidity

Young males of age 20-40 years are most commonly involved. range from 10-60 years. average age is 29.5 years

Ari Leppaniemi, Jarmo Salo and Reijo Haapiainen¹ (1995) 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: A tertiary care hospital experience by AnisUzZaman, Muhammad Iqbal, FarhanZaheer, Rehan Abbas Khan, Khalid Ahsan Malik². This study included 79 patients with abdominal trauma who presented in the Accident and Emergency department of Civil hospital Karachi and underwent exploratory laparotomy from October 2011 to April 2013. A proforma was used to document patients demography, findings and final outcome with mean age group 21-30 (41.70%). Results found similar to my study.

A proforma was used to document patient's demography, findings and final outcome 76 (96.2%) patients were male and 3 patients were female. Results found similar to my study. Penetrating Chest Trauma In North Of Jordan: A Prospective Study by M Khammash, F El Rabea published in The Internet Journal of Thoracic and Cardiovascular Surgery Volume 8 Number 1 during the year 2004, 26 patients were managed, 25 males and one female

When patient presents with abdominal pain with features of shock (tachycardia, hypotension), it should arouse the suspicion of active intra-abdominal bleeding and immediate evaluation and treatment should be started. Patients with evisceration of bowel loop should be generously examined and should be taken to OT as soon as possible due to risk of strangulation and prevent changes of peritonitis. In a penetrating thoracic and abdominothoracic trauma³ patient with the complain of chest pain and breathlessness thorough evaluation should be done to rule out hemothorax, pneumothorax, hemopneumothorax, lung contusion, subcutaneous emphysema, pericardial effusion, cardiac tamponade

Physical examination was negative in 6 cases i.e in these cases it did not be decided whether the injury was penetrating or nonpenetrating based on clinical judgement. Further help was provided by in X-ray of the abdomen in erect posture and wound exploration, Peritoneal lavage was not employed in this study.

Shock was present in 1/3rd of patients. Absent bowel sounds and other signs of peritonitis were present in only 1/3rd of cases at initial presentation. Pneumoperitoneum was present on X-ray in only 35 out of 50 patients. Peritoneal tap was positive in only 10 patients out of 15 patients in whom it was done.

Hence in deciding on a patient whether the injury is penetrating or not; reliance cannot be placed on a single physical finding but all findings have to be taken together. A negative physical examination does not rule out internal penetration until the X-ray does not show

pneumoperitoneum or until wound exploration is negative and the patient remains stable in the ward when kept under observation for a minimum period of 24 hours. An ultrasound of the abdomen must also be done when feasible to rule out presence of free fluid and solid organ injury.

In only in five cases, on doing laparotomy, there was no internal injury except for the peritoneal penetration. Theoretically this negative laparotomy could have been avoided by doing diagnostic peritoneal lavage⁴. But the inclination in this institute is to do laparotomy so that the patient as well as surgeon can be sure that there is no internal injury.

Table 8 : ORGAN INJURY

S.No	Study	Small Intestine	Large Intestine
1	Present Study	17	7
2	Hardik	7	3
3	Mabsiddiq	14	6
4	Anisuzjaman	34	35

In my study 17(34%) patients had small bowel injuries, followed by tranverse colon, Liver and Kidney 2(8%) cases each.

Overall survival rate was 84 % with mortality 16 %. Early Morbidity was found in form of wound related complications SSI and wound dehiscence, reasons for such complication appears to be emergency surgery in case of category 3 and 4 where bilious and fecal peritonitis have set in at time of presentation. Other factors like inadequate bowel preparation and no or minimal optimization of comorbid condition like diabetes, malnutrition, IHD etc. Late morbidity and sequel in form of incisional hernia and diaphragmatic hernia were found due to wound related complications. Morbidity rate in my study is 28 percentage was comparable to study by AnisUzZaman, where morbidity was 30.6 percentage including early and late complications. I have observed mortality rate of 16% (n=04) and Persistent shock and hemorrhage (n=2,50%) is the most common cause of death in my study. The reason was extensive hemorrhage leading to DIC and Shock. Other causes were septicemia and Pneumonia. The average hospital stay in my study is 8 days which is comparable with other studies. The above findings were comparable to study by AnisUzZaman where mortality was 10.2 and morbidity 30.6 percentage with average hospital stay 8 days. Out of 50 trauma patients 41(82%) has survived and shown good prognosis on follow ups.

. Vomiting or history of LOC are indicators of probable head injury in the patient of trauma and should be managed accordingly⁵. Results were comparable to other studies.

Hematuria in a patient with penetrating abdominal trauma suggests injury to kidney, ureter, bladder or urethra and should be managed accordingly⁶.

SUMMARY

A clinical study and analysis of fifty cases which were admitted to Govt. General Hospital, Kurmool, between May 1998 and October 2000 with penetrating injuries to the abdomen aged above thirteen years has been done.

These included cases due to stab injury, firearm injury, injury by other sharp objects like glass pieces and bull-gore injuries.

Cases which presented with positive physical findings (i.e shock, evisceration, peritonitis) and or pneumoperitoneum and or positive peritoneal tap were subjected to laparotomy and treated accordingly.

Those cases where there were on findings state above, were subjected to wound exploration under local anesthesia in the operation theatre. (If there were no penetration of the fascia wound was managed by simple suturing after washing and keeping a corrugated rubber drain). If there was penetration of the fascia formal laparotomy was done and treated according to injuries noted inside.

Since most of these injuries cannot be primarily prevented (unlike road traffic accidents which can be prevented by certain regulations) secondary prevention and disability limitation is the goal. This is achieved by quick decision to confirm penetrating injury and to do laparotomy at right time and management of injuries according to this minimises the morbidity and mortality of these injuries.

CONCLUSIONS

Based on the statistical analysis of the cases managed as stated above the following conclusions were drawn.

- 1) Penetrating injuries to the abdomen represented about 0.48% of the admissions to the surgical wards at Govt. General Hospital Kurnool, and they may roughly parallel the various problems of unrest in the society.
- 2) Young to middle aged men are the persons at risk in more than 85-90% of cases.
- 3) All cases of civilian violence are caused by stabs with knives and all cases of firearm injuries occurred between the police and extremist groups. The later problem represented only 8% of the total in this area.
- 4) Pneumoperitoneum on plain x-ray was present in only 70% of cases.
- 5) Peritoneal tap was positive in 10 out of 15 cases and is highly unreliable even if there is massive haemoperitoneum.
- 6) Using sound clinical judgement supported by simple investigations like plain x-ray of abdomen, para-centesis, wound exploration and observation in the ward; correct diagnosis as to penetration can be arrived at in almost all cases.
- 7) In 60% of cases more than one organ or structure are involved Hence all organs must be explored including the diaphragm at laparotomy.
- 8) Small bowel is the most common structure involved followed by transverse colon and stomach.
- 9) Liver is the most common solid organ affected followed by pancreas and spleen in this study.
- 10) Wound-infection is the most common post operative complication and occurs when a hollow viscus is perforated.
- 11) About 25% of hollow viscus injuries are complicated by Post operative wound infection.
- 12) Of the various factors that may influence the mortality those that are significant are (i) The severity of the internal injury, (ii) The age of the patient (iii) The time interval between injury and surgery.

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