

The Study of Pattern of Injury, Clinical Presentation, Organ Involvement and Associated Injuries in Patients of Penetrating Abdominal Trauma in a Tertiary Care Hospital

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Abstract

Background: Abdomen is the most frequently involved organ in penetrating injuries. Its anatomical location makes it unprotected and most susceptible for penetrating injuries either homicidal or accidental. Penetrating injuries can be caused by stab either homicidal or accidental, gunshots. This study is being done to evaluate various indications for emergency laparotomy and morbidity in penetrating abdominal injuries.

Methods: The prospective observational study was conducted in SCB Medical College, Cuttack from October 2018 to September 2020. The study population included patients with penetrating injury to abdomen admitted to SCB Medical College & Hospital, Inclusion - selected patients with penetrating abdominal trauma who are admitted in emergency department and required some definitive intervention/ monitoring for evident abdominal organ injury or intra-abdominal haemorrhage or haematoma.

Results: The study included 74 males and six females. 63 patients with peritoneal penetration on local wound exploration, evisceration, those with haemodynamic instability, with peritoneal signs underwent exploratory laparotomy. Of the 63 patients who underwent exploratory laparotomy, 54 had therapeutic laparotomy. It was negative in 9 cases. The commonest post-operative complications following penetrating abdominal trauma is respiratory complication. There were total five cases of intra-abdominal abscess occurring following trauma involving colon and small bowel.

Conclusion: Measures taken for the care of patients at the trauma site and establishing well equipped trauma care centres at least at every district hospital will go a long way in preventing morbidity and mortality in these unfortunate victims.

Keywords: Abdominal Injuries, Laparotomy, Post Operative Complications.

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Introduction

Trauma is a major health problem. Among various modes of trauma, penetrating

trauma necessitates for immediate surgical intervention in most of the cases. Most

commonly penetrating trauma in civilian groups younger healthy population, who are very much responsible for progress of society and country.[1] Since most of the deaths in penetrating injuries occur within minutes to hours, hence form an important part of surgical emergencies.

Abdomen is the most frequently involved organ in penetrating injuries. Its anatomical location makes it unprotected and most susceptible for penetrating injuries either homicidal or accidental.

Penetrating injuries can be caused by stab either homicidal or accidental, gun shots. Over the past century major advances were made in the field of imaging, fibre optics ultrasonography and injury assessment scoring systems, a more selective approach is being applied to the treatment of these injuries.[2] The present approach is being adopted for abdominal trauma management in contrast to the traditional military mandate that all abdominal penetrating injuries should have surgical intervention. Because of increased rates of negative laparotomy with stab injuries, selective management was suggested by various studies. After the World War I operative management replaced the expectant therapy and reduced mortality rates. Major improvement in the management of abdominal wounds occurred with the introduction of blood transfusion and liberal use of antibiotics.[3] In 1960, after observing the increased rate of negative laparotomy, Shaftan suggested the selective management of patients with stab wounds. In a developing country like ours where majority of population resides in villages and a very few available trauma care centres are located in the cities, the care of penetrating injuries is far from satisfactory.[4] Our main aim in penetrating injuries should be immediate medical attention. So, this study is being done to evaluate various indications for emergency laparotomy and morbidity in penetrating abdominal injuries.

Materials and Methods

The prospective observational study was conducted in SCB Medical College, Cuttack from October 2018 to September 2020. The study population included patients with penetrating injury to abdomen admitted to SCB Medical College & Hospital, Cuttack. After recording of vitals and urgent resuscitation haematology profile was sent for and radiological interventions such as x-ray abdomen and USG are performed. Secondary survey was done to identify other associated injuries. A clear-cut indication of operative management was outlined based on clinical and radiological outputs. The intra operative findings were recorded in the proforma. The patients were assessed for any post-operative complications on 1st, 2nd, 4th, 7th and 10th day. The progress of the patient or development of any complications, total stay in the hospital and all mortality were recorded

Inclusion criteria

Randomly selected patients with penetrating abdominal trauma who are admitted in emergency department and required some definitive intervention/monitoring for evident abdominal organ injury or intra-abdominal haemorrhage or haematoma.

Exclusion criteria

All deaths on arrival Cases that are so severely injured that they do not survive attempts at resuscitation in the emergency. Patients with minor injuries. Patients admitted with suspicion for major organ injury but found to have no major intra-abdominal injury through assessment and evaluation. Patients that take discharge against medical advice and lost to follow ups. Patients that are deemed mentally unfit to grant informed consent in the period of study.

Results

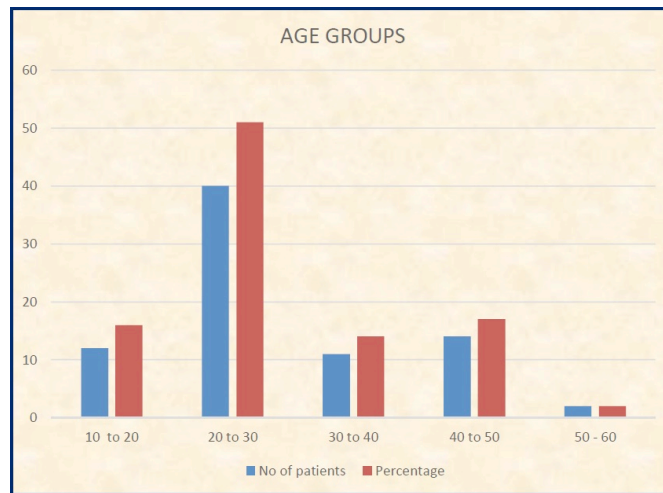


Figure 1: Age group affected

Incidences of penetrating abdominal trauma in various age groups are given in the figure

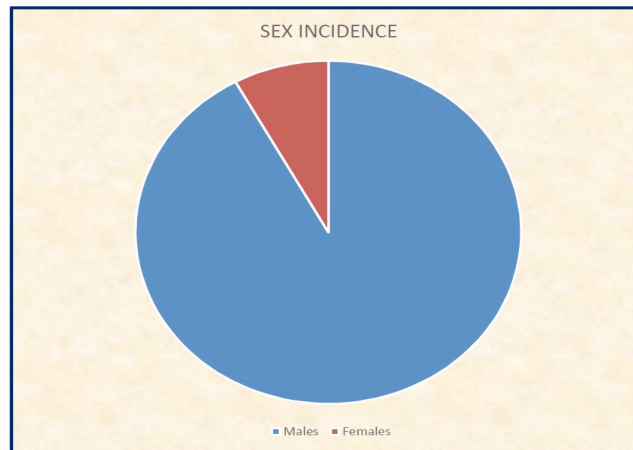


Figure 2: Sex incidence

The study included 74 males and six females.



Figure 3: Mode of Penetrating Injury

Homicidal stab injury was the commonest mode of penetrating abdominal injury followed by injury due to bull goring.

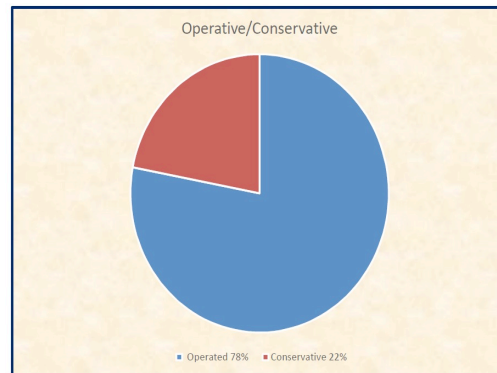


Figure 4: Ratio of operative to conservative treatment.

After a detailed evaluation and suitable investigation, 63 patients with peritoneal penetration on local wound exploration, evisceration, that with hemodynamic instability, with peritoneal signs underwent exploratory laparotomy. About 17 patients selected for non-operative management because they had no signs of peritoneal penetration or peritonea signs. None of these required delayed laparotomy after being subjected to serial clinical examination.

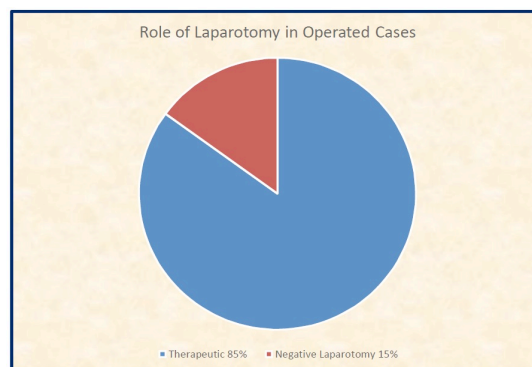


Figure 5: Role of laparotomy in operated patients

Of the 63 patients who underwent exploratory laparotomy, 54 had therapeutic laparotomy. It was negative in 9 cases. All of them were stable injuries to anterior abdomen.

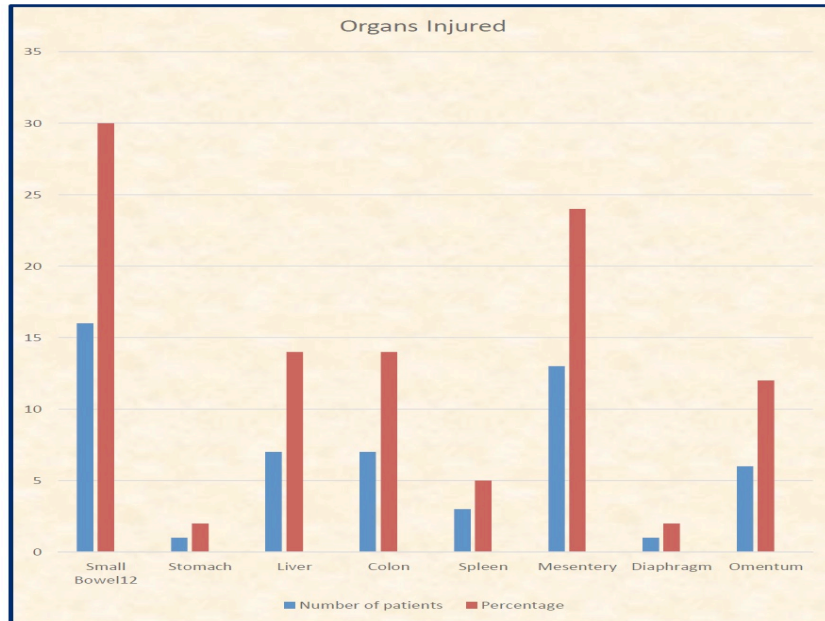


Figure 6: Organs injured in patients with penetrating abdominal trauma.

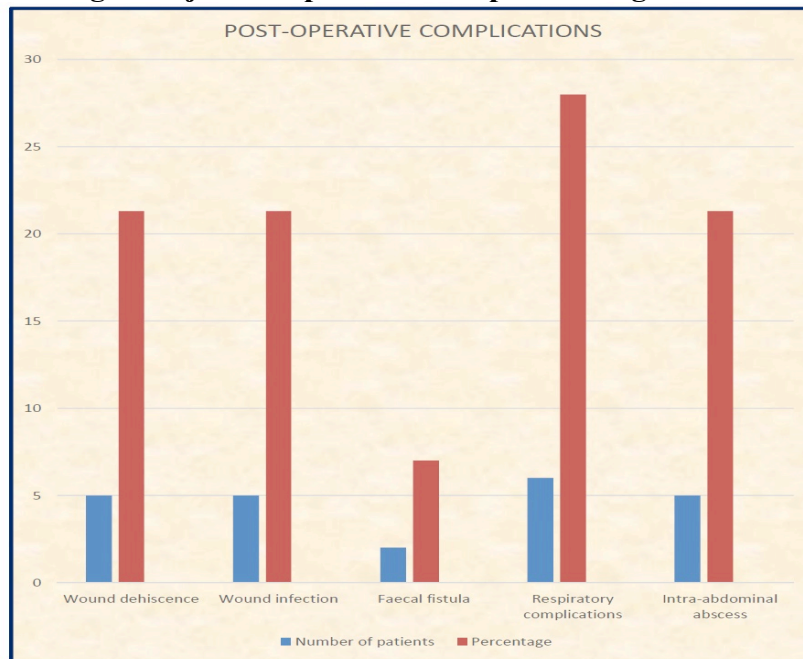


Figure 7: Post operative complications.

Commonest post-operative complications following penetrating abdominal trauma is respiratory complication. There were total five cases of intra-abdominal abscess occurring following trauma involving colon and small bowel. Two cases developed faecal fistula due to multiple stab injury to abdomen. Wound dehiscence occurred in two cases involving small bowel injury and three with colonic injury. Wound infection occurred in cases involving liver laceration, colonic and small bowel injury.

MO=Multiple Organ Dysfunction Syndrome

RES=Respiratory Complications

REN=Renal Dysfunction

SEP=Sepsis

ANA=Anastamotic Leak

Discussion

In the present study, stab injuries constituted the most common cause for penetrating injuries to abdomen accounting nearly 92%. This is followed by bullgore

injury. In Nance FC [5] study stab injuries to abdomen accounted 53% of all penetrating injuries while gunshot wounds accounted for remaining 47%.

This difference was because the reference study was carried out in urban centre and possession of guns and fire arms was common in their study population. Most of the cases coming to our hospital were from low socioeconomic status and from rural areas. The weapons like knife, sickle and axe are common to the population of present study as these are used for household activities and easily available. Also, cattle are a part of livelihood being used for ploughing the fields and for transportation of goods. This account for the bull gore injuries as the second common mode of penetrating abdominal injury.

In the present study peritoneal penetration was noted in 78% of the stab injuries to abdomen. This correlates well with Nance FC[5] where peritoneal violation was noted in 82% of stab wounds of the abdomen. Ninety five percent cases of GSWs to abdomen cause significant intraabdominal injuries. Hence local wound exploration is not indicated in such cases.

In the present study peritoneal penetration, hemodynamic instability, generalised peritonitis and evisceration were prime indications for exploratory laparotomy. Peritoneal penetration was noted in 78% of cases. In Leppaniemi[6] peritoneal penetration was present in 72% of cases. In the present study omentum and/ or bowel evisceration was present in 41% of cases. The difference is due to difference in number of cases. In another study, Nagy K[6] evisceration constituted 73% of cases and was the indication for laparotomy. Generalised peritonitis was present in 33% of cases in present study. In study by Nagy K[6] generalised peritonitis was present in 125 of cases. In the present study, hemodynamic instability was present in 12% of cases. This correlates well with

Nagy[6] in which 9% of cases were in shock.

The present study, 78% of cases of penetrating abdominal injury underwent exploratory laparotomy. In Leppaniemi AK [7] the number of operated cases constituted 68%. Similarly, in Nance FC [5] 75% of cases underwent laparotomy. The laparotomy was therapeutic in 85% of cases and in remaining 15% it was negative. In Nance FC et al [5] in 78% of stab injury abdomen, the laparotomy was therapeutic. Even in Nagy et al. [6], 78% of all cases required laparotomy for repair of an intra-abdominal injury. Roentgenograms were normal in 15% of cases of penetrating abdominal trauma which correlates well with Kester et al. [10] where roentgenograms were abnormal in 8% of cases. This little difference is due to a greater number of bowel perforations in our study. This shows that abdominal roentgenograms were unreliable in diagnosis of penetrating abdominal trauma.

Omental evisceration indicated peritoneal penetration and in some studied it was associated with serious abdominal injuries up to 75% of cases. In another study patients with omental protrusion were managed without operation without any complications. Omental evisceration is probably more related to the size and location of penetrating wound and the omental anatomy in an individual patient than to the presence of significant internal injury.

The present study omental evisceration was present in 80% of cases which correlated well with Nagy K et al. [6] where 75% of cases had omental protrusion. Those with evisceration of bowel are commonly associated internal injuries than those with omental protrusion alone.

Hollow viscus injuries are most frequent in patients with penetrating abdominal trauma. In Nance FC et al [5] study liver and small bowel is the commonest organs to be injured. The present study also shows

similar findings. The other series of studies (Lowe RJ et al, 1980; Dawidson et al, 1976; Feliciano DV et al 1988), GSWs to abdomen commonly cause injury to small bowel, colon and liver. The respiratory complication is the most frequent complication postoperatively accounting up to 28%, second most being intraabdominal sepsis, wound infection and wound dehiscence accounting for 21.3% of them occurred in those with colonic and small bowel injury. This in correlation with Ivatury RR et al (1988) where 17% of colonic trauma cases developed intra-abdominal sepsis. In Croce MA et al [4] intra-abdominal sepsis developed in 5% to 20% of cases after penetrating stomach and small bowel injury.

Conclusion

Penetrating abdominal trauma is a common type of surgical emergency Young males in the reproductive age group 20-30 years is predominantly affected. The patients affected are usually from lower socioeconomic group. The commonest mode of penetrating injury is by stab wounds to abdomen. Hence measures taken for the care of patients at the trauma site and establishing well equipped trauma care centres at least at every district hospital will go a long way in preventing morbidity and mortality in these unfortunate victims. Careful and repeated clinical examination and appropriate diagnostic investigations lead to successful treatment in these patients. Majority of patients require operative intervention particularly those with hemodynamic instability, generalised peritonitis, evisceration of omentum and bowel and continuing haemorrhage. Peritoneal penetration as such is a poor indication of significant organ injury and requires direct organ specific evaluation, such as computed tomography or laparoscopy to identify patients who can be safely treated without operations. Abdominal roentgenograms are unreliable to predict the intestinal perforation or aid to management in the patients with positive

peritoneal signs. Majority of the patients who present with evisceration after penetrating wound require a laparotomy. This is true regardless of what has eviscerated or the presence of other clinical indications to operate. Evisceration continues to prompt operative intervention. Mesocolon and mesentery is the third common organ injured in the present study. It can be managed by simple suturing. Transmural colonic penetrating injuries were treated by colostomy. However primary repair of colon injury can be contemplated depending upon on the degree of contamination, injury to other organs and hemodynamic instability. Respiratory infection and intra-abdominal abscess were the frequent postoperative complication in the present study followed by wound infection.

Ethical approval: The study was approved by the Institutional Ethics Committee

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