



OPEN ACCESS

Key Words

Penetrating abdominal injury,
surgical management,
postoperative complication

Corresponding Author

Devendra Chaudhari,
Department of General Surgery,
Government Medical College, Surat,
Gujarat, India
drchaudhari06@gmail.com

Author Designation

¹Senior Resident

²Associate Professor

³Professor and Head

Received: 20 December 2023

Accepted: 19 January 2024

Published: 25 January 2024

Citation: Chetan Aehral, Devendra Chaudhari and Mukesh Pancholi, 2024. Retrospective Cross-Sectional Study of Surgical Management of Penetrating Abdominal Injuries Cases at Tertiary Health Care Hospital. Res. J. Med. Sci., 18: 192-195, doi: 10.59218/makrjms.2024.4.192.195

Copy Right: MAK HILL Publications

Retrospective Cross-Sectional Study of Surgical Management of Penetrating Abdominal Injuries Cases at Tertiary Health Care Hospital

¹Chetan Aehral, ²Devendra Chaudhari and ³Mukesh Pancholi
¹⁻³Department of General Surgery, Government Medical College, Surat, Gujarat, India

ABSTRACT

Trauma is a major health problem. Among various modes of trauma, Penetrating trauma necessitates for immediate surgical intervention in most of the cases. To determine the cause and risk factors leading to post-operative complications and the outcomes of surgical management of abdominal stab injury. A Retrospective cross-sectional study of surgical management of 30 cases of penetrating abdominal injuries Admitted in general Surgery department of Government Medical College, Surat (Gujarat), India during the periods of 2015 to 2018. In present study (2015-2018) majority of patients belonged to the 21-30 years age group followed by those in 30-40 age groups. In present study of the 30 cases of penetrating abdominal trauma, 90% were males and 10% were females. In present study, peritoneal penetration was noted in 56.66% of stab injuries to abdomen. The laparotomy was therapeutic in 86.66% of cases and in remaining 13.33%, it was negative. Wound infection is the most frequent complication postoperatively accounting up to 16.66%, second most being respiratory complication, fecal fistula and wound dehiscence accounting for 6.66% of them occurred in those with colonic and small bowel injury. The duration of stay of patients in the hospital ranged from 3-40 days with an average of 7 days. Young males in the productive age group of 20-30 years are predominantly affected. The patients affected are usually from lower group socio-economic. Respiratory infection and wound infection were the frequent post-operative complications in the present study.

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 in civilian group involves younger healthy population, who are very much responsible for the progress of the society and the country. 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, gunshots. Over the past century, major advances were made in the field of imaging, fiber optics, ultrasonography and injury assessment scoring systems, a more selective approach is being applied to the treatment of these injuries. This 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. In 1960, after observing the increased rate of negative laparotomy, Shafstam¹ suggested the selective management of patients with stab wounds.

MATERIAL AND METHOD

Study Design and Sampling: It was a retrospective cross-sectional study of Surgical management of 30 cases of penetrating Abdominal injuries admitted in general Surgery department of Government Medical college, Surat (Gujarat), India during the periods of 2015 to 2018 was conducted after approval of local ethical committee and no discrimination was made in respect to age and sex on the selection of cases to be studied.

Inclusion Criteria: All patients with penetrating abdominal injuries presenting at NCH, Surat with:

- Age >14 years
- Isolated abdominal injury either in form of assault or by accident
- Managed surgically

Exclusion Criteria:

- Age <14 years
- Polytrauma patients and patients with stab injury other than abdominal stab injury

Data Collection: For the data collection of cases, we included any penetrating injuries either accidental or stab injuries which penetrate the abdominal wall and who were managed surgically in general surgery department Surat in duration from 2015 to 2018 would be taken in to consideration. Data would be taken from the case papers from record section. As this is an observational study, there would not be any form of intervention in the patient's management. Investigations and treatment of the patients would remain the same advised by the treating physician. As this is a retrospective observational study, there would not be any follow up of patients.

After collecting information from 30 cases of surgically managed abdominal stab injury, data will be entered and storage in Microsoft excel as well as analyzed to draw a conclusion regarding the trend of risk factors, modes of presentations and outcomes of the same.

RESULTS

Table 1 shows demographic characteristics of patients in present study Out of 30 patients, 7(23.33%) patient belongs to 11-20 yrs age group, 11patients (36.66%) belong to 21-30 yrs age group, 9 patients (30%) belong to 31-40 yrs age group, 2 patients (6.66%) belong to 41-50 years age group and 1 patient (3.33%) belong to 51-60 yrs age group.

Table 2 shows characteristic of injuries in present study in the present series as well as Foster's series, stab injuries account for up to 24 (80%) of penetrating abdominal trauma. Fall on sharp objects is another mode of injury in this study and accounts for 2 (6.66%) of cases and 4 (13.33%) others. Majority of the patients presented to the casualty between 1-6 hours after trauma. Only 1 (3.33%) patient presented after an interval over 24 hours. Patients present late to the hospital because of lack of awareness of the severity of the injury. Shock is a valuable diagnostic and prognostic sign in abdominal trauma as there may be presence of massive hemorrhage. In the present series, 13 patients (43.33%) cases presented with shock. 18 out of 30 cases had associated injuries varying from minor wounds to major fractures. Majority of patients 18(60%) interval between injury and surgery was 2-6 hours. Small bowel was most frequently injured organ, 08 (26.66%) out of 30 patients had multiple organ injuries. The commonest post-operative complications being wound infection and respiratory tract infection followed by septicemia. In the present series, 2 (6.66%) patients died Because of DIC (Disseminated Intravascular coagulation) and septicemia.

Table 3 represents the treatment characteristic of patients in present study peritoneal penetration on local wound exploration, hemodynamic instability, and evisceration were the prime indications for exploratory laparotomy. Peritoneal penetration on local wound exploration was noted in 86.66% of cases and

Table 1: Age and gender wise distribution of patients

Age of the patients		
No of patients (Total =30)	Age group	Percentage
0-10	-	-
11-20	7	23.33
21-30	11	36.66
31-40	9	30
41-50	2	6.66
51-60	1	3.33
Gender wise distribution		
Male	27	90
Female	3	10

Table 2: Characteristics of the injuries

Variables	No of patients	Percentage
Mode of injury		
Penetrating abdominal trauma	24	80
Fall on sharp object	2	6.66
Others	4	13.33
Injury-admission interval		
Interval(hours)		
<1	16	53.33
>1-<6	10	33.33
>6-<12	3	10
>24	1	3.33
Patients with shock		
Shock present	13	43.33
Shock absent	17	56.66
Associated with other injuries		
Head & neck	1	3.33
Chest	9	30
Pelvis	2	6.66
Extremities	6	20
Spine	0	0
Time interval between injuries and surgery		
Interval(hours)		
<2	4	13.33
>2 to <6	18	60
>6 to <12	7	23.33
>24	1	3.33
Organ injuries		
Type of organ		
Liver	0	0
Spleen	1	3.33
Small bowel	8	26.66
Stomach	1	3.33
Colon/rectum	4	13.33
Mesentery	4	13.33
Mesocolon	1	3.33
Omentum	3	10
Gall bladder	1	3.33
Duodenum	0	0
Pancreases	0	0
Kidney	1	3.33
Vascular	3	10
Uterus	0	0
Diaphragm	1	3.33
Post operative complication		
Wound infection (SSI)	5	16.66
Subphrenic abscess	0	0
Pulmonary infection	2	6.66
septicemia	1	3.33
Fistula/wound	2	6.66
Gapping	0	0
MOF	0	0
Hemorrhage	0	0
Abdominal distension	0	0
Stoma retraction	1	3.33
Stoma prolapse	1	3.33
Mortality		
Death	2	6.66
Survive	28	93.33

omentum and/or bowel evisceration was present in 86.66 % of cases, generalized peritonitis was present in 12 % of cases. In the present study, hemodynamic instability was present in 4 (13.33%) of cases.

Table 3: Treatment characteristics of patients

Indication of laparotomy		
Indication of laparotomy	No of patients	Percentage
Peritoneal penetration of LWE	17	56.66
Omentum and /or bowel evisceration	26	86.66
Generalized peritonitis	10	33.33
Hemodynamic instability	04	13.33
Laparotomy		
Therapeutic	26	86.66
Negative	4	13.33

DISCUSSIONS

In present study (2018-2020) majority of patients belonged to the 21-30 years age group followed by those in 30-40 age groups. IN Nance *et al.*^[1] study people in the 21-30 age groups were commonly affected. In Nagy *et al.*^[2] study majority of patients with penetrating trauma were in 20-35-year age group. Therefore, young and productive age group persons are the usual victims of penetrating trauma.

In present study of the 30 cases of penetrating abdominal trauma 90% were males and 10% were females. In Nance *et al.*^[1] males comprised 85% of cases and females comprised 15% of cases. In Leppaniemi *et al.*^[3] 87% were males and 13% were females. IN Nagy *et al.*^[2] 88% of cases were males and 12% were females. About mode of injury in the present series as well as Foster's series, stab injuries account for up to 82% of penetrating abdominal trauma.

In this study small bowel was most frequently injured organ, 08 (26.66%) out of 30 patients had multiple organ injuries. Hollow viscus injuries are more frequent in patients with penetrating abdominal trauma. In Nance *et al.*^[1] study liver and small bowel are the commonest organs to be injured. The present study also shows similar findings. The other series of studies Lowe *et al.*^[4] Dawidson *et al.*^[6], Feliciano *et al.*^[6], GSWs to abdomen commonly cause injury to small bowel, colon and liver.

In present study, peritoneal penetration was noted in 56.66% of stab injuries to abdomen. This correlates well with the Nance *et al.*^[1] where peritoneal violation was noted in 82 % of stab wounds to abdomen. In present study peritoneal penetration on local wound exploration, hemodynamic instability, and evisceration were the prime indications for exploratory laparotomy. Peritoneal penetration on local wound exploration was noted in 86.66 % of cases. In Leppaniemi *et al.*^[3] peritoneal penetration was present in 72% Of cases. This little difference can be explained by the fact that in about 6% of cases peritoneal penetration was undetermined in the reference study. In the present study omentum and / or bowel evisceration was present in 86.66 % of cases. In another study Nagy *et al.*^[2] in that evisceration constituted 73 % of cases and was the indication for laparotomy. Generalized peritonitis was present in 33% of cases in the present study. In a study by Nagy *et al.*^[2] generalized

peritonitis was present in 12% of cases. In the present study, hemodynamic instability was present in 13.33% of cases. This correlates well with Nagy *et al.*^[2] in which 9% of cases were in shock.

In the present study the laparotomy was therapeutic in 86.66% of cases and in remaining 13.33% it was negative. In Nance *et al.*^[1] in 78% of stab injury abdomen the laparotomy was therapeutic. Even in Nagy *et al.*^[2], 78% of all cases required laparotomy for repair of an intra-abdominal injury.

In the present study, wound infection is the most frequent complication postoperatively accounting up to 16.66%, second most being respiratory complication, fecal fistula and wound dehiscence accounting for 6.66% of them occurred in those with colonic and small bowel injury. This is in correlation with Ivatury *et al.*^[7] where 17% of colonic trauma cases developed intra-abdominal sepsis. In Croce *et al.*^[8] intra-abdominal sepsis developed in 5 to 20% of cases after penetrating stomach and small bowel injury.

In the present study the duration of stay of patients in the hospital ranged from 3-40 days with an average of 7 days. In Leppaniemi *et al.*^[3] the duration of stay ranged from 1-38 days with an average of 6 days. Mortality rate in the present study is 6.66%, correlates with Nance *et al.*^[1] where mortality rate is 1%.

CONCLUSION

Young males in the productive age group of 20-30 years are predominantly affected. The patients affected are usually from lower socio-economic 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 centers 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 leads to successful treatment in these patients. Majority of the patients require operative intervention particularly those with hemodynamic instability, generalized peritonitis, evisceration of omentum and bowel, and continuing hemorrhage. 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. Majority of 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. Small bowel are the commonest organs injured in the present study. Small bowel injuries can

be managed by the simple suturing to resection and anastomosis. Mesocolon and mesentery is the third common organ injured in the present study. It can also be managed by simple suturing. Transmural colonic penetrating injuries were treated by colostomy. However primary repair of colon injury can be contemplated depending on the degree of contamination, injury to other organs and hemodynamic stability. Respiratory infection and wound infection were the frequent post-operative complications in the present study followed by wound infection.

Limitation: As the study is a hospital based cross-sectional study, results cannot be generalized in community at large. Further community based quantitative and qualitative studies can be planned

REFERENCES

1. Nance, F.C., M.H. Wennar, L.W. Johnson, J.C. INGRAM and I. COHN, 1974. Surgical judgment in the management of penetrating wounds of the abdomen. *Ann. Surg.*, 179: 639-646.
2. Nagy, K., R. Roberts, K. Joseph, G. NA and J. Barrett, 1999. Evisceration after abdominal stab wounds: Is laparotomy required. *J. Trauma. Injury. Infec. Crit. Care.*, 47: 622-624.
3. Leppäniemi, A.K., P.E. Voutilainen and R.K. Haapiainen, 1999. Indications for early mandatory laparotomy in abdominal stab wounds. *Br. J. Surg.*, 86: 76-80.
4. Lowe, R.J., D.R. Boyd, F.A. Folk and R.J. Baker, 1972. The negative laparotomy for abdominal trauma. *J. Trauma. Inj. Infec. Crit. Care.*, 12: 853-861.
5. Dawidson, I., 1976. Gunshot wounds of the abdomen. *Arch. Surg.*, Vol. 111. 10.1001/archsurg.1976.01360260030006
6. Feliciano, D.V., C.G. Bitondo, G. Steed, K.L. Mattox, J.M. Burch and G.L. Jordan, 1984. Five hundred open taps or lavages in patients with abdominal stab wounds. *Am. J. Surg.*, 148: 772-777.
7. Ivatury, R.R., 1986. Penetrating duodenal injuries. Analysis of 100 consecutive cases.
8. Croce, M.A., T.C. Fabian, R.M. Stewart, F.E. Pritchard, G. Minard and K.A. Kudsk, 1992. Correlation of abdominal trauma index and injury severity score with abdominal septic complications in penetrating and blunt trauma. *J. Trauma. Inj. Infec. Crit. Care.*, 32: 380-388.