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STUDY OF PENETRATING INJURIES TO ABDOMEN IN PATIENTS TREATED AT TERTIARY CARE CENTRE IN INDIA

Prashant Kumar Hosamani[1], Abdul Quraishi[2], Kishor Bhiurao Jeughale[3], Sagar Anil Kurkure[4], Jawansing Manza[5]

[1]Senior Resident, Department General Surgery, BJGMC Pune, India.
[2]Professor, Department General Surgery, GMC Nagpur, India.
[3]Assistant Professor, Department General Surgery, BJGMC Pune, India.
[4]Assistant Professor, Department General Surgery, BJGMC Pune, India.
[5]Assistant Professor, Department General Surgery, BJGMC Pune, India.

Corresponding Author:
Dr. Kishor Bhiurao Jeughale, Assistant Professor General Surgery Department BJGMC Pune, India.
Email: kishorjeughale08@gmail.com

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Abstract

Background: Penetrating injuries can be caused by stab either homicidal or accidental or gun shots. Present study was aimed to study penetrating injuries to abdomen in patients treated at tertiary care centre in India. **Material and Methods:** Present study was prospective, observational study, conducted in patients admitted to trauma care centre and general surgery ward with history of penetrating trauma to abdomen. **Results:** Among 107 patients, majority were from age group 21-30 (33.9%) years. In this study men are the most affected population (96.5%) and female are (3.5%). Regarding mode of injury ,98 (91.6%) patients showed h/o stab injury by sharp objects,4 (3.7%) patients had Impalement injury, road traffic accident in 3(2.8%) patients and history of bull gore (animal) injury 2(1.9%) patients. In this study small bowel was most commonly involved (50.5 %) followed by large bowel (21.5 %), liver (14 %), stomach (4.7%) & spleen (2.8 %). In this study 10 (9.3%) patients had history of head injury,4 (3.7%) patients had history of chest injuries,4(3.7%) patients had Extremities injury. According to this study 98 patients were discharged and 9 patients died (mortality was 8,4%) In this study 5 patients died out of 18 patients with associated injuries and 4 patients out of 89 patients with isolated penetrating trauma to abdomen. **Conclusion:** Primary closure of bowel perforation is the most common procedure done. In patients of penetrating trauma to abdomen, early diagnosis and early surgical management leads to better outcome. The results are favourable when there I is good teamwork backed by good critical care set-up.

Keywords: Stab injuries, penetrating injuries to abdom, haemodynamic instability, Primary closure of bowel perforation

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Introduction

Trauma is a major health problem in the world. Among various modes of trauma, penetrating trauma necessitates for immediate surgical intervention in most of the cases. Since most of the deaths in penetrating injuries occur within minutes to hours, hence form an important part of surgical emergencies. The abdomen is the most injured area in trauma patients[1], thus abdominal trauma leads in morbidity and mortality in all age groups in the world.[2]

Its anatomical location makes it unprotected and most susceptible for penetrating injuries either homicidal or accidental. However, identifying life threatening intraperitoneal injuries due to trauma is a challenge. Stab wounds and gunshot wounds are the most common causes of penetrating abdominal injuries.[3]

Penetrating injuries can be caused by stab either homicidal or accidental or gun shots. Over the past century major advances were made in the field of imaging, fibre optics, ultrasonography and injury assessment scoring systems and more selective approach is being applied to the treatment of these injuries. Present study was aimed to study penetrating injuries to abdomen in patients treated at tertiary care centre in India

Material And Methods

Present study was prospective, observational study, conducted in department of General surgery, at Department General Surgery, BJGMC Pune, India. Study duration was of 2 years (October 2020 to September 2022). Study approval was obtained from institutional ethical committee.

Inclusion criteria

- Patients admitted to trauma care centre and general surgery ward with history of penetrating trauma to abdomen, patients/relatives willing to participate in present study

Exclusion criteria

- Patients/relatives not consenting to participate in the study

Study was explained to patients in local language & written consent was taken for participation & study. All patients with abdominal trauma underwent history taking, thorough clinical examination, relevant laboratory & radiological investigations (X-Ray, ultrasonography or CT scans). After initial assessment & resuscitation of the patients, thorough assessments for injuries were carried out. The decision for surgical procedure was depended on the extent of penetrating injuries, hemodynamic stability and radiologic findings. The postoperative progress of patients was closely monitored.

Parameters monitored were age, sex, duration of between injury and time of presentation, mode of injury, hemodynamic status, type of injury, organ injured, associated injuries, management, post operative complications and outcome.

Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version. Statistical analysis was done using descriptive statistics.

Results

Among 107 patients, majority were from age group 21-30 (33.9%) years. In this study men are the most affected population (96.5%) and female are (3.5%). Regarding mode of injury ,98 (91.6%) patients showed h/o stab injury by sharp objects,4 (3.7%) patients had

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Impalement injury, road traffic accident in 3(2.8%) patients and history of bull gore (animal) injury 2(1.9%) patients.

Table 1: General characteristics

	No. of patients	**Percentage**
Age groups (in years)		
3 – 10	2	1.9%
11 – 20	9	8.4%
21 – 30	36	33.6%
31 – 40	34	31.8%
41 – 50	14	13.1%
51 – 60	8	7.5%
61 – 70	3	2.8%
71 – 80	1	0.9%
Mean age (mean ± SD)		
Gender		
Male	104	97.2%
Female	3	2.8%
Mode of injury		
Stab injury	98	91.6%
Impalement	4	3.7%
Road Traffic Accident	3	2.8%
bull gore	2	1.9%

With respect to time of presentation to hospital,93.5% patients presented within 6hrs of injury, 4.7% patients presented between 7-12 hrs ,0.9% patients presented between 13-24 hours and 0.9% patients presented after 48 hours. At the time of presentation 51.4% patients were hemodynamically stable, 83(77.6%) patients had peritonitis and 12 (11.2%) patients had evisceration.

Table 2: Status at presentation

	No. of patients	**Percentage**
Presentation (hours)		
1 – 6	100	93.5%
7 – 12	5	4.7%
13 – 24	1	0.9%
25 – 48	0	0%
After 48hrs	1 (90hrs)	0.9%
Hemodynamic status		
Stable	55	51.4%
Unstable	52	48,6%
Other characteristics		
Peritonitis	83	77.6%
Evisceration	12	11.2%

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In this study small bowel was most commonly involved (50.5 %) followed by large bowel (21.5 %), liver (14 %), stomach (4.7%) & spleen (2.8 %). In this study 10 (9.3%) patients had history of head injury,4 (3.7%) patients had history of chest injuries,4(3.7%) patients had Extremities injury

Table 3: Organ involved & associated injuries

	No. of patients	**Percentage**
Organ		
Small bowel	54	50.5%
Large bowel	23	21.5%
Liver	15	14.0%
Mesentery	14	13.1%
Stomach	5	4.7%
Spleen	3	2.8%
Duodenum	2	1.9%
Pancreas	2	1.9%
Kidney	1	0.9%
Associated injuries		
Head injury	10	9.3%
Chest injury	4	3.7%
Extremities injury	4	3.7%

In this study grade I and II bowel perforations underwent simple primary closure (28 %), Grade III and IV bowel perforations underwent resection anastomosis or stoma (11.2 %), multiple bowel perforations underwent primary closure with stoma or resection anastomosis with proximal stoma depending on devascularised bowel segment. Liver packing was done for grade III injuries. grade III or more splenic injuries underwent splenectomy.

Table 4: Surgical Procedure

Procedure	**number**	**Percentage**
Primary closure	30	28.0%
Ileostomy	23	21.5%
Resection anastomosis	12	11.2%
Colostomy	12	11.2%
Mesentery repair	12	11.2%
Packing	8	7.5%
Drainage of peritoneum and haemostasis	7	6.5%
Primary closure with stoma	6	5.6%
Negative laparotomy	5	4.6%
Resection anastomosis with stoma	4	3.7%
Splenectomy	2	1.9%
Partial nephrectomy	1	0.9%

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In this study common post-op complications were Wound infection (15 %), Wound dehiscence (6.5 %), Pneumonia (6.5 %), Sepsis (4.8 %), Renal failure & Shock (2.8 %) & Anastomotic leak (0.9 %).

Table 5: Post operative complications

Post-op complication	Frequency	Percentage
Wound infection	16	15%
Wound dehiscence	7	6.5%
Pneumonia	7	6.5%
Sepsis	5	4.8%
Renal failure & Shock	3	2.8%
Anastomotic leak	1	0.9%

According to this study 98 patients were discharged and 9 patients died (mortality was 8,4%)

Table 6: Outcome

Outcome/status	Frequency	Percentage
Discharged	98	91.6%
Death	9	8,4%

In this study 5 patients died out of 18 patients with associated injuries and 4 patients out of 89 patients with isolated penetrating trauma to abdomen.

Table 7: Type of injury and mortality

Type of injury	Mortality	Total patients
Isolated penetrating trauma to abdomen	4 (4.5%)	89 (83.2%)
Penetrating trauma to abdomen with associated injuries	5 (27.7%)	18 (168%)
Total	9 (8.4%)	107 (100%)

Discussion

In the present study majority of patients belonged to 21-30years of age. Youngest patient was 3yrs old and oldest was 75 yrs old. with mean age being 33.75 yrs, maximum study population was men (97.2%).

In a study by B. Raj Siddharth n *et al.*,[4] 96 patients were evaluated majority patients were men (78 %) and most common age group was 3rd decade. In a study done by Chatragadda Ramya *et al.*,[5] 96 cases were studied, majority of patients were men (84%). And most common age group was 3rd decade. In a study done by Naveen P *et al.*,[6] out of 26 cases, majority of cases were men (84%) and most common age group was 3rd decade. In a study done by Sameer Toppo *et al.*,[7] most common age group was 20-40 yrs of age group. Similar findings were noted in present study.

In this study males were more affected with ratio of male: female being 97:3. In a study done by B. Raj Siddharth n *et al.*,[4] M: F ratio was 13: 4, In a study done by Chatragadda Ramya *et al.*,[5] M:F ratio was 21:4. In a study done by Naveen P *et al.*,[6] M:F ratio was 21:1. In a study done by Samir Toppo *et al.*,[7] M:F ratio was 13 :2.

In a study done by B. Raj Siddharth *et al.*,[4] 64 cases were evaluated out of which 62.5% patients had homicidal stab injury as mode of injury, small bowel injuries accounting

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to 60%. In a study done by Chatragadda Ramya *et al.*,[5] 96 cases were evaluated, 51% patients had homicidal stab injury with small bowel (38.2%) being most common organ injured. In a study done by Naveen. P *et al.*,[6] 69.2% patients had stab injury as mode of injury and small bowel was the most common organ injured. In a study done by Samir Toppo *et al.*,[7] most common hollow viscous organ Injured was small bowel (23%) and most common solid organ was liver 17.6%. Similar findings were noted in present study.

In the present study 51.4% patients were haemodynamically stable at the time of presentation and 48.6% patients were unstable. In a study done by B. Raj Siddharth n *et al.*,[4] 82.6% patients were haemodynamically stable and 17.2% were unstable. In a study done by Chatragadda Ramya *et al.*,[5] 91.7% patients were stable and 8.3% patients were unstable at the time of presentation. In a study done by Samir Toppo *et al.*,[7] 44%% patients were haemodynamically stable and 66% patients were unstable.

In the present study 77.6% patients presented with features of peritonitis at the time of presentation and rest 22.4% patients did not have features of peritonitis. In a study done by B. Raj Siddharth n *et al.*,[4] 53.1% patients presented with features of peritonitis at the time of presentation. In a study done by Chatragadda Ramya *et al.*,[5] 50 % patients had features of peritonitis at the time of presentation and 50% patients did not. In a study done by Samir Toppo *et al.* .,[7] 86.6% patients presented with features of peritonitis at the time of presentation and 13.4% patients did not have peritonitis.

In the present study 11.2 % patients presented with evisceration of bowel/ omentum at the time of presentation. In a study done by B. Raj Siddharth n *et al.*,[4] 59.4% patients presented with evisceration at the time of presentation. In a study done by Chatragadda Ramya *et al.*,[5] 20.8% patients presented with evisceration at the time of presentation. In a study done by Samir Toppo *et al.*,[7] 40% patients presented with evisceration.

In this study Primary closure for bowel perforation done in 28% patients and resection anastomosis was done in 11.2 % patients, Ileostomy in 21.5% patients with bowel injury, colostomy done in 11.2%, Mesentery repair done in 11.2%, Packing of liver done in 7.5%, drainage of peritoneum and haemostasis done in 6.5% patients with penetrating trauma to abdomen. In a study done by Chatragadda Ramya *et al.* [79] (2017) 41.7% patients underwent primary closure / resection anastomosis for bowel injury in 41.7% patients, Stoma done in 15 patients, packing of liver done in 6.3% patients, Splenectomy done in 21% patients. In a study done by Samir Toppo *et al.*,[7] 32.5% patients underwent Primary closure / resection anastomosis, 17.6% patients underwent stoma procedures, liver repair or packing done in 11.7% patients, Mesentery repair done in 11.7% patients, Drainage of peritoneum and haemostasis done in 8.8% patients and 2.9% patients underwent splenectomy.

Abdominal trauma is a common surgical emergency & requires immediate medical services. The incidence of abdominal trauma is increasing globally and it is a cause of considerable morbidity and mortality among trauma patients. [8,9,10,11] Initial resuscitation followed by appropriate management decision with help of USG & CT is important in management. Selective non-operative management have a definitive role in management.

Conclusion

Stab injuries are most common mode cause of penetrating injuries to abdomen. Most common clinical presentation was peritonitis followed by haemodynamic instability and

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evisceration. Small bowel is most common site of injury followed by large bowel and liver. Primary closure of bowel perforation is the most common procedure done. In patients of penetrating trauma to abdomen, early diagnosis and early surgical management leads to better outcome. The results are favourable when there I is good teamwork backed by good critical care set-up.

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