

BOWEL PERFORATION AND STAB, OUR EXPERIENCEAffin A¹¹Associate Professor, Department of General Surgery, Travancore Medical College, Kollam.**ABSTRACT****BACKGROUND**

Bowel perforation following stab forms an important component of emergency duty surgeons, victims varying from young to elderly age groups. Over the years, we have seen many changes in the diagnosis and management of a case of perforation.

MATERIALS AND METHODS

This is a retrospective observational study done in Travancore Medical College between January 1, 2015, to December 30, 2016, who presented with acute abdomen and diagnosed to have perforated bowel. The clinical presentation, imaging features, diagnosis, management and complications of all these patients were analysed.

RESULTS

The mean age was 33.5 with majority being males. Homicidal stab injuries accounted for most of the injuries (62.5%). 96 patients underwent laparotomy, and among which, the procedure was therapeutic in 72 patients. Peritoneal perforation was the best predictor of a therapeutic laparotomy with a high sensitivity and positive predictive value (100 and 80%, respectively). Small bowel was commonly injured. The mean postoperative stay was 8.25 days and there was no postoperative mortality.

CONCLUSION

We should avoid negative laparotomies, but not at the expense of delayed diagnosis and treatment. Diagnostic laparoscopy, which is now in practice is the best modality to avoid negative laparotomies.

KEYWORDS

Penetrating Injury, Bowel Perforation, Abdominal Injury.

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BACKGROUND

Bowel perforation in stab injury forms an important component of emergency duty surgeons. Most of the victims are young and healthy, so the surgical outcome is best, if we are diagnosing and managing the condition accordingly at the earliest and best. The technical advances in imaging had helped the surgeons in deciding when to operate and when not. The better availability of blood and blood products along with new antimicrobials have helped the better outcome of these patients.

In our study, we have concentrated more on the presentation and the surgical outcome of the wounded patients.

MATERIALS AND METHODS

A retrospective observational study was done at our hospital between January 1, 2015, to December 30, 2016. The 128 patients who presented with penetrating abdominal injury were included in the study. Patients with associated chest,

renal or head injuries were excluded. After the emergency medicine intervention in the casualty, cases were admitted and managed under surgery department. Based on the clinical presentation, haemodynamics and imaging features, these patients were either managed conservatively or underwent laparotomy. All patients underwent midline incision laparotomy. Wounds were also locally explored and closed. The postoperative complications were also accessed.

RESULTS

The aetiology of penetrating injury is accessed and given in Table 1. The mean age of presentation was 35 years ranging from 20 to 62. Majority of the case were males (72). Stab injuries accounted for most of the penetrating injuries, mostly homicidal. The plain x-ray abdomen erect/lateral recumbent position revealed pneumoperitoneum in just 24 patients (18.75%).

Table 2 depicts the indications and findings in laparotomy is given in Table 3. 96 patients underwent laparotomy and among which the procedure was therapeutic in 72 patients. Haemodynamic instability and mental or bowel evisceration were good predictors of therapeutic laparotomy. But, the best predictor with high sensitivity and positive predictive value was shown by peritoneal penetration (Graph 1 and 2). Pneumoperitoneum is a poor predictor. Intestine was the commonly injured organ. Wound dehiscence was the commonest complication (Table 4).

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Etiology	Number	Percentage
Homicidal Stab Injury	80	62.5
Self Inflicted Stab Injury	4	3.13
Bull Gore Injury	36	28.13
Fall Over Sharp Objects	8	6.26

Table 1. Etiology of Penetrating Abdominal Trauma

Indication for Laparotomy	Number (Present/Absent)	Percentage (Present/Absent)
Penetration of peritoneum	90:38	70.31:29.69
Generalized tenderness	68:60	53.13:46.88
Omental and/or bowel evisceration	76:52	59.38:40.63
Hemodynamic instability	22:106	17.19:82.81

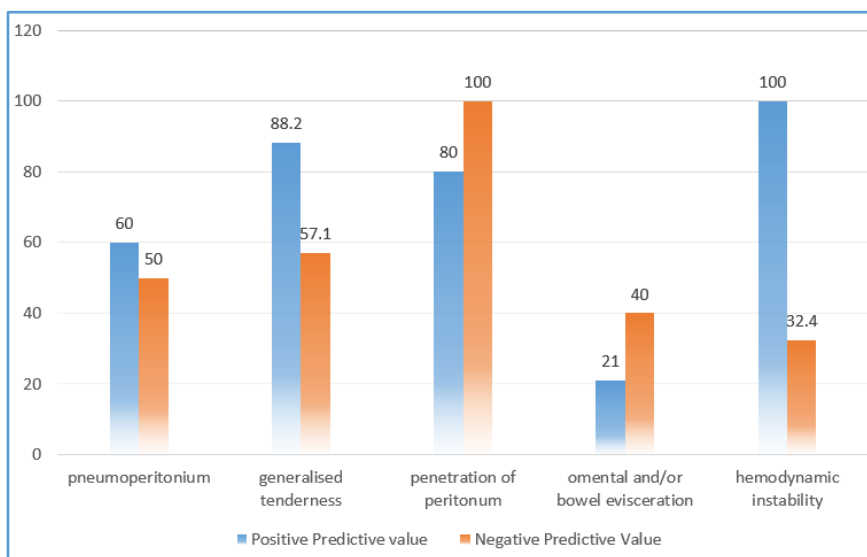
Table 2. Indication for Laparotomy

Organs Injured	Number
No injury	8
Liver (Therapeutic: Nontherapeutic Group)	14:8
Spleen (Therapeutic: Nontherapeutic Group)	8:0
Hollow Viscus (Stomach: Small Bowel: Large Bowel)	8:28:4
Mesentery (Therapeutic: Nontherapeutic Group)	8:8
Multivisceral (Therapeutic: Nontherapeutic Group)	2:0

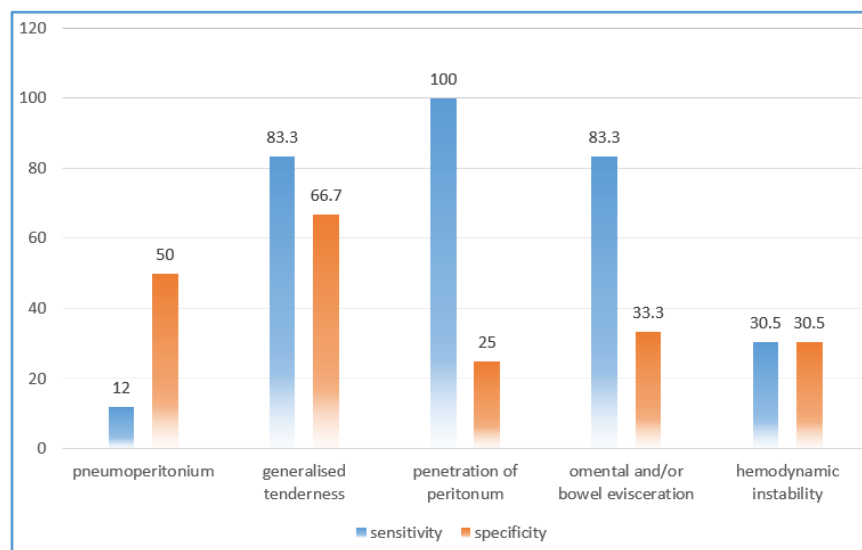
Table 3. Organs Involved

Postoperative Complications	Number
Respiratory	7
Anastomotic leak	0
Postoperative ileus	4
Wound infection	6
Wound dehiscence	9

Table 4. Postoperative Complication



Graph 1. Positive and Negative Predictive Value of the Presenting Features in Co-Relation to a Therapeutic Laparotomy.



Graph 2. Sensitivity and Specificity of the Presenting Features in Co-Relation to a Therapeutic Laparotomy



Figure 1



Figure 2

Figure 1 & 2 - Bowel Perforation



Figure 3



Figure 4

Figure 3 & 4 - Multiple Stab Wounds

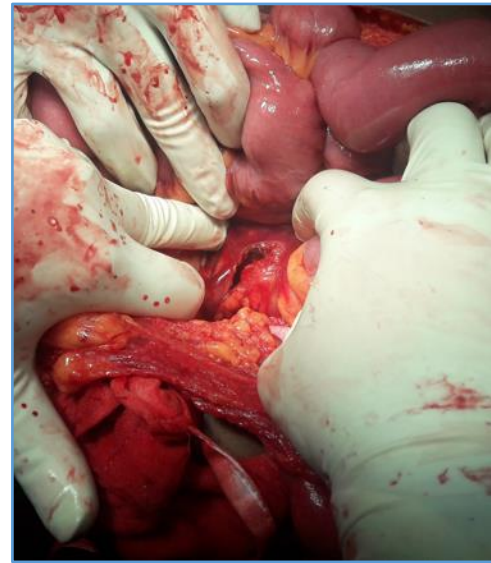


Figure 5. Retro-peritoneal Extension

DISCUSSION

Most of the victims of penetrating abdominal trauma are the young and middle-aged men who are in the prime of their life.¹ At the same time, the incidence of unnecessary laparotomy as per previous reports range from 23 to 53% for patients with stab wounds and 5.3 to 27% for patients with gunshot wounds. Complications develop in 2.5 to 41% of all trauma patients undergoing unnecessary laparotomy.² According to study done by Shaftan,³ it was concluded that "the application of trained surgical judgment rather than dogma is the more rational and intelligent approach to the management of abdominal injury." The expectant policy towards these injuries was later termed "selective conservatism."

In penetrating abdominal injuries whether civilian or military, gunshot or stab, the organ most commonly injured is the small bowel accounting 49 to 60% of all injuries. In general, stab wounds are less damaging than gunshot wounds and result in fewer complications. Nearly, one third of abdominal stab wounds do not penetrate the peritoneal cavity and only 50% of those that penetrate require surgical intervention. Studies by Moore et al have shown that the number of organs injured, the penetrating abdominal trauma index and the abdominal septic complications are significantly lower in stab wounds than in gunshot wounds.^{4,5}

Bull gore injuries⁶ are particularly common in rural setup accounting for 25% of the abdominal penetrating injuries. Such injuries are often associated with a blunt component. The extent of intra-abdominal injury varies depending on the site of penetration. More than one organ may be affected.

Initial examination of the trauma victim plays a significant role in the proper management of the patient both immediately in the emergency room and later in the surgical department. Lee et al⁷ retrospectively reviewed 219 patients who suffered from stab wounds to the abdomen between 1974 and 1983 and managed selectively. The rate of negative or unnecessary laparotomies was 7.8%, whereas

the false negative initial examination rate was 5.5%. The overall accuracy of initial clinical examination was 88.6%.

Roentgenogram of the abdomen is questionable in the case of stab wounds and contributes a little to the evaluation of stab wounds to the abdomen. In a study by Kester et al, roentgenograms were abnormal only in 8% of cases. Pneumoperitoneum was seen in 18.75% in present series.

Local wound exploration is helpful in determining the integrity of peritoneum and negative finding enables discharge of patients from an emergency department. Thompson and Moore found that local wound exploration followed by diagnostic peritoneal lavage when peritoneal violation was deemed likely after stab wounds resulted in a low unnecessary laparotomy rate of 8%. In our series, all the patients underwent wound exploration under regional anaesthesia and 70.31% of the patients were detected positive for peritoneal penetration.

Abdominal paracentesis in the setting of penetrating abdominal trauma was described by Shaftan in the 1960s. The use of Diagnostic Peritoneal Lavage (DPL) as an adjunct in the management of these patients was subsequently reported by Thal in 1977.⁸ Since then, a number of articles investigated DPL as a means to assess the need for surgery after penetrating abdominal trauma. The recommended thresholds for positivity have ranged from 1000 to 1,00,000 RBCs/mm³. With the widespread use of selective management, the non-invasive tools such as CT and Focused Abdominal Sonography in Trauma (FAST) became more popular adjuncts and DPL became more often reserved for unstable patients requiring a rapid diagnosis.

Ultrasound is most useful in detection of haemoperitoneum with accuracy of 91-97%.⁹ It has been proposed that additional diagnostic studies are needed in the face of a negative FAST to rule out occult injury.¹⁰

The original use of CT in penetrating abdominal trauma was first reported by Philips et al in 1986.¹¹ The authors concluded that CT enema reliably identified injuries in this patient population. Another prospective study of triple-contrast helical CT in 200 patients with penetrating torso trauma was published by Shanmuganathan et al¹² in 2004 concluding that the triple-contrast helical CT accurately demonstrates peritoneal violation and visceral injury. CT scan also identifies the penetrating wound track and its extent. However, the major drawback with use of CT is its insensitivity in detecting injury to bowel, the commonest organ injured by penetrating trauma.¹³ Salim et al reported an 100% negative predictive value of CT in the evaluation of anterior abdominal stab wounds.¹⁴

Diagnostic laparoscopy for trauma has gained widespread acceptance in recent times in view of the benefits of a minimally-invasive approach that is short of hospital stay, less postop pain, faster return to regular diet, ambulation, work, lower incisional hernia rates as well as better cosmetic results. Diagnostic laparoscopy maybe considered as a tool to evaluate diaphragmatic laceration and peritoneal penetrations. However, the non-therapeutic laparotomy rate after a laparoscopy positive for peritoneal penetration remains a concern. Another major concern is

missed injury. Also, diagnostic laparoscopy is not indicated in haemodynamically unstable patients and also needs good technical skills in laparoscopy. Hence, the routine use of diagnostic laparoscopy to identify how viscous injuries not recommended in present time.^{15,16}

The management of penetrating abdominal trauma in the presence of shock or physical finding of peritonitis should be immediate laparotomy. Selective conservatism is advocated for stab injury patients with no abdominal signs and those who are haemodynamically stable. As per the guidelines established by Biffl and Moore,¹⁷ shock, evisceration and peritonitis warrant immediate laparotomy following penetrating abdominal trauma. Anterior abdominal stab wound victims can be followed with serial clinical assessments in the absence of the above signs. The majority of patients with gunshot wound are best served by laparotomy; however, selected patients may be managed expectantly. In various series, the rate of operated cases reported was 65 to 75%.^{1,4,5}

The patient who are managed conservatively shall benefit from serial physical examination. Serial physical examination is reliable in detecting significant injuries, if performed by experienced clinicians and preferably by the same team. In these patients, abdominopelvic CT is strongly advised as a diagnostic tool to facilitate management decisions.¹⁸

Peritoneal violation has been mentioned as the indication of laparotomy in 70-80% of cases according to the reported series in the literature.^{4,5} Visceral or omental evisceration in a patient with stable clinical signs and without evidence of peritonitis is a relative rather than absolute indication for an explorative laparotomy. Since, there are arguments both for and against routine exploration,^{19,20} no recommendation has yet been proposed in this context. Hence, these patients are presently probably best served by laparotomy.

The majority of the patients who were managed non-operatively in the present study were discharged after 2 days of observation. The guidelines published by Homo et al recommended that majority of such patients may be discharged after 24 hours observation in the presence of a reliable abdominal examination and minimal to no abdominal tenderness.¹⁸

CONCLUSION

Penetrating abdominal trauma is a common type of surgical emergency affecting the young males. The commonest mode of injury is by stab wounds to the abdomen. Though the management of these patients should aim at minimising the rate of negative laparotomies, this should not be done at the expense of delayed diagnosis and treatment. Diagnostic laparoscopy maybe applied as a tool to avoid unnecessary laparotomy; however, it requires adequate experience and skills in laparoendoscopy. The best mode of management must be tailor made for each individual based on the nature of injury, findings at presentation and organ injured.

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