



Original Article

The efficacy of serial physical examination in management of penetrating abdominal trauma to avoid negative laparotomy in selected cases

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Abstract

Background: Patients with Penetrating Abdominal Injury (PAI) are at risk of harboring life-threatening injuries. Many patients are in need of emergency operative intervention. However, there are some patients who can be safely managed non-operatively. Every patient with an abdominal penetrating trauma should have a thorough clinical examination. Repeating the clinical examination at regular intervals is the cornerstone of selective management, as symptoms and signs that were initially absent may appear later.

Objective: To see the efficacy of serial physical examination in patients with penetrating abdominal injury thus avoiding non-therapeutic laparotomy in the overall management of patients.

Methods: Convenient and purposive 60 PAI patients admitted in casualty block of Dhaka Medical college & Hospital were selected for selective non operative management (SNOM). On admission the abdominal wound was inspected and neither digital nor direct probing of the wound was attempted. Patients selected for admission had an intravenous line established, a thoracic and abdominal X-ray taken and urine and blood samples were taken. If necessary, a nasogastric tube was inserted. Asymptomatic haemodynamically stable patients were admitted for clinical observation in a single unit during which period the patient was examined by a senior surgeon for clinical re-assessment. Patients were discharged when feeding was normal and if there were clear signs of improvement.

Results: Over a 6 month period 60 consecutive patients with penetrating abdominal wound were reviewed. In total 52 patients (86.67%) were managed with clinical re-assessment and discharged without laparotomy. Eight patients (13.33%) underwent laparotomy after observation. Small bowel, liver, mesenteric vessels were most frequently affected.

Non-therapeutic laparotomy rate was 0%. After laparotomy the morbidity rates were 62.5% (p = 0.92). One local wound infection occurred without prior laparotomy. Average hospital stay after observation was 2.8 days, after laparotomy 9.8 days. Delayed laparotomy did not increase morbidity or hospitalization.

Conclusion: Our experience with penetrating abdominal trauma supports the concept of selective conservatism based on repeated physical examination. In a well established trauma centre this has proven to be highly effective with remarkably low rates of non-therapeutic laparotomies and absence of missed diagnosis of visceral injuries.

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Introduction

Prior to the 20th century high mortality rates were the rule when stab or gunshot wounds were treated non-operatively. Introduction of mandatory exploration for all penetrating abdominal wounds during World War II resulted in markedly improved morbidity and mortality rates¹. Subsequently this military approach was successfully applied to the ever growing problem of civilian violence.

The management of truncal penetrating wounds has long remained controversial. Routine early operation for all patients with penetrating abdominal trauma was first questioned in 1960 by Shaftan, who advocated selective conservatism². Since then additional diagnostic procedures have been advocated to enhance the sensitivity and specificity of clinical judgment alone in evaluating patients for possible intra-abdominal injury following truncal stab wounds³. The primary objective of an evaluation of abdominal trauma is to determine if an intra-abdominal wound is present and whether laparotomy is indicated. In this report we analyzed our experience with the selective approach to evaluate its reliability and accuracy in penetrating abdominal trauma.

Materials and Methods

This is a prospective study and the study was conducted in casualty block of Dhaka Medical College Hospital, Dhaka over 60 patients of penetrating abdominal injury. Study sample collected by selective consecutive sampling method. Patients of penetrating abdominal injury with pneumoperitoneum otherwise haemodynamically stable and no/minimal sign of peritonism at the time of admission managed by serial physical examination. Patient with PAI by Gun shot, haemodynamically unstable, having distant peritonitis, aspiration of blood from nasogastric tube were excluded.

On admission the abdominal wound was inspected and patients with clearly superficial wounds were discharged immediately after treatment. Patients selected for admission had an intravenous line established, a thoracic and abdominal X-ray taken and urine and blood samples were taken. If necessary, a nasogastric tube was inserted. Asymptomatic haemodynamically stable patients were admitted for 24 to 48 h of clinical observation in a single unit during which period the patient was examined by a senior surgeon for clinical re-assessment. Patients were discharged when feeding was normal and if there were clear signs of improvement

The laparotomies were divided into two groups: therapeutic and non-therapeutic explorations. We defined a non-therapeutic laparotomy as one in which no or only insignificant lesions were found that retrospectively could not justify an operation. Insignificant lesions were haematomas or intra-abdominal blood without a clear source as well as small lesions, e.g. of liver, spleen, serosa or omentum.

Results

Sixty patients were hospitalized because of one or more abdominal penetrating wound. 56 men and 3 women and 1 child with a mean age of 28 year. Six patients had more than one abdominal stab wound. In total 52 patients (86.67%) were managed with clinical re-assessment and subsequently be discharged without laparotomy. (Figure 1) Eight patients (13.33%) underwent laparotomy after observation (fig. 1).

Overall mortality rates 0%. After laparotomy the morbidity rates were 62.5% (p = 0.92). One local wound infection occurred without prior laparotomy. Average hospital stay after observation was 2.8 days, after laparotomy 9.8 days. Delayed laparotomy did not increase morbidity or hospitalization.

Table-1: Age distribution of penetrating abdominal injury

Age	Number of patient	%
<15 yrs	1	1.6%
15-40 yrs	45	75%
>40 yrs	14	23.3%
Total	60	100%

Mean age 28 yrs

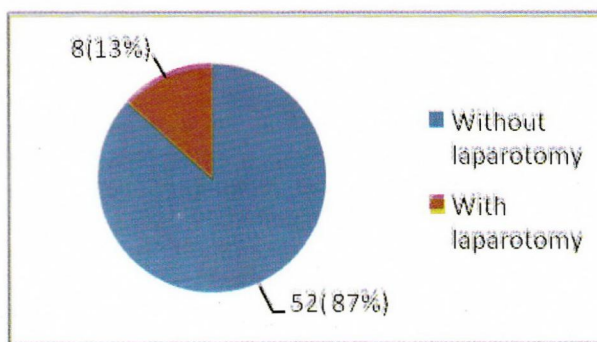


Fig.1. Treatment of abdominal penetrating injury with the introduction of selective management.

Among 60 patients, 52(86.7%) were successfully managed without laparotomy. Only 8 (13.3%) patients had laparotomy.

Table-2: Criteria for laparotomy in 8 patients

Indication	Number of patient	%
Peritoneal irritation	5	62.5%
Haemodynamic instabil	3	37.5%

Table 3. 4 Affected organ in 8 operated patients with penetrating abdominal trauma

Organ	n ^a	%
Small bowel	4	50%
Colon	1	12.5%
Liver	3	37.5%
Vessels	2	25%
Diaphragm	1	12.5%

Table- 4: Delayed laparotomy after initial observation

Patients	Delay(h)	Indication of operation	Findingsat laparotomy	Stay in Hospital(days)
1	1	aemodynamic instability	lesion of middle colic vessels	4
2	4	peritoneal irritation	lesion of small gut, liver	7
3	2	peritoneal irritation	lesion of small gut	8
4	1	peritoneal irritation	lesion of colon, liver, diaphragm	14
5	24	haemodynamic instability	lesion of liver	3
6	4	peritoneal irritation	lesionof small gut	10
7	20	haemodynamic instability	lesion of mesenteric vessels	6
8	6	peritonel irritation	lesion of small gut	8

Discussion

Management of Penetrating Abdominal Injury (PAI) varies widely in different trauma centres. There is little doubt that hemodynamic instability or any sign of peritoneal irritation requires immediate laparotomy. Changes in evaluation methods over the past decades have decreased the rate of nontherapeutic exploration from 30-40% to a minimum of 7-10%⁴.

Although abdominal stab wounds cause internal wounds in only one third of the cases, some surgeons have advocated routine explorations of all potentially penetrating wounds⁵. Others use some form of selective conservative management trying to minimize the incidence of non-therapeutic laparotomy without increasing morbidity due to missed or delayed recognition of serious wounds⁶. Options for conservative approach include clinical observation and serial physical examination, diagnostic peritoneal lavage, local wound exploration, abdominal CT scanning and ultrasonography.

Apart from the fact that serial physical examination significantly lowers the rate of non-therapeutic laparotomies, it is considered to be of equal or even superior value to LWE and DPL by several authors⁷. Laparoscopy is reported to reduce the rate of non-therapeutic laparotomies, as well as the total cost and length of stay⁸. However, the use of laparoscopy still

results in a nontherapeutic laparotomy rate of 7 to 24% and a morbidity of 3%⁹. A combination of diagnostic laparoscopy in those with positive criteria and serial physical examination as reported here certainly merits further investigation.

DPL as a diagnostic tool in the evaluation of blunt abdominal trauma has been well established, its role however in evaluating penetrating trauma is much less defined. DPL is considered to be sensitive in case of solid visceral injuries, but not when hollow organs, diaphragm or retroperitoneum are injured¹⁰.

Omental herniation and bowel evisceration as indications for laparotomy are controversial. Visceral injuries are reported to occur in not less than 90% of patients with bowel evisceration¹¹. Rates of intraabdominal injuries with omental evisceration vary from 69 to 80%, two to three times as high as in all patients with abdominal stab wounds¹². In our study we found 4 (57%) intra-abdominal injuries in 7 cases of bowel evisceration, 7 (58%) with significant injuries in 12 cases of omental prolapse. On the other hand, laparotomy because of evisceration caused 25% of all non-therapeutic laparotomies.

In this study 8 patients (13.33%) underwent delayed laparotomy after unsuccessful observation without mortality or increase in morbidity and hospital stay.

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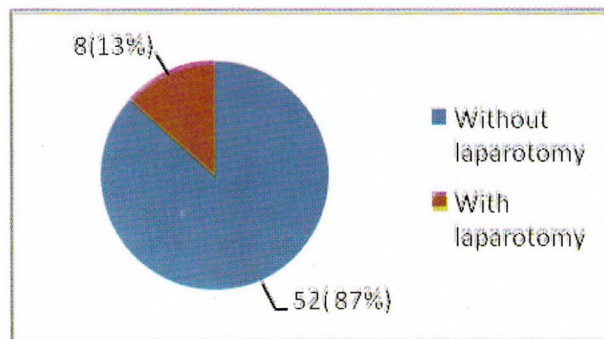


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Patients selected for SNOM are expected to be observed and to undergo serial physical examinations by experienced clinical staff. Frequent assessments for changes in examination findings or development of peritoneal signs at regular intervals are mandatory, so that injuries are diagnosed as soon as they are clinically apparent. The results of this study reflect the practice patterns of tertiary level hospital. These centers specialized in comprehensive trauma care and have 24-h in-house personnel in the form of attending surgeons and/or surgical residents, house officers or mid-level practitioners, which enables close monitoring of patients after admission. These centres also have readily available staff and operating room capabilities for immediate surgical intervention.

Conclusion

Selective conservatism with criteria for selecting patients who will benefit from immediate operation will result in a drastic morbidity reduction and costs saving with short hospital stay based on a 48 h observation period. Our experience with abdominal penetrating wounds supports the concept of selective conservatism based on repeated physical examination. In a well established trauma centre this has proven to be highly effective with remarkably low rates of non-therapeutic laparotomies and absence of missed diagnosis of visceral injuries. Peritoneal perforation and haemoperitoneum should not be an indication for routine laparotomy.

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