

Role of Laparoscopy in Evaluation of Various Blunt Abdominal Trauma

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Abstract

Introduction with Objective: The aim of the present study was to assess the role of laparoscopy in evaluation of various Blunt abdominal trauma (BTA) in tertiary care teaching hospital. **Materials and Methods:** A prospective observational study was conducted from 21st June 2016 to 21st December 2017 among 50 abdominal blunt trauma patients attending at Casualty Block, Dhaka Medical College Hospital, Dhaka, after obtaining requisite consent from the patients attendant. Data were collected through the assessment and investigation report of abdominal blunt trauma patients in the Casualty Department. The collected data were entered into the computer and analyzed by using SPSS (version 20.1) to assess the role of laparoscopy in evaluation of various blunt abdominal trauma. **Results:** Most of the patients were from 21-30 years (36%) of age group followed by 11-20 years (32%). The median age of this study population is 27 years. Of the study population, 84% (n=42) were male and 16% (n=8) were female. Male-female ratio was 84:16. In this study, 62% (n=31) of patients underwent only laparoscopy and 38% of patients (n=19%) underwent laparoscopy followed by laparotomy. Perforation of gas containing hollow viscus (94.73%) is responsible for conversion of laparoscopy into laparotomy in patients with blunt abdominal trauma. Among 50 patients 14 patients (28%) developed post operative complications. Rate of wound infection was higher laparoscopy followed by laparotomy (n=11). One patient developed post operative collection following laparoscopy. The accuracy rate is 100% in laparoscopic evaluation of BTA in this study. **Conclusion:** laparoscopy is a useful modality for evaluating and managing hemodynamically stable blunt abdominal trauma patients.

Key words: Laparoscopy, Blunt abdominal trauma (BTA).

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Introduction:

Laparoscopy was first used for a trauma patient in 1956 by Lamy, who observed two cases of splenic injury and later, it was noted that laparoscopy is useful for determining the need for laparotomy¹. Fortunately, the incidence of BAT requiring laparotomy is only 6%². Management of BAT requires an art of resuscitation, early diagnosis and initial evaluation and management then lastly the perfect surgical skill. In BAT most commonly injured organs are liver, spleen, kidney, intestines, pancreas, stomach, urinary bladder and vessels accordingly³. Previously all BAT ended up in laparotomy and managed according to organ injury, however in such cases chances of negative laparotomy were high but, due to research and advances in diagnostic field like USG, FAST, CT scan of abdomen, the chances of negative laparotomy significantly reduced and sometimes managed conservatively⁴. With advent and development of new technology, laparoscopy minimally access surgery (MAS) has gained widespread acceptance as a useful tool in evaluation of the patient with blunt

abdominal injuries⁵. Laparoscopic evaluation of abdominal cavity has been established as sensitive and specific in the trauma setting (sensitivity 94% and specificity 98%)⁶. Unnecessary abdominal exploration in severely injured patients can be reduced by employing urgent laparoscopy in BAT. Hemoperitoneum associated with stable vitals with liver injury, splenic injury, bowel injury, mesenteric injury or bladder injury can be managed very well by means of laparoscopy. Advanced laparoscopic technique including bowel resection and anastomosis, ligation of blood vessels can be utilize in BAT, as good as in elective open surgery⁷⁻¹⁰. One can visualize peritoneal cavity and act expeditiously if needed(i.e. laparotomy, laparoscopic assisted intervention or only observation) at the time of laparoscopy¹¹. Laparoscopy is cost effective, reduces the rate of negative laparotomy, reduces the patient’s stay in hospital and mortality and allows early mobilization and resumption of work. The purpose of this study is to evaluate the role of emergency laparoscopy as a modality in BAT.

Materials & Methods:

A prospective observational study was conducted from 21st June 2016 to 21st December 2017 among 50 abdominal blunt trauma patients attending at Casualty Block, Dhaka Medical College Hospital, Dhaka, after obtaining requisite consent from the patients attendant. Data were collected through the assessment and investigation report of abdominal blunt trauma patients in the Casualty Department. The collected data were entered into the computer and analyzed by using SPSS (version 20.1) to assess the role of laparoscopy in evaluation of various Blunt abdominal trauma. The study was approved by the institutional ethical committee. After receiving initial treatment, patients were sent to the radiology department for an immediate evaluation of their abdominal visceral injuries by a chest X-ray (erect posteroanterior view), abdominal X-ray (erect and supine), focused abdominal sonography for trauma (FAST), and computed tomography (CT) scan. Purposive sampling was used in this study.

Results:

Most of the patients were from 21-30 years (36%) of age group followed by 11-20 years (32%), 31-40 years (20%), 41-50 years (8%) and >50 years (4%) respectively. The median age of this study population is 27 years (Table I).

Table I: Distribution of the study patients (n=50)

Age (years)	Number	Percentage
11-20	16	32%
21-30	18	36%
31-40	10	20%
41-50	4	8%
≥50	2	4%

On this study predominant was male as shown in pie chart. Of the study population, 84% (n=42) were male and 16% (n=8) were female. Male-female ratio was 84:16 (Figure I).

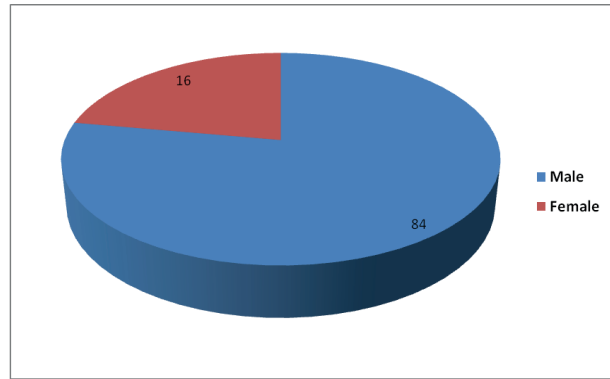


Figure I: Pie chart showing sex distribution of the population (n=50)

In this study, 62% (n=31) of patients underwent only laparoscopy and 38% of patients (n=19) underwent laparoscopy followed by laparotomy.

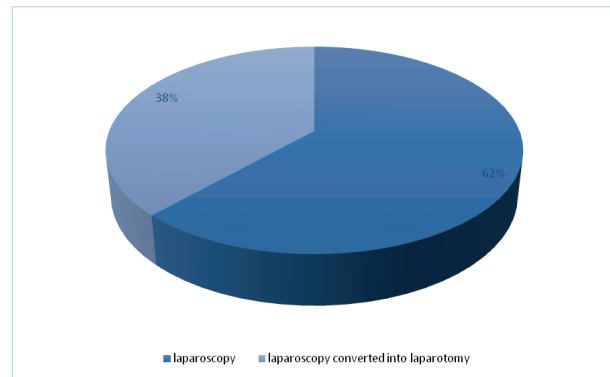


Figure II: Laparoscopy and laparoscopy converted into laparotomy (n=50)

Laparoscopy was classified as negative (6%) if there was no injury, as nontherapeutic (44%) if there was an injury but did not require a surgical intervention, therapeutic (12%) if injury was identified and repaired and positive (38%) if there was an injury that required conversion to open exploration for repair. Among positive (n=19 patients), 14 had small bowel injury, 2 had large bowel injury, 2 had duodenum injury and 1 had uncontrolled bleeding due to mesentery and omental tear (Table II).

Table II: Mode of management in study population (n=50)

Procedure	Number	Percentage
Negative Laparoscopy	3	6%
Non Therapeutic Laparoscopy	22	44%
Therapeutic Laparoscopy	6	12%
Laparoscopy converted into laparotomy	19	38%

Perforation of gas containing hollow viscus (94.73%) is responsible for conversion of laparoscopy into laparotomy in patients with blunt abdominal trauma.

Table III: Reasons for conversion of Laparoscopy into Laparotomy (n=19)

Causes of conversion	Number	Percentage
Perforation of gas Containing hollow Viscus	18	94.73%
Uncontrolled bleeding	1	5.36 %

Post operative complications were high in patients with blunt abdominal trauma with laparoscopy converted into laparotomy. Among 50 patients 14 patients (28%) developed post operative complications. Rate of wound infection was higher laparoscopy followed by laparotomy (n=11). One patient developed post operative collection following laparoscopy and it was managed by USG guided aspiration.

Table IV: Post operative complication following surgery (n=14)

Complication	Laparoscopy	Laparoscopy followed by Laparotomy
Wound infection	0	11
Respiratory complication	0	2
Post operative collection	1	0

In this study total 31 patients out of 50 were managed successfully by laparoscopy without laparotomy. There was no missed injury. Rest of the patients were also diagnosed laparoscopically but required conversion into laparotomy for further definitive management. The accuracy rate is 100% in laparoscopic evaluation of BTA in this study.

Table V: Diagnostic accuracy of laparoscopy in various organ injury.

Type of injury	Number of patients	Diagnosed by laparoscopy	Missed injury	Accuracy rate
Solid organ injury	22	22	0	100%
GIT	18	18	0	100%
Retro peritoneal hematoma	4	4	0	100%
Mesenteric tear	6	6	0	100%
Urinary bladder Injury & Hematoma	3	3	0	100%

Discussion:

The most common affected age group of this study is 21-30-years and median age group is 27 years. Similar finding was found in several studies. VD Gohil, HD Palekar and M Ghoghari¹² study showed the most common age group involved is 11-20 years and 21 -30 years age group respectively. The median age group of their study was 23 years. The median age group in YB Chol et al series¹³ was 40.9 years and in Timothy C Fabian et al series¹⁴ was 32 years. In our country, male are more work outside the home and involved in financial activities, so they are more frequently affected by physical trauma. In this study, maximum 84 % were male and 16% were female with male: female ratio of 84:16 which is a little bit different to sex distribution ratio in VD Gohil et al¹² series which was 76:24. Another study by Morsi Mohamed et al¹⁵ 76.19% were male and 23.81% were female. Another study result, conducted by Muhammad Rafiq Memon et al¹⁶

showed, out of 32 patients 29 were male and 3 were female. In present study, on laparoscopy, 19 (38%) patients had major injuries in whom laparoscopy was converted into exploratory laparotomy. According to the study of VD Gohilet al.¹² only 1 case (4%) was converted into laparotomy due to large single perforation in ileum with large mesenteric hematoma with moderate fecal contamination. In R. Stephen Smith et al.¹⁷ study, only 2 of 90 cases were performed with standard laparoscopy required conversion to laparotomy. Diagnostic accuracy of laparoscopy in this study is 100%, on the other hand in the study of VD Gohilet al.¹² diagnostic accuracy of laparoscopy is 93% and in Hamish Foster et al.¹⁸ it is 89%. In this study, post operative complications were found in 14 patients. Among them 13 patients were undergone laparoscopy converted into laparotomy. Wound infection occurred in 11 patients out of 13. Respiratory complication occurred in 2 patients. Only 1 patient had post operative collection following laparoscopy which was further managed by USG guided aspiration. But there was no complication found in VD Gohilet al.¹² series related to laparoscopic procedure. In YB Cholet al.¹⁴ the complications had occurred only in 3 cases which included wound infection in 1 case, paralytic ileus in 1 and atelectasis in 1 case. The rate of wound infection is more in our study due to excessive crowding in our hospital and lack of 100% aseptic procedures in all steps of patient management.

Conclusion:

Current trends in all areas of surgery are towards minimal invasive techniques. Data shows that laparoscopy is a useful modality for evaluating and managing hemodynamically stable blunt abdominal trauma patients. The ultimate outcome of laparoscopy is very much satisfactory and cost effective to the patient. As technology and expertise among the surgeons continue to improve, more standard therapeutic interventions may be done laparoscopically in future.

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Conflict of Interests: None.

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