

# Role of Diagnostic Laparoscopic for Conversion to Therapeutic Laparotomy in Blunt Abdominal Trauma

Laparoscopic for Conversion to Therapeutic Laparotomy

Syed Haider Abbas<sup>1</sup>, Muhammad Akram Dogar<sup>2</sup>, Muhammad Kareem Ullah<sup>1</sup>, Saeed Mahmood<sup>1</sup>, Adnan Sadiq Butt<sup>1</sup>, and Ehtisham Ahmed Khan<sup>1</sup>

## ABSTRACT

**Objective:** To determine the frequency of conversion to therapeutic laparotomy after diagnostic laparoscopic in blunt abdominal trauma

**Study Design:** Cross-sectional study

**Place and Duration of Study:** This study was conducted at the Department of Surgery, Lahore General Hospital, Lahore from 1<sup>st</sup> January 2019 to 30<sup>th</sup> June 2019.

**Materials and Methods:** Ninety five patients were included. Then patients will undergo laparoscopic surgery under general anaesthesia. During laparoscopy, patients were evaluated if there was abdominal unstable wound or internal organ bleeding and cannot be managed through laparoscopy, and then conversion to therapeutic laparotomy was labelled.

**Results:** The mean age of patients was 36.33±13.93years. There were 79 (83.2%) males and 16 (16.8%) females in our study. The major cause of trauma was road traffic accident (30.5%) followed by fall from height (24.2%), strike something hard (23.2%) and fight (22.1%). Eighteen (18.95%) patients needed for conversion to open laparotomy after laparoscopic procedure.

**Conclusion:** The frequency of need of conversion to open surgery was found to be low in our study. Now, we have got the local evidence and now we recommend the laparoscopy to be performed in all BAT cases, keeping in mind the low rate of conversion to open surgery.

**Key Words:** Blunt abdominal trauma, Laparoscopy, Laparotomy, Conversion

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## INTRODUCTION

Blunt abdominal trauma (BAT), most commonly resulting from motor vehicle accidents and falls, is a mechanism of injury frequently encountered by both emergency physicians and trauma surgeons. Unlike penetrating abdominal injuries, unclear signs of traumatic injuries after BAT often leaves many treatment decisions to the acumen of the clinician.<sup>1,2</sup> abdominal traumas is the leading causes of mortality and common presentation in an emergency setting. Mortality rate related to this trauma is enormous. So rapid diagnosis has very much importance for making appropriate therapeutic decisions, which could

reduce the incidence of trauma-related mortality rate and can saves lives<sup>3</sup>. Major abdominal trauma has significant threat to the health of patient. World Health Organization has an estimation that abdominal trauma-related mortality rate is about 9% all over the world.<sup>4</sup> In England and Wales, around 12,500 individuals die every year as a consequence of trauma, which makes this a leading cause of mortality in young adults as well as in children.<sup>5</sup>

In the last 30 years, penetrating abdominal injuries have been managed by operative exploration irrespective of the hemodynamic condition of the patient. The majority of clinicians would choose the surgical option for the management of patients with hemodynamic instability.<sup>6-8</sup>

## MATERIALS AND METHODS

This cross sectional study was carried out at Department of Surgery, Lahore General Hospital Lahore from 1<sup>st</sup> January 2019 to 30<sup>th</sup> June 2019 and comprised 95 cases. Patients of age 16-60 years of either gender, presenting with blunt abdominal trauma were included. Patients who have diabetes mellitus, renal disease, bleeding disorders, open abdominal wound, intestinal perforation, free gas under the

<sup>1</sup>. Department of Surgery, General Hospital Lahore.

<sup>2</sup>. Department of Surgery, Central Park Medical College Lahore.

Correspondence: Dr. Syed Haider Abbas, Registrar  
Department of Surgery, Lahore General Hospital Lahore.  
Contact No: 0333 3625052  
Email: sshhah2000@yahoo.com

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diaphragm, penetrating abdominal wounds, non-traumatic abdominal emergencies and iatrogenic injuries were excluded. Patients were undergone laparoscopic surgery under general anesthesia. All surgeries were done by a consultant surgeon with assistance of researcher. Initially, all patients were resuscitated with intravenous fluids, analgesics, intravenous antibiotics and blood transfusion, if required. During laparoscopy, patients were evaluated if there was abdominal unstable wound or internal organ bleeding and cannot be managed through laparoscopy and then conversion to therapeutic laparotomy was labeled. Data was analyzed by using SPSS-21.

## RESULTS

The mean age of patients was  $36.33 \pm 13.93$  years. There were 79 (83.2%) males and 16 (16.8%) females in our study. There were 41 (43.2%) patients who had ASA I before undergoing laparoscopy while 54 (56.8%) had ASA III. The major cause of trauma was road traffic accident (30.5%) followed by fall from height (24.2%), strike something hard (23.2%) and fight (22.1%) (Table 1).

**Table No.1: Demographic information of the patients (n-95)**

Variable	No.	%
Age (years)	$36.33 \pm 13.93$	
<b>Gender</b>		
Male	79	83.2
Female	16	16.8
<b>Cause of trauma</b>		
Fight	21	22.1
Road traffic accident	29	30.5
Strike something hard	22	23.2
Fall from height	23	24.2
Duration of BAT (hours)	$3.54 \pm 1.77$	

**Table No.2: Vitals at presentation**

Body temperature (°F)	$99.73 \pm 0.73$
Blood Pressure (mmHg)	$134.37 \pm 15.83$
Respiratory Rate (bpm)	$16.51 \pm 3.16$
Pulse (bpm)	$78.80 \pm 11.81$

**Table No.3: Need to conversion to therapeutic laparotomy**

Conversion to therapeutic laparotomy	No.	%
Yes	18	18.95
No	77	81.05

At time of presentation, the mean body temperature was  $99.73 \pm 0.73^\circ\text{F}$ , mean blood pressure was  $134.37 \pm 15.83\text{mmHg}$ , mean respiratory rate was  $16.51 \pm 3.16\text{bpm}$  and mean pulse rate was  $78.80 \pm 11.81\text{bpm}$  (Table2).

Eighteen (18.95%) needed for conversion to open laparotomy after laparoscopic procedure and 77 (81.05%) not need for conversion to open laparotomy after laparoscopic procedure (Table 3)

## DISCUSSION

The management of BAT has been improved intensely. Though laparotomy is a standard-of-care in patients who are hemodynamic ally unstable, while patients who are hemodynamic ally stable are generally managed through non-operative way, adding adjuncts like interventional radiology. Nevertheless, while non-operative way has proved good results in some injuries involving solid organs. But few other lesions, including diaphragm, hollow viscous and mesentery, are not eligible for such approach and necessitates a surgical intervention.<sup>9</sup>Sometimes, the choice between surgical and conservative management is difficult. This is consistent with cases with injury to the diaphragm or intestines, which cannot be detected by imaging techniques. Thus, this gives rise to a need for other modalities to aid the diagnosis and even management of such cases.<sup>8,10</sup>

Laparoscopy is applied for better diagnosis and therapeutic purpose in hemodynamic ally stable patients presented with abdominal trauma.<sup>11</sup>The characteristic of laparoscopy in the diagnosis and also in therapeutic interventions has been improved significantly in last decades. In abdominal trauma, laparoscopy has been considered as a feasible substitute for diagnosis of intra-abdominal injuries following penetrating & blunt abdominal trauma. The number of negative or non-therapeutic laparotomies executed earlier, has been reduced after the initiation of laparoscopy use for the diagnosis and treatment.<sup>12</sup> The surgical outcome of laparoscopy has greatly improvement in several parts of abdominal surgery. But there are several apprehensions of laparoscopy which limit it application in such cases.<sup>13,14</sup>

Laparoscopy is a safe and precise in abdominal injuries. The use of laparoscopy has several benefits including reduced hospital stay, less post-operative wound infections or ileus complications, and also no missed injuries.<sup>15,16</sup> In a meta-analysis, composed of 11 reports with around 355 patients of blunt abdominal trauma, the sensitivity and specificity of laparoscopy were 94% & 98%, respectively with accuracy rate of 97% in estimating the ultimate requisite for therapeutic laparotomy. Though fairly safe and accurate (morbidity rate ~ 1.2%), the interventional nature, cost of procedure and time consumption nature of laparoscopy limit its use in routine in abdominal trauma cases.<sup>6,17,18</sup>

Laparoscopy can considerably reduce the further surgical interventions. It is very useful in accurate diagnoses and has better therapeutic potential. If findings of laparoscopy found negative, it may also lessen the quantity of unnecessary laparotomies.

Though few trials showed favorable results on laparoscopy use in cases of blunt abdominal trauma, randomized controlled trials are missing. Laparoscopy necessitates appropriate training and practice and also adequate staffing and equipment.<sup>9</sup> One study found that laparoscopy has 100% therapeutic role in cases of BAT and no case require conversion to open/therapeutic laparotomy.<sup>19</sup> While another study found that laparoscopy has 93.75% therapeutic role in cases of BAT and 6.25% cases required conversion to open/therapeutic laparotomy.<sup>20</sup> One more study showed three times conversion to laparotomy after laparoscopy in BAT cases i.e. 18%.<sup>21</sup>

In another study, 35 cases of blunt abdominal trauma were recruited and planned to undergo laparoscopy. Approximately 27 (77%) cases were managed by using laparoscopy. This included 43% cases who underwent for both; diagnostic and therapeutic purpose while 34% cases only had diagnostic purpose. Eight (23%) cases needed to be converted to open surgery. This was because of active bleeding and complex abdominal injuries.<sup>22</sup> Lin et al<sup>23</sup> observed 8.5% rate of need to be converted to open surgery after laparoscopy in cases of blunt abdominal trauma. With the advancement in radiological imaging and treatment, like trans-arterial embolization,<sup>24,25</sup> non-surgical management way has become a treatment of choice for several hemodynamically stable cases of blunt abdominal trauma.<sup>23,26</sup> Alternatively, laparotomy done in emergency setting can be life saving for unstable cases like patients in shock and not responding to the fluid resuscitation. However, laparoscopy could be beneficial in such situations, for example for cases of isolated intra-abdominal fluid accumulation of undefined origin detected on computed tomography scans.<sup>26</sup>

## CONCLUSION

The frequency of need of conversion to open surgery was found to be low in our study. Now, we have got the local evidence and now we recommend the laparoscopy to be performed in all BAT cases, keeping in mind the low rate of conversion to open surgery.

### Author's Contribution:

Concept & Design of Study:	Syed Haider Abbas
Drafting:	Muhammad Akram Dogar, Muhammad Kareem Ullah
Data Analysis:	Saeed Mahmood, Adnan Sadiq Butt, Ehtisham Ahmed Khan
Revisiting Critically:	Syed Haider Abbas, Muhammad Akram Dogar
Final Approval of version:	Syed Haider Abbas

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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