

Post-Operative Complications among 50 Cases of Traumatic Gut Injury

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Abstract

Introduction: Traumatic gastrointestinal tract perforation is one of the commonest abdominal emergencies. The number of admitted trauma patients just focuses the tip of the iceberg because a lion's share of these ill-fated people with abdominal trauma pass their last breath on the way to the hospital. Even after the best possible treatment, patients still face post-operative complications due to various factors. The present study was conducted to observe such cases of post-operative complications among patients of abdominal injury.

Aim of the study: The aim of the study was to observe the post-operative complications among 50 abdominal injury cases.

Methods: This cross-sectional observational study was conducted at the Department of Surgery, Dhaka Medical College Hospital, Dhaka, Bangladesh. The study duration was 1 year, from January 2007 to December 2007. A total of 50 cases were selected for the purpose of this study from those admitted to the study hospital due to traumatic gut injury.

Result: The majority of the patients were male and were of the young group. Penetrating groups (60%) predominate over the blunt group (40%). Penetrating injuries were mainly caused by stab and gunshot injuries on the other hand road traffic accidents were mainly responsible for blunt trauma. 58% of patients were in shock on admission and 48% had associated extra-abdominal injury. 52% of patients were resuscitated successfully by means of blood and I/V fluid and most of them were resuscitated within 1-4 hours. The diagnosis was mainly based on clinical presentation and with the aid of very limited investigation. The majority of patients (72%) were operated on within 24 hours of admission. The small intestine was the main organ involved. A number of procedures were adopted for operative management but the most common procedure was simple repair and resection with end-to-end anastomosis. Primary post-operative complications were wound infection and urinary tract infection, observed in 26% and 20% of participants respectively.

Conclusion: The present study observed that intra-abdominal injury was highly prevalent among adults and males, and over half the participants had penetration type of injury. At the time of admission, majority were conscious, but over half had been under shock. Majority of post-operative complications were in the form of wound infections and urinary tract infections.

Keywords: Trauma, Penetrating, Gastrointestinal, Infection, Abdominal

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I. Introduction

The human body is exposed to a growing quantity and diversity of external pressures, such as falls, blows, piercing wounds from sharp objects, gunshot wounds, workplace accidents, and not to mention auto accidents. The abdomen covers a sizable portion of the body, offers less protection than the chest, and is more vulnerable to injuries since it is closer to the ground.^[1] Although the agents that cause wounds rarely follow anatomical boundaries, they frequently injure the head, chest, abdomen, and other parts of the trunk and extremities in addition to these other locations. The frequency of admissions with abdominal trauma is rising in our nation as a result of fast urbanization and rising social unrest even though abdominal trauma is a fairly common surgical emergency. Each year, thousands of people—the majority of whom are young, energetic

segments of our population—become crippled or pass away as a result of this type of accident. According to estimates, 1,20,000 persons in the USA pass away from trauma each year, with abdominal trauma accounting for 10% of those fatalities. However, our nation's data are murky.^[2] The gastrointestinal tract is the most often afflicted organ, with the stomach accounting for 5 percent, the duodenum for less than 1 percent, and the small intestine for 20 to 25 percent, regardless of the kind of abdominal injury. However, if identified early and treated quickly within the "golden hour," all of these are treatable traumatic disorders. Delay in identification frequently significantly reduces the likelihood of recovery and outcome. Exceptions are granted when these injuries are linked with other injuries (such as head and chest traumas) that require immediate special treatment. Surgery has been around as long as humans have. Many believe that trauma was the primary medical condition of early humans. Edwin Smith's papyrus from ancient Egypt has been discovered to deal with medicine, surgery, obstetrics, and gynecology, and his writing between 3000 and 1600 BC covers 48 cases of trauma stretching from head to foot "a capite ad calcem."^[3] Although there has been no investigation of the prognosis of gut injuries in traumatic gastrointestinal tract perforation, mortality for abdominal injuries has been relatively high in the past (e.g. world war I -53.5%; world war II -25%; Vietnam war 10%). However, the percentage has since been decreased to less than 5%.^{[3],[4]} Modern diagnostic facilities, early detection and operation, correct management through better pre and post-operative care, and other variables are major contributors to lower death rates. Most of the variables impacting morbidity and death in traumatic gastrointestinal tract perforation can be avoided by early detection and treatment. It is only possible in a setting where there is a full range of diagnostic facilities and staff that is both knowledgeable and interested in trauma care. But in cases where all of these facilities are not readily available, many complications, both major and minor, may arise. This is especially true for developing countries like ours where many of these facilities are outside of the reach for majority of the population. Among the many short and long-term post-operative complications, infection, blood loss and shock are the most common features.^{[5],[6]} The present study was conducted to observe only the short-term post-operative complications among 50 gut injury patients.

II. Objective

General Objective

- To observe the short-term post-operative complications among gut injury patients.

III. Methods

This was a cross-sectional observational study that was conducted at the Department of Surgery, Dhaka Medical College Hospital, Dhaka, Bangladesh. The study duration was 1 year, from January 2007 to December 2007. A total of 50 cases were selected for the purpose of this study from those admitted to the study hospital due to traumatic gut injury. All cases present with trauma and distended abdomen meeting the enrollment criteria were consecutively selected and allocated into the groups based on acute cases. Informed written consent was taken from each patient and their privacy and confidentiality were maintained. Each patient in the surgery department was evaluated by taking a careful history, physical examination, and investigations. All findings were recorded in a prescribed data collection sheet. Ethical approval was obtained from the ethical review committee of the study hospital. A structured questionnaire addressing all the variables of interest was developed, and the questionnaire was pre-tested and modified according to the feedback review from field testing. Data was collected on variables of interest from the selected patients using the structured questionnaire. Collected data was checked, edited, and entered into the computer program Statistical Package for Social Science (SPSS). Both descriptive and inferential statistics were used in the process of data analysis.

Inclusion Criteria

- All patients present with traumatic gut injury irrespective of age and gender
- Patients who had given consent to participate in the study.

Exclusion Criteria

- Patient with traumatic gut injury alongside severe head injury
- Unable to answer the criteria question.
- Injury of the gut other than trauma like duodenal ulcer perforation, ischemic necrosis of the gut, typhoid ulcer perforation, etc.

IV. Results

Table 1: General condition of the patients on admission (n=50)

Condition		Number	Percentage(%)
Hemodynamic status	Good/Stable	21	42
	Shock	29	58
Consciousness	Unconscious	01	02
	Semi-conscious	09	18
	Conscious	40	80

The majority of patients (58%) were in shock on admission. 42% were hemodynamically stable. 80% were conscious, 18% were semi-conscious and one was unconscious.

Table 2: Characteristics of the study population (n=50)

Variables		Number	Percentage(%)
Age group(years)			
0-10		04	08
11-20		14	28
21-30		23	46
31-40		06	12
41-50		02	04
51-60		01	02
Gender			
Male		45	90
Female		05	10
Type of Trauma			
Penetrating		30	60
Blunt		20	40
Associated Injuries (n=50)			
Head injury		01	3.84
Thoracic injury		03	11.53
Fracture	Upper limb	05	19.23
	Pelvis	03	11.53
	Lower limb	03	11.53
Soft tissue		11	42.30
None		24	48
Site of GIT Involvement			
Stomach		03	06
Duodenum		03	06
Jejunum		20	40
Ileum		02	04
Caecum		04	08
Ascending colon		10	20
Transverse colon		07	14
Descending colon		01	02
Mode of Transport			
Tempo or Baby Taxi		23	46
Ambulance		10	20
Rickshaw Van		04	08
Engine Boat		00	00
Truck		00	00
Private Car		04	08

Multiple	09	18
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The age of the patients in this series ranged from 0-to 60 years. The highest incidence was noted between the ages of 21-30 years (465) followed by the age group 11-20 years (28%). 4patients were below 10 years of age and 1 patient was above 50 years of age. There were 45 male patients (90%) and female patients (10%). The male: female ratio was 9:1. Out of 50 patients, 30 (60%) sustained penetrating injury and 20 patients (40%) sustained blunt trauma.Among the 26 patients with an associated extra-abdominal injury. 42.03% suffered soft tissue injury, 19.23% patients had associated upper limb fracture, 11.53% patients had a pelvic fracture,11.53% patients had lower limb fracture, and 11.53% patients had a thoracic injury. Only one (3.84%) patient in this series had an associated head injury.Per operative injury to the jejunum was found in the highest number (20 cases) of the patient followed by Ascending colon (10), transverse colon (07) stomach (03), and Duodenum (03), caecum (04), Descending colon (01), ileum.Main transport system involved in the transportation of the injured patient was temp/Baby taxi 46%. Ambulance was the second vehicle 20%.18% of the patient's uses multiple transport system to reach the hospital. Private car and Rickshaw van used by 08% patients.

Table 3: Time laps between trauma and presentation in casualty

Time lapse(Hour)	Number	Percentage(%)
0-1	15	30
1-6	09	18
6-12	20	40
12-24	06	12

Majority of patients (40%) came to hospital within 6 to 12 hours of sustaining injury. 30% of patients reached hospital within one hour, 18% after 1 hour but within 6 hours and 12% after 12 hours but within 24 hours. Minimum time was 35 minutes and maximum time was 24 hours.

Table 4: Types of trauma among the participants (n=50)

Type	Number	Percentage(%)
Penetrating (n=30)		
Stab	12	40
Gunshot	10	33.34
Assault by a sharp instrument	02	06.67
Bomb blast	01	03.33
RTA	04	13.33
Attack by a domestic animal	01	03.33
Blunt (n=20)		
RTA	10	50
Blow/Kick	08	40
Fall from height	02	10

Among the 30 patients with penetrating injury highest incidence was due to stab injury in 12 patients (40%), followed by Gunshot injury in 10 patients (33.34%), assault by a sharp instrument in 02 patients (6.67%), RTA 04 patients (13.34%), Bomb blast 01 patient (3.33%) and attack by domestic animal 01 patient (3.33%). Among the 20 cases of blunt trauma, 10 patients (50%) sustained injury from RTA, 08 patients (40%) suffered assault (Blow/kick), and 02 patients 10% were injured by a fall from height.

Table 5: Clinical presentations among the participants

Symptoms and Signs	Penetrating Group (n=30)		Blunt trauma group (n=20)	
	Number	Percentage(%)	Number	Percentage(%)
Abdominal Pain	28	93.33%	16	80.00%
Bleeding	21	70.00%	0	0.00%
Vomiting	17	56.67%	12	60.00%
Dehydration	15	50.00%	10	50.00%

Hypotension	16	53.33%	13	65.00%	
Anaemia	10	33.33%	8	40.00%	
Unconsciousness	0	0.00%	1	5.00%	
Abdominal distension	9	30.00%	12	60.00%	
Rigidity	15	50.00%	14	70.00%	
Tenderness	17	56.67%	14	70.00%	
Shifting dullness	12	40.00%	10	50.00%	
Obliteration of liver dullness (upper border)	0	0.00%	12	60.00%	
Absent bowel sound	10	33.33%	9	45.00%	
Evisceration	Omentum	7	23.33%	0	0.00%
	Gut	1	3.33%	0	0.00%
Extra abdominal injury	12	40.00%	14	70.00%	
Skin Abrasion and Bruises	0	0.00%	5	25.00%	
Asymptomatic	0	0.00%	4	20.00%	

30 patients out of 50 had sustained a penetrating injury in the series and their presentation was quite obvious. Abdominal pain was the main symptom (93.30%) followed by bleeding 70%, and abdominal distension 30%. Important signs were dehydration (50%), hypotension (53.33%), shifting dullness 40%, anemia (33.30%), signs of peritonitis (Tenderness & rigidity), evisceration of omentum (23%) and gut (3%). 20 patients in this study sustained blunt trauma and their clinical presentation was not clear-cut. But a majority (80%) had mild to severe abdominal pain 60% had vomiting and 20% were asymptomatic. Physical examination revealed dehydration in 50% of patients hypotension in 60%, and signs of peritonitis (Tenderness and rigidity) in about 70% of patients.

Table 6: Requirement and means of resuscitation (n=50)

Resuscitation	Number	Percentage(%)	Means of resuscitation	
			I.V. Fluid	Both (Blood and I/V fluid)
Done & responsive	26	52	12	14
Not done	21	42	Not resuscitated	
Done but not responsive	03	06	Both I/V fluid and blood	

Most of the patients (58%) were hemodynamically unstable at presentation. So adequate resuscitation was done before commencing definitive treatment. Out of 50 patients, 12 patients (24%) were resuscitated with intravenous fluid only and 14 patients (28%) required both blood and intravenous fluid for resuscitation, 21 patients (42%) did not require any resuscitative measure while 03 patients (6%) could not be resuscitated even after using both intravenous fluid and blood.

Table 7: Time required for resuscitation (n=26)

Time required(Hour)	Number	Percentage(%)
<1 hour	0	0.00%
1-2	9	34.62%
3-4	13	50.00%
4-6	4	15.38%
>6	0	0.00%

Among the 26 cases who needed and were responded with resuscitation, the majority (50%) responded within 2-4 hours. Among the remaining cases, 09 cases (34.62%) and 04 cases (15.35%) were stable within 1-2 hours & 4-6 hours respectively. None of the patients could be resuscitated within one hour.

Table 8: Distribution of the nature of investigations among participants (n=50)

Nature of investigations	Total	Percentage(%)
Plain X-ray Abd.in erect posture	50	100
Chest X-ray P/A& Lateral view	30	60
X-ray pelvis A/P view	03	06
X-ray upper limb &neck	05	10
X-ray lower limb	03	06
Ultrasonogram of the whole abdomen	07	14
Blood grouping	50	100
Complete blood count	20	40
RBS	10	20
ECG	05	10
Serum creatinine	02	04
Blood urea	01	02
Serum electrolyte	01	02
Urine routine microscopic examination	10	20

Diagnostic aid was very much limited in this series. Abdominal X-rays in erect posture A/P view including both domes of diaphragms and blood group were done in every case (100%) CBC was done for 20 cases, urine Routine Microscopic Examination for 10 cases. Another investigation was x-ray chest P/A view (30 cases), x-ray pelvis (3 cases), x-ray upper limb and neck (5 cases), x-ray lower limb (3 cases), ultrasonogram of the whole abdomen (7 cases), RBS (10 cases) and ECG (5 cases). Fluid requirement depends upon pulse, blood pressure, and urine output.

Table 9: Time laps between admission and definitive procedure (n= 50)

Time laps(Hour)	Number	Percentage
2-6	10	20
7-12	21	42
13-24	15	30
25-36	02	04
37-48	02	04

21 cases were operated within 7-12 hours of admission. 15 operations were done within 13-24 hours of admission and 10 operations were done within 6 hours of admission. Operations were delayed for more than 36 hours for 4 cases.

Table 10: Indication for operation (n=50)

Indication	Number	Percentage(%)
A. Penetrating		
1.Peritoneal penetration proved by		
a. Exploration-Digital/instrumental	20	40
b. Evisceration	08	16
2.Signs of surgical abdomen		
a. Rigidity and tenderness with or without distension	28	56
b. Rebound tenderness	22	44
c. Absent bowel sound	19	38
3.Refractory shock	01	02
B. Non-penetrating group		
1.Signs of acute abdomen	13	26
2.Sub diaphragmatic gas shadow	10	20
3.Positive peritoneal tap	11	22
4.Refractory shock	02	04

Among the penetrating group peritoneal penetration was the main indication for the operation which was proved by exploration of abdominal wounds in 20 cases (40%) and by evisceration, in 8 cases (16%). Other indications in this group (penetrating) were signs of the surgical abdomen and 01 patient was operated on for refractory shock. Among the nonpenetrating group, operations were indicated for signs of acute abdomen in 13 cases (26%), positive peritoneal tap in 9 cases (18%), and refractory shock in 2 cases (4%).

Table 11: Operative procedure followed in the series (n=50)

Portion of G.I.T.	Procedure	Number	Percentage (%)
Stomach	Primary anatomical repair	06	16
Duodenum	Primary anatomical repair	06	12
Small gut	Primary anatomical repair	20	40
	Resection & anastomosis	11	22
Large gut	Primary anatomical repair	02	04
	Repair & proximal colostomy	10	20
	Repair & proximal defunctioning ileostomy	04	08
	Resection & anastomosis with proximal defunctioning colostomy	05	10
	Exteriorization as a loop colostomy	05	10

Table 12: Post-operative complication (n=50)

Complication	Number	Percentage (%)
Wound dehiscence	03	06
Wound infection	13	26
Pulmonary complication	03	06
Complication of colostomy	02	04
Septicemia	01	02
Urinary tract infection	10	20
Pyrexia	03	06

During the post-operative period a number of minor and some major complications took place. Wound infection 13 cases (26%), urinary tract infection 10 cases (20%). Other complications included pyrexia 03 cases (06%), complication of colostomy 02 cases (04%), septicemia 01 case (02%).

V. Discussion

The present study was conducted with a total of 50 cases of gut injury who were treated at the surgery department of Dhaka Medical College Hospital. Among the study participants, high prevalence of young population was observed. It was observed that majority of the participants were under the age of 30 years. This high prevalence of young adults among the study population might be due to the daily active life lead by the younger population, leaving them at a higher risk of getting environmental injuries. These findings were supported by various other studies.^{[7],[8]} High male prevalence was also observed among the participants, with male: female ratio of 9:1. This also supports the previous hypothesis of gut injury being more common among those that are more active in their daily life, as the norms of our society make it extremely hard for women of any age to be active. This was also in line with the findings of few other studies.^{[8]-[11]} Among the participants of our study, 60% had penetrating gut injuries, while the remaining 40% had abdominal injuries from blunt trauma. This finding however, was contradictory to the findings of few western studies that observed a higher frequency of blunt trauma injuries compared to gut injuries.^{[12],[13]} Extra abdominal injuries were associated with other forms of injury in 52 participants. Among them, majority were soft tissue injuries (42.30%), followed by upper limb fractures (19.25%), pelvic fractures (11.53%), thoracic injuries (11.53%) and head injuries (3.84%). These results were quite similar to study conducted Evered et al.^[15] Mode of transportation is a directly related factor to time laps from injury to treatment and can ultimately influence the post-operative complications, morbidity and mortality rates among patients. In this series, majority used auto rickshaws (tempo or baby taxi) (46%), followed by ambulance (20%), multiple transportation methods (18%) to reach the hospital etc. Only very few used private car (08%) & Rickshaw van (08%). Transportation system for any patient is still in very primitive stage in our country. Economic scarcity and lack of education are other factors behind the transport problem. This

transport system has a direct relationship post-operative complications by influencing the time to present in casualty. Majority of patients (40%) came to hospital within 6 to 12 hours of sustaining injury. 30% of patients reached hospital within one hour, 18% after 1 hour but within 6 hours and 12% after 12 hours but within 24 hours. The general condition of the patients at the time of admission is an important factor in determining the factors modifying morbidity and mortality. In this series 58% of patients were in shock at the time admission. Majority (52%) were effectively managed either by I/V fluid or blood or by both. Resuscitation failed for 3 patients due to concealed hemorrhage (per operative findings) and persistent shock was the indication for operation for them. Out of the cases of penetrating trauma 40% comprised stab injury 33.34% by gunshot. These two causes comprised 73.34% of penetrating injuries. Other causes like a bomb blast, assault by a sharp instrument, road-traffic accidents, and attacks by domestic animals were very infrequent. Out of the cases of blunt trauma, road traffic accidents accounted for 50%, assault (Blow/kick) for 40%, and fall from height 10%. These findings had little similarities with western studies, where the incidence of a gunshot wound as a cause of penetrating injury was much higher.^[15] Another western study showed a higher incidence of stab injuries as a cause of penetrating injuries.^[14] But in regards to blunt trauma injury causes, our study findings were similar to these Western studies.^{[14],[15]} Time lapse from initial injury to treatment plays a big role in the morbidity and mortality rates of such patients. In this series, 21 cases were operated within 7-12 hours of admission. 15 operations were done within 13-24 hours of admission and 10 operations were done within 6 hours of admission. Operations were delayed for more than 36 hours for 4 cases. Peritoneal penetration was the major indication for the surgery in the penetrating group, as evidenced by abdominal wound exploration in 20 instances (40 percent) and evisceration in 8 cases (16 percent). Other indications (penetrating) in this group included indicators of the surgical abdomen, and one patient was operated on for refractory shock. Operations were recommended for symptoms of acute abdomen in 13 patients (26 percent), positive peritoneal tap in 9 instances (18 percent), and refractory shock in 2 cases in the non-penetrating group (4 percent). Several mild and serious problems occurred throughout the post-operative period. Wound infection was reported in 13 instances (26%), while urinary tract infection was observed in 10 cases (20 percent). Other minor problems included episodes of pyrexia 03 (06 percent). Colostomy complications occurred in two cases (04%), and septicemia occurred in one case (02 percent). Post-operative complications have an impact on morbidity and mortality and most of the complications were due to gross contamination of wound at the spot, by the handling of common people who do not have any knowledge of sterility. Besides that, strict asepsis could not be maintained all time due to increased patient load in the casualty as it is the only separate casualty Surgery department in the country. Cross infection is also considered as a factor responsible for post-operative Complication and ultimately influenced the morbidity & mortality.

Limitations of The Study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

VI. Conclusion

The present study observed that intra-abdominal injury was highly prevalent among adults and males, and over half the participants had penetration type of injury. At the time of admission, majority were conscious, but over half had been under shock. Majority of post-operative complications were in the form of wound infections and urinary tract infections.

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