

Outcome of Conservative Management of Solid Visceral Injury in Blunt Trauma Abdomen

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Abstract

Background: Blunt trauma Abdomen (BTA) due to RTA is the sixth leading cause of death in India. Conservative management of most blunt abdominal injuries developed from the observation that most of these injuries would 'heal themselves' and that operative intervention could interfere with this process. **Aim:** To evaluate the outcome of conservative management of solid visceral injuries in BTA. **Design:** Prospective observational study. **Methods:** Study conducted in the Postgraduate Deptt. of Surgery, Govt. Medical College Jammu entailing 72 patients of BTA admitted from October 2018 to November 2019. **Results:** Out of 72 patients, 56 males were & 16 females. 69.44% had RTA. Most common age group was 21-30 years (30.56%). 56.94% patients reported to hospital within 2 to 6 hours. FAST was positive in 95.83% patients. Liver was most commonly affected solid organ. 77.77% were managed conservatively and average hospital stay was 9.78 days. 4.16% patients of BTA expired in the study. **Conclusion:** In almost all the solitary solid visceral injuries with mild to moderate hemodynamic changes, Non Operative Management (NOM) is highly successful. It is concluded that all the isolated solid visceral injuries must be given fair chance of NOM where facilities of medical care or surgical ICUs are available for continuous monitoring.

Keywords:

Blunt Trauma Abdomen, Non Operative Management, Focused Assessment with Sonography for Trauma, Road Traffic Accident, Contrast-Enhanced Computed Tomography

Introduction

Trauma is a modern day epidemic and a cause of significant morbidity and mortality. Of all the major subsets, abdominal trauma stands third in terms of the incidence and is one of the most common causes of preventable trauma related deaths^[1]. Approximately 85% of abdominal trauma is caused by blunt injury^[2]. The most common organ injured is the spleen, followed by

the liver and small bowel^[3]. Mortality is secondary to blood loss, peritonitis and delay in appropriate management. The overall efficacy rate of conservative management has been reported to be more than 91% in modern literature^[4]. The detection of an intraabdominal injury is frequent diagnostic problem in polytrauma patient^[5]. Aim of the study to evaluate the outcome of

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conservative management of solid visceral injuries in BTA.

Materials and Methods

Study Design: Prospective observational Study

Duration of Study: 1 year from October 2018 to November 2019.

Inclusion Criteria: All Hemodynamically stable Blunt Trauma abdomen patients of more than 13 years of age belonging to either sex.

Exclusion Criteria:

- Haemo-dynamically unstable patients.
- Patients with hollow viscus injury.
- Patients having associated injuries that require laparotomy.
- Patients not consenting

After obtaining informed consent, eligible patients underwent detailed history-taking, clinical examination, laboratory tests, and imaging studies as needed. Pulse rate, blood pressure, abdominal girth, and hemoglobin levels were monitored every 2, 4, and 12 hours respectively on the first, second, and third days. A rise in abdominal girth and pulse rate or a drop in hemoglobin and blood pressure indicated the need for resuscitation in the middle care unit. If the fall continued, the case was reassessed by a senior surgeon to determine the appropriate operative management.

Results

Out of the 72 patients with blunt abdominal trauma (BTA), 56 were male and 16 were female, with varying degrees of injury to internal organs such as the liver, spleen, kidney, pancreas, and adrenal gland. Among the 56 patients (77.77%) who received conservative management, most were stable or became stable after resuscitation and did not require immediate surgery. The remaining 16 patients (22.23%) underwent operative management. Males (n=13) outnumbered females (n=3) among these patients. The most common mode of injury was from a road traffic accident (RTA) accounting for 69.44% (n=50) of cases, while falls accounted for 15.28% (n=11) of cases. The average age of patients with BTA was 32.14 years (11-68 years), with the majority (n=22) falling within the 21-30 age group, followed by 31-40 years (n=18). (Table-I) regarding the time of presentation, 41 (56.94%) patients reported to the hospital within 2 to 6 hours of their injuries, while 15 (20.83%) reported within 1 hour of the incident. The remaining 01 (1.39%) patient did not seek medical attention until over 24 hours had passed. The average reporting time post-incident was

4.46 hours.(Table-II)

Table I: Age & Sex distribution in BTA

S. No.	Age in years	Male	Female	Total	Percentage
1.	11-20	14	03	17	23.61%
2.	21-30	17	05	22	30.56 %
3.	31-40	14	04	18	25.00%
4.	41-50	05	01	06	8.33%
5.	51-60	05	02	07	9.72%
6.	>60	01	01	02	2.78%
7.	Total	56	16	72	100%

In this study, 42 out of the 56 patients (75%) with BTA who received non-operative management had abdominal tenderness, while 15 had abdominal distension, 10 had guarding, and 15 had external abdominal injuries. Among the 16 patients who underwent operative management, all had abdominal tenderness and distension, and 9 had guarding and 7 had external injuries. (Table-III) The average pulse rate was 95.14 beats per minute, with a mean systolic blood pressure (SBP) of 117.

All patients with mild to moderate free fluid underwent FAST. 95.83% of patients showed free fluid, while 4.17% did not. In hemodynamically stable patients with documented FAST free fluid, CECT abdomen was performed.

Of the 64 patients who underwent CECT abdomen, 41 had liver injury, with 33 being isolated liver injuries and 8 being associated injuries. Additionally, 26 patients had splenic injury, with 20 being isolated and 6 being associated. 11 patients had renal injury, with 10 being isolated and 1 being associated with other organs. One patient each had adrenal and pancreatic injuries. Eight patients had multiple organ injuries.

Table II: Time lapse between incidence and reporting (n=72)

S.No.	Time	No. of Cases	Percentage
1.	<1hour	15	20.83%
2.	2-6hours	41	56.94%
3.	7-12hours	13	18.05%
4.	13-24hours	02	2.78%
5.	>24hours	01	1.39%

Out of 41 patients of Liver injury, 10 had grade I, 22 had Grade-II, 8 had grade III & 01 had Grade IV injury. All the patients with Grade I, Grade II and grade IV injury were managed conservatively, however 2 patient with Grade II injury expired. 7 out of total 8 patients with

Table III: Abdominal Signs in BTA

S. No.	Signs	No of cases (NOM) (n=56)	No of cases (OM) (n=16)	Total
01	Tenderness	42	16	58
02	Distension	15	16	31
03	Guarding	10	9	19
04	External Injury	15	6	21
05	No Abdominal Signs	6	Nil	6

Grade III injury were managed by Non-operative method and 1 was operated upon, however 1 patient expired. The reason for death in two patients with Grade II liver injury was not primarily contributed by liver injury. In 01 patient there was associated fracture of right femur and patient died on 5th day of admission due to fat embolism. Another patient of Grade II liver injury was having associated severe head injury that led to his death. (Table-IV)

Out of 26 patients with splenic injury, 14 underwent non-operative management (NoM) with no mortality, while 3 with Grade-IV and 9 with Grade V injury underwent operative management, resulting in 1 mortality. All patients with renal injury, regardless of grade, were successfully managed with NoM without mortality. In this study, 1 patient with Grade IV pancreatic injury and 1 with Grade II adrenal injury and associated Grade I liver injury were managed operatively and conservatively, respectively. Additionally, 5 patients had chest injury, 6 had head injury, and 9 had skeletal system injury beyond BTA abdomen.

Average hospital stay in BAT cases that were managed conservatively was found to be 9.78 days (1-21 days), whereas; in those patients that were selected for operative management it was 11.65 days (7-24 days).

Two patients who received NoM treatment died due to liver injury and another due to severe head injury. There was only one mortality in the operative group, where a patient with grade V splenic injury and grade III hepatic injury underwent splenectomy and hepatorrhaphy, respectively, and died on the third post-operative day.

Discussion

Current management strategies for most blunt abdominal injuries are based on the observation that these injuries often heal on their own, and operative intervention can interfere with this process.^[6] As more data is gathered from around the world, our understanding of blunt abdominal trauma management is improving. Despite advances in techniques and diagnostic and supportive care, morbidity and mortality rates remain high. This study aimed to analyze the course of illness during non-operative management (NoM) of blunt abdominal trauma (BAT) and to evaluate the outcomes of NoM in terms of mortality, morbidity, and conversion rate to operative management. In our study, 77.77% of cases (n=56) were male and 22.23% (n=16) were female, with a male-to-female ratio of 3.5:1. These findings were consistent with other studies in the literature.^[7,8]

Discussion

In the present study the most common age group suffered with BAT was 21 to 30 years (30.56%, n = 22) followed by 31 to 40 years age group (25%, n = 18), followed by 23.61% (n = 17) in 11 to 20 years age group. Almost similar observations were made by Mehta *et al.*,^[7] as well as Kane&Dhandore^[9] in their studies. Main

Table IV: CECT abdomen findings as per grade of injury (n=64)

GRADE OF INJURIES	NO OF CASES	PERCENTAGE
Liver Gr. I	07	09.72 %
Liver Gr. II	21	29.17%
Liver Gr. III	05	06.94%
Liver Gr. IV	01	01.39%
Spleen Gr. II	01	01.39%
Spleen Gr. III	05	06.94%
Spleen Gr. IV	03	04.17%
Spleen Gr. V	03	04.17%
Renal Gr. I	01	01.39%
Renal Gr. II	05	06.94%
Renal Gr. III	03	04.17%
Renal Gr. V	01s	01.39%
Pancreas Gr. IV	01	01.39%
Gr. I Liver + Gr. I Spleen	01	01.39%
Gr. I Liver + Gr. II Spleen	01	01.39%
Gr. I Liver + Gr. II Adrenal	01	01.39%
Gr. III Liver + Gr. II Spleen	02	02.77%
Gr. III Liver + Gr. IV Spleen	01	01.39%
Gr. III Liver + Gr. II Renal	01	01.39%
CECT Not Done	08	11.11%
Total	72	100%

reason for BAT was RTA (69.44%), followed by fall from the height (15.28%) in present study. Assault constituted only 6.9% of patients. These findings were also consistent with what Mehta *et al.*,^[7] and Maqsood *et al.*,^[10] in their study.

Majority of the patients, 56.94% (n = 41) reported to the hospital within 2 to 6 hours interval post injury followed by less than 1 hour (20.83%) and 7 to 12 hours (18.05%) of injury. The finding was consistent with Kane and Dhondore ^[9]. Foder *et al.*,^[11] in their study observed median hospital stay of 14 days with Blunt Abdomen Trauma. Kulkarni *et al.*,^[12] observed 46% of patients had to stay for 11 to 20 days in the hospital following BAT. These findings are in concordance with observations of our study.

Average age of patients with BTA consider for NoM in present study was 32.14 years. Foder *et al.*,^[11] observed the average age with Blunt Abdomen Trauma who were managed by NOM was 32.4 years, which is almost same in the present study as well.

With a mean pulse rate of 95.14 beats per minute and a mean Systolic Blood Pressure (SBP) of 117.64 mmHg, our findings align with those reported in other studies.^[13,14]

The current study found that abdominal tenderness (n=58) was the most common sign, followed by abdominal distension (n=31), which aligns with the findings of Kulkarni *et al.*,^[12].

FAST was negative in 4.17% (n = 3) in our study. Miller *et al.*,^[15] 6.2% patients having fast negative report, whereas; Deunk *et al.*,^[16] reported FAST negative in 5.78% patients of Blunt Trauma Abdomen. In the present study free fluid was observed in 95.83% patients. Mishra *et al.*,^[17] reported free fluid in 99% of patients of Blunt Trauma Abdomen.

In the present study, 41(56.94%) patients were harbouring liver injury with 33 cases as isolated and 8 as associated. From amongst 26 (36.11%) patients of splenic injury 20 had isolated and 6 as associated injury. In 11 (15.27%) patients as renal injury, 10 had isolated and 1 associated injury. 1 patient of pancreatic injury was found to be with isolated injury and lone patient of adrenal to with associated injury. El-Manyar *et al.*,^[18] observed 50.5% cases of liver, 36.9% patients of spleen, 21.3% patients of kidney and 5.6% patients of pancreas. These finding were consistent with other studies.^[10,19]

A total of 11 (15.27%) patients of renal injury were observed in the present study indicating kidney as the third most commonly injured organ, Vimal and Sonal ^[19] reported 6% patients of renal injury in their study, whereas;

Smith *et al.*,^[20] reported 10% incidence of renal injury in patients with blunt abdominal trauma.

In the present study 5 patients (6.944%) were having associated chest injury and 6 patients (8.33 %) were associated with head injury. Mishra *et al.*,^[17] reported 16% incidence of associated chest and 9% of head injury in their series. In the present study, we could come across only one case of Grade *IV pancreatic injury, whereas: Vimal and Sonal ^[19] reported only 1% patients of pancreatic injury and no case of adrenal gland injury.

In the present study, 37 out of 41 (90.24%) patients with hepatic injury were managed by conservative method. Similar results have been observed by Maqsood *et al.*,^[10] in which 81.25% (13/16) of patients with hepatic injuries were managed conservatively.

The study found a 5.37% mortality rate due to associated injuries, which is lower than the 10.5% reported by Dave *et al.*,^[14] and the 3.5% reported by Foder *et al.*,^[11]. Mehta *et al.*,^[7] also found a similar 4% mortality rate. In a study of 206 patients with blunt liver, spleen, or kidney injuries, the failure rate was 9% for liver injuries, 33% for splenic injuries, and 11% for kidney injuries, respectively Velmahos *et al.*,^[21].

The current analysis included 53.84% (n=14) of patients with splenic injuries who were managed non-operatively. Maqsood *et al.*,^[10] reported similar findings.

All the 11 patients of renal injury were managed successfully by NOM. Similarly Vimal KA and Sonal A^[19] managed 85.5% of the case with BAT successfully by NOM. Okus *et al.*,^[22] observed 86.3% and Hashemzadeh *et al.*,^[23] observed 93.8%. success rate for NOM. The study's average transfusion was 1.60 units, and Afifi *et al.*,^[24] found that 5.2% of blunt abdomen trauma patients required 1 to 2 units of plasma for NOM.

Conclusion

The study found that most patients with blunt abdominal trauma (BAT) were in their productive age group and were due to road traffic accidents (RTA). The liver was the most commonly affected solid organ, followed by the spleen and kidneys. Adrenal and pancreatic injuries were rare. Mild to moderate hemodynamic changes were observed in all patients with isolated solid visceral injuries, making conservative management successful. Mortality was mainly caused by associated injuries, not isolated solid visceral injuries. Isolated solid visceral injuries should be given a fair chance of conservative management if medical facilities are available. Patients with multiple visceral injuries should be closely monitored and promptly referred for surgery if necessary.

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Conflict of interest: None declared

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