



TO EVALUATE THE NON-OPERATIVE MANAGEMENT IN BLUNT TRAUMA ABDOMINAL SOLID ORGAN INJURY: A PROSPECTIVE STUDY

General Surgery

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ABSTRACT

One of the most prevalent road traffic accident injuries is abdominal trauma. The change to targeted non-operative management of traumatic abdominal solid organ injuries is one of the most prominent trauma trends. This research evaluated the outcomes of operative and non-operative therapy for blunt abdominal trauma solid organ damage in hemodynamically stable adults hospitalised to the Mahatma Gandhi Medical College and Hospital, Jaipur. A prospective observational study enrolled patients with blunt trauma abdominal with solid organ injury at 12 months (April 2022 to May 2023). Based on physician choice, all patients were either given non-surgical or operational therapy. According to our research, non-operative care of blunt abdominal injury is a secure and efficient form of treatment. Road traffic accidents were the most frequent cause of injury in our research. 76% of patients who had effective non-operative care had positive outcomes. Most of the conversion to operational management decisions were made in the first 48 hours after admission. Haemoglobin drop, hypotension, and prolonged fever with indications of peritonitis despite ongoing resuscitation were the criteria for conversion in our research. Morbidity was observed to be higher in the converted group than in the non-operative management group.

KEYWORDS

Road traffic accident, abdominal trauma, non-operative management, blunt injury

INTRODUCTION

Economic losses from road accidents affect both the countries and the families of the victims. These losses result from medical expenses, such as rehabilitation costs and incident investigation fees, as well as lost productivity (e.g., income) for people who are killed or rendered incapacitated by injuries, as well as for family members who must take time off from work (or school) to care for the wounded.

Abdominal injuries may result from road accidents. Height falls, blunt object attacks, workplace injuries, sports injuries, bomb explosions, etc. Rapid deceleration causes shearing force to rupture hollow organs by rapidly raising intra-abdominal pressure from external compression or crushing tissues at interfaces between external force and vertebral column, which are relatively fixed in comparison to surrounding structures.

The development of more modern imaging methods such as CT has made it possible for physicians to determine the severity of injuries. These are often treated surgically, although the current approach in trauma care is the selective non-operative management (NOM) of abdominal solid organ injuries. The results of retrospective investigations that reveal a lowered failure rate served as the foundation for this NOM strategy. The effectiveness of NOM in preserving the spleen is 90–95% in children and 70–80% in adults. Renal damage has a 90% success rate, while NOM of the liver has an even greater success rate. Review of pancreatic damage is conflicting. The NOM of liver damage was supported by Velmahos et al. NOM is used in hemodynamically stable patients.

This prospective research examines NOM outcomes in blunt trauma abdomen in tertiary care. FAST positive patients with hemodynamic instability receive emergent laparotomy.

OBJECTIVES

1. A prospective study of non-operative treatment for blunt abdominal solid organ injury.
2. Analyse the conditions for conversion to operative management.
3. Determine the organ with the best non-operative result.
4. To establish a NOM protocol for blunt intra-abdominal solid organ injury.

METHOD

A prospective observational study to evaluate the outcomes of non-operative management and operative management in blunt trauma abdominal solid organ injury in hemodynamically stable adults among

60 patients admitted in Mahatma Gandhi Medical College and Hospital, Jaipur during the study period of 12 months (April 2022 to May 2023) with satisfying the following inclusion & exclusion criteria were included in this study. Patients over the age of 18 with abdominal blunt trauma who are hemodynamically stable and arrived at the emergency department with a history of trauma meet the inclusion criteria. Patients with hollow viscous injuries, hemodynamically unstable patients, patients with CECT suggestive of active bleeding, and patients with additional injuries necessitating exploratory laparotomy were excluded. Treating physicians gave their approval for the research to include patients who satisfied the inclusion criteria.

All patients who presented to the emergency room were evaluated and given resuscitation if required in line with the ATLS procedure. The mechanism of the injury was noted together with demographic information and history. All of the patients underwent FAST, and after they were stable, they were further assessed using CECT abdomen and pelvis to determine the severity of solid organ injury. Patients who met the study's eligibility requirements were admitted to the intensive care unit. Blood pressure, heart rate, Glasgow Coma Scale score, haemoglobin, packed cell volume, abdominal circumference chart, associated injuries and their impact on patient outcomes and hospital stays, hospital stay duration, total blood products transfused, time of conversion and the reasons for conversion, complications in the converted group, outcomes for each patient, and mortality (if any) were recorded for all patients.

Patients' Hb and PCV levels were checked every four hours in the first 24 hours, every six hours in the next 24 hours, and twice daily in the third 24 hours. Abdominal girth, BP and HR were all monitored in the same way.

A blood transfusion was administered if there was a drop in Hb or BP, an increase in HR, or a rise in the abdominal circumference chart. In spite of all of this, emergency laparotomy was performed if the patient was hemodynamically unstable. These individuals were classified as converted cases after they had surgery. It was noted the complications and length of stay. Patients were attentively watched the whole time until their final results, which was either discharge or death.

FOLLOW UP AND DISCHARGE PROTOCOL

Whilst the patient was in hospital, condition was monitored by examining blood tests, heart rate, blood pressure and belly for any signs of bleeding or other complications related to injury. Once the patient was discharged from hospital, the patient was followed up in the outpatient clinic to ensure that injury was healing. The time taken to

repair was dependent on the extent and severity of the injury and general health and nutrition of the patient. It was important that patient came regularly to outpatient department until the patient had fully recovered.

ACTIVITY LIMITATIONS

Delayed bleeding or infection can occur after non operative management of the liver, spleen or kidney injuries, which is why it was recommended some caution with activity. The patient limited activities according to severity of injury as mentioned in discharge for approximately 3 months or as advised. The aim of these limitations was to allow injury to heal and to ensure that patient does not have complications.

Some Limitations Included The Following:

- No contact sports; e.g. football, basketball
- No heavy lifting; e.g. at work, gym/weights, household activities
- No vigorous/ dangerous activities; e.g. motorbike riding, horse riding, skiing, ladder climbing.

Symptoms of delayed bleeding or infection included any of the following:

- Feeling faint and/or dizzy
- Fever (high temperatures)
- Increasing pain in your belly
- Nausea
- Vomiting
- New blood in your urine
- Increasing size of your belly

If any of these symptoms developed, patient was counselled to please return to Hospital or the nearest hospital emergency department for assessment. A combination of normal abdominal examination, USG abdomen, complete blood count and other relevant investigation ruled out intra-abdominal injury in BTA patients. Patient was discharged safely after they proved normal for these assessments. All patients were followed-up up to 3 months after discharge on day 7, day 14, day 21

Statistical Analysis

The Chi square test was used to compare the groups of the categorical data, which were given as percentages. The mean and standard deviation of the quantitative data were reported, and they were compared using a student's t-test. If the probability was less than 0.05, it was deemed significant. SPSS (Statistical Package for Social Sciences) Version 22.0 statistical analysis software was used for the statistical analysis.

RESULTS

After an initial examination, 60 haemodynamically stable individuals were enrolled in the research, 42 of whom were males and 18 of whom were females. The mean age of young and old patients was 20 years and 76 years old respectively.

The majority of them (32% of the total) appeared with soft, non-tender abdomens. 13 patients had tenderness, guarding was found in 16 patients and 7 patients merely exhibited rigidity. Other than abdominal injuries, patients also experienced related injuries. The majority of them suffered long bone injuries, accounting for 37% of total injuries. 22 patients also related rib fractures. According to organ damage, the liver is the most usually wounded organ with 32 patients out of 60 followed by the 9 patients of spleen injury. Kidney damage was found in 12 patients. The pancreas is the least often damaged organ (7). The most prevalent cause of injury was a road traffic accident (RTA). RTA was responsible for 49% of all wounded patients.

In our study, most patients were treated using non-invasive procedures. With regular vitals and appropriate intensive care, 43 patients (71.67%) were successfully managed without surgery. Only 8 patients who sustained liver injuries required conversion, whereas 3 patients who had spleen injuries needed laparotomies, 4 patients who sustained kidney injuries, and 2 patients who sustained pancreatic injuries were treated non-operatively. There were a total of 60 patients, but 17 of them were transformed into laparotomies. The main cause of the change was a decrease in haemoglobin owing to persistent active bleeding from the wounded organ that could not be controlled by conservative measures. Conversion was also prompted by hypotension and prolonged fever.

Out of the 17 patients who had laparotomies, 8 had liver injuries that required primary repair of liver laceration, 3 had splenectomies, 4 had nephrectomies, and 2 had pancreatic injuries that necessitated resection. 6 out of the 17 patients who had laparotomies experienced postoperative wound infection. 4 patients had wound dehiscence. Septicaemia (1) and respiratory issues (2) were two more consequences.

Table 1: Organ Wise Conversion And Conservative

Organ Injury	Converted Yes		Converted No		Total	
	No.	%	No.	%	No.	%
Liver Injury	8	13.33%	24	40.00%	32	53.33%
Spleen Injury	3	5.00%	6	10.00%	9	15.00%
Kidney Injury	4	6.67%	8	13.33%	12	20.00%
Pancreatic Injury	2	3.33%	5	8.33%	7	11.67%
Total	17	28.33%	43	71.67%	60	100.00%

DISCUSSION

It is crucial to evaluate the most practical treatment recommendations for monitoring in cases of blunt abdominal solid organ damage given the rising popularity of non-operative care. The incidence of unsuccessful operational exploration has decreased as a result of selective NOM. Regarding the supervision of these patients and the treatment of any possible problems, this presents a new set of challenges.

Age and sex of the patient had no bearing on the result in our research of NOM. Most of the patients were male, and the majority of them were between the ages of 29 and 38. The average age was 34. Accidents involving motor vehicles were the most frequent cause of injuries. All of the patients who were switched over to surgical care showed free fluid in the ultrasonography at first. This analysis is comparable to Velhamos 2003 research. Out of 17 cases, 8 cases were transformed in 48 hours, and remaining 9 cases in 72 hours. Conversion to operational management was comparable to another research.⁸

"In our study the highest percentage of injury was liver accounting for 53.33% of total whereas other studies show that the most common organ to be injured is the spleen. There were isolated 32 cases of liver injury and out of this only 8 (13.33%) got converted. Therefore the success rate of NOM of liver was 89.33%. The percentage of isolated splenic injury was 15% out of which 3 (5%) patients got converted. The study conducted by Velmahos et al shows similar values on splenic trauma, showing the maximum number of failures in splenic injury.⁹ The isolated kidney injury was seen in 16% of patients and pancreas accounted for 6% of total patients. Pancreatic injury was managed without surgery."

In our research, a decrease in haemoglobin (16%) was the most frequent cause of conversion, than 9% hypotension, and 3% peritonitis prolonged fever. Out of 60 patients, 43 patients who had non-operative care had no complications. There were 17 patients who had laparotomies, and 14 of them had postoperative complications. 4 and 3 patients who developed wound infection and wound dehiscence respectively. The most frequent postoperative consequence was wound infection.

Therefore, non-operative care of abdominal solid organ damage after blunt trauma is superior than operational management according to our research. Patients who had laparotomies had higher post-operative complications than those who received conservative care. According to our research, the liver is the organ that responds best to non-operative treatment, and only a small minority of patients need conversion.

CONCLUSION

According to our research, non-operative care of blunt abdominal injury is a secure and efficient form of treatment. Road traffic accidents were the most frequent cause of injury in our research. All patients who had unsuccessful nonoperative therapy had free fluid in the abdomen, according to FAST. The liver and spleen were the two organs that were harmed most often. The decision to switch to operational care was made without consideration of the CT grade of the injury.

In our research, 71.67% of the patients had better outcomes after non-operative therapy. The liver is the best organ for non-operative therapy after blunt trauma since the conversion rate in patients with hepatic damage was low. Splenic injury had the greatest risk of non-operative

treatment failure.

Most of the conversion to operational management decisions were made in the first 48 hours after admission. Haemoglobin drop, hypotension, and prolonged fever with indications of peritonitis despite ongoing resuscitation were the criteria for conversion in our research. The converted group had greater morbidity than the non-operative management group, it was discovered.

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