

Study of Outcome in Patient of Grade-3 & 4 Liver Injuries in Blunt Abdomen Trauma

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Abstract

Background and Aim: Road traffic accidents are commonest cause resulting Blunt Abdominal trauma. Liver injury is second most common solid organ injury in blunt abdomen trauma after spleen. Latent period, vital status and associated organ injuries and grade of liver injury decide the outcome of patients. Present study was performed with an aim to ascertain conservative or operative approach of management of liver trauma with help of investigating modalities haemodynamic status of patients and associated injuries. *Materials and Methods:* This prospective study was conducted in 30 patients presenting with liver injury in blunt abdominal trauma during the period from May 2015 to January 2018 at P.D.U. Government Medical College and Hospital, Rajkot. Data were collected from the patients by their history, examination and appropriate investigations. Documentation of patients, which included history, vitals of patients, clinical findings, blood investigations, diagnostic tests, intraoperative findings, operative procedures were all recorded on a Performa specially prepared. *Results:* out of 30 cases, 24 were males accounting 80% of study populations and 6 (20%) were females. Mean age in present study was 29.22 years. In 20 (66.67%) cases, road traffic accident was the most common mode of injury. Mean latent period was 4.68 hours. Out of 30 cases 23 patients having grade 3 & 7 patients having grade 4 liver injury. USG was done in 30 cases and computed tomography Abdomen was done in 28 patients. 86.67% managed by non-operative management as they were

hemodynamically stable and Primary operative management group includes (13.33%) primarily underwent operative management as they were hemodynamically unstable at presentation in liver grade 3 & 4. *Conclusion:* In Patients with high grade liver injuries, better investigation modalities, hemodynamic stability by proper resuscitation and blood transfusion can be managed with conservative approach which decreases significantly morbidity and mortality of patients in hemodynamically stable patients.

Keywords: Blunt Injury; Diagnostic Modalities; Liver Trauma; Mortality.

Introduction

Trauma has been called the neglected disease of modern society, despite its close companionship with man. Trauma is the leading cause of death and disability in developing countries and the most common cause of death under 45 years of age [1]. World over injury is the 7th cause of mortality and abdomen is the third most common injured organ. Abdominal injuries require surgery in about 25% of cases. 85% of abdominal traumas are of blunt character [2]. The spleen and liver are the most commonly injured organs as a result of blunt trauma. Blunt Abdominal trauma is one of the most common causes of liver injury caused mainly due to road traffic accident and accounts for 75 to 80%. Blunt injury of abdomen is also a result of fall from height, assault with blunt objects, industrial mishaps, sport injuries, and blast injuries.

The liver is the second most injured organ in abdominal trauma [3]. Road traffic accidents and antisocial violent behavior accounts for majority of liver injuries [4]. Liver grade 1 and 2 injury less

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associate with mortality and manage conservatively. Liver grade 3 and 4 is associated with high mortality.

Clinical examination alone is inadequate because patients may have altered mental status and distracting injuries. Initial resuscitation along with focused assessment with sonography in trauma (FAST) and computed tomography (CT) abdomen are very beneficial to detect those patients with minimal and clinically undetectable signs of abdominal injury and are the part of recent management guidelines.

The purpose of Ultrasonography is to provide a quick bedside assessment for hemoperitoneum and hemopericardium. A FAST exam consists of sonographic evaluation of pericardium, right upper quadrant, including Morrison's pouch, left upper quadrant and the pelvis. This evaluation is not designed to identify the degree of organ injuries, but rather the presence of blood.

CT scan is the standard imaging study for hemodynamically stable patients following blunt trauma [5,6]. Severity of injuries is also graded based on CT scan examination. Extravasation of contrast demonstrated on CT scan (35–40 HU) indicates active bleeding from the injury site and further intervention is needed [7,8]. CT scan plays an integral role in the nonoperative management of liver injuries.

Angiography plays a vital role in the conservative management of the liver injury. Extravasation of contrast seen on CT scan requires emergency angiography and angioembolization in hemodynamically stable patients. Post-operative angioembolization is also reported in damage control surgery prior to removal of packing, if rebleeding is suspected [9,10].

In blunt liver trauma, non-operative management is a standard of care in hemodynamically stable patients. It is not the grade of the injury, but rather the hemodynamic parameters of the patient which help the conservative versus operative management decision [11,12]. The most common reasons for failure of nonoperative management are advanced age, delayed bleeding, hemodynamic instability and active extravasation of contrast from major vessels and injury to hollow viscus organs [13,14].

The main indication of the operative approach to the blunt liver injury is hemodynamic instability, not the grading of the injury. Although a higher grade injury has higher potential for failure of nonoperative management.

Active bleeding, constant decline of hemoglobin and increased transfusion requirement which indicate the need for laparotomy [10-14].

In view of increasing number of liver trauma present study has been chosen to ascertain conservative or operative approach of management of liver trauma with help of investigating modalities haemodynamic status of patients and associated injuries.

Materials and Methods

This was a prospective study of patients presenting with blunt abdominal trauma during the period from May 2015 to January 2018 at P.D.U. Medical College, Rajkot. Numbers of cases studied were 30. Informed consent was taken from all the patients. Data were collected from the patients by their clinical history, examination and appropriate investigations.

Documentation of patients, which included, identification, history, clinical findings, diagnostic test, operative findings, operative procedure were all recorded on a Performa specially prepared.

The decision for operative or non-operative management depended on the outcome of the Hemodynamic status and Radiological Investigations.

Statistical Analysis

The data was coded and entered into Microsoft Excel spreadsheet. Analysis was done using SPSS version 15 (SPSS Inc. Chicago, IL, USA) Windows software program. The variables were assessed for normality using the Kolmogorov-Smirnov test. Descriptive statistics were calculated.

Results

From May 2015 to January 2018, 50 number of cases were studied which belonged to all surgical units in Government Hospital.

In 30 cases, 24 were males accounting 80% of study populations and 6 (20%) were females. In this study majority belongs to 21-30 years of age accounting for 38% followed by 31-40 years of age. Mean age in present study was 29.22 years. This is due to productive & active social life of this group of people. In 20 (66.67%) cases road traffic accident was the mode of injury followed by assault by blunt object in 7 (20.33%). Least was injury due to fall from height in 3 (10%). In present study 80% of cases presented to hospital between 0-6 hours of incident. And 20% of cases presented between 7-12 hours. Mean latent period was 4.68 hours [Table 1].

Associated injury along with abdominal injury was present in 24 cases. The commonest extra abdominal injury was thoracic in the form of fractured ribs and hemo/pneumothorax followed by soft tissue injury, head injury; pelvis and extremities fracture [Table 2].

USG was done in 30 cases. 2 patients underwent laparotomy after USG abdomen [Table 3]

In our study computed tomography (CECT) Abdomen was done in 28 patients with 2 patient underwent laparotomy after CECT Abdomen [Table 4]

Table 5 shows the Incidence of grade wise injury in different solid organs as per above table. Majority

of injury were classified as grade III. All pancreatic injuries and majority of renal injuries were low grade.

Non-operative management success (NOM-S) group includes 26 patients 86.67% managed by non-operative management as they were hemo-dynamically stable at presentation whereas Primary operative management (OP) group includes 4 patients (13.33%) primarily underwent operative management as they were hemo-dynamically unstable on presentation [Table 6].

In present study Hemoglobin level was found above 10 gm% in 14 (46.67%) cases and between 8-10 gm% in 10(3.33%) cases and <8 gm% in 6 (20%) case. Overall mean transfusion required to maintain hemoglobin level >10gm% ranging 1 to 7 units of PCV (mean 3.22 units/per patient). 6 patients were having Hb<8 gm% at presentation, having higher grade of injuries had highest mean requirement (mean 5.57 units) of blood transfusions [Table 7].

Table 1: Demographic characteristics, mode of injury and latent period of patients in frequency and percentage

Variables	No of patients of liver grade 3&4 (Frequency)	Percentage (%)
Sex Ratio		
Total no. of patients (30)		
Sex		
Male	24	80
Female	06	20
Age incidence		
Age (years)		
0-10	01	3.33
11-20	06	20
21-30	12	40
31-40	05	16.67
41-50	03	10
51-60	01	3.33
61-70	02	6.67
Mode of Injury		
Road Traffic Accident (RTA)	20	66.67
Fall from Height	03	10
Assault	07	23.33
Latent period		
0-6 hours	24	80
7-12 hours	06	20

Table 2: Associated injury of the patients

Associated injury	No of cases	Percentage (%)
Head	03	10
Thorax	12	40
Extremities	03	10
Pelvis & spine fracture	02	6.67
Soft tissue injury	04	13.33
No association	06	20

Table 3: Ultrasonography of Abdomen

Organs	No of patients (30)	Percentage (%)
Liver	18	60
Liver+ Spleen	09	30
Liver+ kidney	02	6.67
Liver + pancreas	01	3.33

Table 4: CECT Abdomen

Organs	No of cases(n=30)	Percentage (%)
Liver	18	60
Liver+ Spleen	09	30
Liver+Pancreas	01	3.33
Liver+ Kidney	02	6.67

Table 5: Grade of injury

Organ	Grade		Total
	3	4	
Liver	23	7	30
Spleen	6	3	9
Kidney	1	1	2
Pancreas	1	0	1

Table 6: Ratio of operative to conservative treatment

Management	No of Patients(n=30)	Percentage (%)
Non-Operative	26	86.67%
Operative	04	13.33%

Table 7: Average no. of blood transfusion required

HB %	No of Cases	AVG. no of BT Required
>10gm%	14	1.5
8-10 gm%	10	2.70
<8 gm%	06	5.57

Discussion

In this study it was found that males are more common (80%) victims of blunt abdominal injury which is comparable to Davis et al. [15] and Cox et al. [16] in which male patients were 70% and 73% respectively. The incidence is more in males as males are commonly involved in RTA and Assaults.

Majority of our study population belongs to 21-30 years of age followed by 31-40 years of age as young people are involved in RTA, which is compared to Davis et al. [3] study. Mean age in present study was 29.06 years.

In present study RTA is the most common (66.67%) mode of injury, this is comparable to study done by Davis et al. [15] in which 70% patients injured by Road traffic accident and 50% patients in the Study by S.Gupta [18]. This is because of increased number of vehicles recently.

Latent period is the interval between the time of injury to presentation to the hospital. 80% of our patients presented between 0-6 hrs after injury. 20% presented in 7-12 hrs after injury. Mean latent period was 4.64 hours. This is much higher than study by Maurice et al. [17] (Mean 1.8 hours). Longer the latent period in our study may be due to distance, availability of transport or refereed cases to our institution from periphery.

Commonest Intraabdominal associated injury was splenic injuries which was present in 9 (30%) patients and follow by renal, pancreas and hollow viscus injuries.

Associated extra abdominal injury was present in 24 (80%) patients. The most common extra abdominal injury was thoracic accounting for 40% followed

by head injury, pelvic/spine and extremities fractures. There was no associated injury in 6 (20%) patients. This is comparable to study by Davis et al. [15] and S.Gupta et al. [18]. Chest, head injury and major bony fracture, when associated with blunt abdominal trauma causes marked increase in duration of hospital stay and overall morbidity.

USG was done in all 30 cases out of which 2 cases were positive for liver injury and hemoperitoneum. This value show high degree of accuracy and sensitivity of 92% in present study [19,20,21]. Which is comparable to other studies e.g. Rose et al. [19] (89%); and literature. e.g. EAST guidelines for trauma [8] (73.88).

There for USG abdomen is reliable in detecting liver injury and free fluid in the abdomen especially in hemodynamically unstable patients in emergency room settings. 2 out of 28 patients were hemo-dynamically unstable and were taken for operative management. CECT Abdomen was done in 28 cases as they were presenting higher grade liver injury on USG & hemodynamically stable. All the CT scan study had positive result leading to 100% sensitivity and specificity [15,16]. Computed tomography (CECT) could provide reliable information on to decide conservative approach in hemodynamically stable patients.

In present study isolated liver injury has the lowest rate of primary operative intervention (6.67%). This is contradiction to other study e.g. in study by George C. et al. [20] where isolated liver injury had highest primary operative rate of 24% and 33.33% respectively. Other organ injuries were treated successfully.

Out of 30 patients 26 (86.67%) patients were managed conservatively. This is comparatively higher than other studies like George C. et al. [20]

where 58.95% and 52.08% patients were primarily treated conservatively.

Conclusion

With availability of highly accurate diagnostic modalities and better management protocols, mortality rate in present study is 8%. Shorter latent period, easy availability and higher sensitivity and specificity of USG and CT scan, proper leads to manage grade 3, 4 liver injury & as non-operatively in hemodynamically stable patient.

Ethical Clearance

Taken from institutional ethical committee of the institute and written informed consent was taken from the participants.

Conflict of Interest: None declared.

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