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ORIGINAL ARTICLE

Outcomes of Conservative Management in a Clinically Stable Patient with Traumatic Liver Injury

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ABSTRACT

Objective: The purpose of this research was to examine the success of non-surgical therapy for patients in stable condition who had come with serious liver injuries to the emergency department of a public tertiary care hospital in Karachi, Pakistan.

Method: This retrospective research was carried out between February 2022 to August 2022 in department of General Surgery, Civil Hospital Ruth Pfau, DUHS, Karachi, after the ethical approval of the institute ethical review board. Patients were divided into two groups, group I receiving conservative care and group II undergoing surgery. Demographics, injury categorization, related lesions, surgical therapy, morbidity, mortality, and length of hospital stay were all were recorded through a questionnaire.

Results: The average age of the 200 participants in the present research was 39.15± 10.47 years. There were 133 (66.5%) males who sustained injuries. The majority of patients (n=150, 75%) were found to have only mild liver damage (grades I–III), whereas 50 patients (25%) had more severe liver damage (grades IV–V). 150 patients (75%) were treated with conservative (NOM) care, whereas 50 patients (25%) had surgical intervention. Twenty-one deaths (10.5 %) were recorded in total.

Conclusion: Conservative care is the preferred course of action for patients with stable hemodynamics, whereas surgical intervention is the treatment of choice for those with hemodynamic instability. Patients undergoing conservative treatment should be closely monitored. Mortality and morbidity rates were not significantly higher in patients whose conservative therapy failed.

INTRODUCTION

Liver injuries are prevalent in both blunt and penetrating trauma despite the liver's concealed position (1). Superficial or small injuries seldom need medical attention (2, 3). Liver trauma is the most common severe abdominal injury, accounting for 20%-40% of all trauma-related fatalities (4). As a result of its larger size and more central location, the right lobe of the liver is often affected (nearby the ribs) (5). When broken down into segments, more than 85 percent of injuries occur in segments 6, 7, and 8. Injury to many organs increases the risk of death and disability (6). The data showed that by the time operational care is administered, bleeding from 86% of liver injuries had ceased. In addition, 67% of abdominal examinations after acute trauma are unnecessary (7). Past two decades have seen a range of management styles, from packing to where we are today, nonoperative management (NOM). Also, CT scan results are also being used to determine which surgical procedure will be undertaken (8). In terms of diagnostic and grading accuracy, abdominal CT scans rank top (9). This is because it can grade bleeding severity and identify ongoing bleeding (10). The benefits of NOM include less intra-abdominal problems, decreased need for blood transfusions, earlier hospital release, and fewer cases of unnecessary investigation. Further, the mortality rate is lower with selective NOM than with surgical intervention (11). Currently, in specialist trauma centers, the vast majority of patients (about 80% for adults and 97% for kids) are treated conservatively (6). Most hospitalized patients are treated satisfactorily with NOM for mild to severe liver damage. Though NOM is used for managing just a third of serious injuries. When patients are hemodynamically stable, conservative care has been advocated for by a number of researchers. Presently, the incidence of traumatic injury and related adverse outcomes, including mortality, have grown dramatically due to the growing urbanization and motorization (12, 13). In addition, there is a lack of information on the role of NOM in liver traumatic injuries on a regional scale. As such, the current research was conceived to gather proof of NOM in Pakistani instances of severe liver injury. The goal of this study was to evaluate the efficacy of conservative treatment for clinically stable patients who presented with severe liver injuries to the emergency department of a public tertiary care hospital in Karachi, Pakistan.

METHODOLOGY

This retrospective research was carried out between February 2022 to August 2022 in department of General Surgery, Civil Hospital Ruth Pfau, DUHS, Karachi, after the ethical approval of the institute ethical review board. During the research time period 250 liver trauma patients were selected through non-probability consecutive sampling. Patient demographics, CT findings (if available), blood transfusion history, severity of liver damage, approach to treatment (non-surgical vs operational), length of hospital stay, length of time in the intensive care unit, and fatality rates were all recorded of the patients with at least 18 years and of both genders, all trauma patients who will be hemodynamically stable at the time of presentation, patients participating into the study on their will. Patients who reported severe stomach injuries or were declared deceased at the scene, hemodynamically unstable traumatic patients requiring operative management, trauma patients as multiple poly trauma injuries were not included. Hemoperitoneum examination was carried out through Focused Assessment with Sonography in Trauma (FAST). On the basis of abdominal CT scan examination, liver injury severity was grade from I-VIPatients with mild to moderate liver damage (I-III) were admitted to the ward, while those with severe liver injury (IV) were referred to the intensive care unit for careful monitoring and follow-up. If the patient's health worsened, an operating room was always available. Conservative management was discontinued if tachycardia (>100 Bpm) and/or hypotension (systolic <90, diastolic<60 mmHg) occured in the first 48 hours of observation. Other conditions for discontinuing conservative management were increased transfusion requirement, increased abdominal pain and tenderness, expansion of a hematoma on CT or a development of a symptomatic perihepatic fluid collection, hematoma or biloma. Patients were followed during their overall hospital course and the final outcome either discharged alive with stable condition or converting to operative management or dead was noted. On this basis of above criterion described patients were divided in two groups Conservative group (n=150) and operative group (n=50).

Categorical variables were summarized as frequencies and percentages. Mean ± standard deviation was calculated to summarize normally distributed numerical variables whereas non-normal numerical variables were summarized as median with inter-quartile range. SPSS version 26 was used to determine the significance in two study groups. P-value less ≤0.05 was considered statistically significant.

RESULTS

The average age of the 200 participants in the present research was 39.15± 10.47 years. The leading cause of death and injury

was automobile collisions. There were 133 (66.5%) males who sustained injuries, making them the most common demographic. The majority of patients (n=150, 75%) were found to have only mild liver damage (grades I–III), whereas 50 patients (25%) had more severe liver damage (grades IV–V). The right lobe of the liver was the most common site of liver damage, accounting for about 73% of all liver trauma cases. Pancreas injuries (23%), CNS injuries (22.5%), Chest injuries (16%), Diaphragm (15%), spleen injuries (14.5%), and kidney injuries (11%) were the most prevalent types of extra abdominal injuries. 150 patients (75%) were treated with conservative (NOM) care, whereas 50 patients (25%) had surgical intervention. 141 patients (57%) had a blood transfusion. Twenty-one deaths (10.5 %) were recorded in total (Table 1).

Table 1: Differences between liver injury grades

Parameters	Grade I (n=65)	Grade II (n=50)	Grade III (n=35)	Grade IV (n=29)	Grade V (n=21)	P Value
Age						0.7711
Mean± S. D	39.15±10.47	41.04±9	39±9.19	38.2±10.32	39.8±12.6	
Median (Range)	38 (18-64)	43 (22-56)	42 (20-56)	38 (19-36)	38 (19-60)	
Sex (n%)						0.3325
Female	22 (34%)	21 (42%)	8 (23%)	9 (31%)	7 (33%)	
Male	43 (66%)	29 (48%)	27 (77%)	20(69%)	14 (67%)	
Associated injuries (n%)						0.0136*
Chest	10 (15%)	5 (10%)	4 (11%)	4 (14%)	5 (24%)	
CNS	7 (11%)	16 (32%)	9 (26%)	9(31%)	4 (19%)	
Diaphragm	7 (11%)	8 (16%)	7 (20%)	4(14%)	4 (19%)	
Kidney	11 (17%	5 (10%)	3 (9%)	3 (10%)	0	
Pancreas	22 (34%)	10 (20%)	4 (11%)	4(14%)	6 (29%)	
Spleen	8 (12%)	6 (12%)	8 (23%)	5 (17%)	2 (10%)	
Liver enzymes						
ALT	269.21±27.8	506.34±23.60	1329.2±255.81	1955.5±83.74	2128±191.5	<0.0001****
AST	210.47±65.5	366.74±19.22	919.22±146.7	1393.4±224.6	1958±82.41	<0.0001****
Blood Transfusion (n%)						0.7216
No	47 (72%)	33 (66%)	6 (17%)	0	0	
1-2	10 (15%)	9 (18%)	14 (40%)	7 (24.1%)	1 (4%)	
3-6	6 (9%)	5 (10%)	9 (26%)	10 (34.4%)	2 (10)	
>6	2 (3%)	3 (6%)	6 (17%)	12(41.3%0	18 (86%)	
Management (n%)						0.8175
Conservative	55 (85%)	43 (86%)	30 (86%)	17 (59%)	5 (24%)	
Operative	10 (15%)	7 (14%)	5 (14%)	12 (41%)	16 (76%)	
Mortality (n%)	3 (4%)	5 (10%)	3(9%0	6(21%)	4 (19%)	

No significant variation (P=0.456) in the mean ages of the participants were observed in both the study groups. The Mean± S.D of age in both the conservative and operative group was 40.32±11.5 and 39.28±9.6 years, respectively (Table 2). In both the groups majority of the participants were males with liver injuries, however no significant variation (p=0.253) was observed in the gender distribution. The Mean± S.D of hemoglobin (Hb) in both the conservative and operative group was 14.31±1.64 and 7.72±1.31, respectively, and significant variation (p=0.000) was observed in the HB level of both study groups. The Mean± S.D of GCS<8 in both the conservative and operative group was 23.8±3.9 and 10.56±3.74, respectively, and significant variation (p=0.000) was observed in the GCS<8 level of both study groups. The Mean± S.D of ISS in both the conservative and operative group was 19.90±3.7 and 25.04±3.9, respectively, and significant variation (p=0.000) was observed in the ISS level of both study groups. The Mean± S.D of alanine transaminase (ALT) in both the conservative and operative group was 796.78±633.6 and 1424.38±809.42, respectively, and significant variation (p=0.000) was observed in the ALT level of both study groups. The Mean± S.D of aspartate transaminase (AST) in both the conservative and operative group was 584.2±487.7 and 1161.8±706.3, respectively, and significant variation (p=0.000) was observed in the AST level of both study groups. The Mean± S.D of ICU stay in both the conservative and operative group was 3.2± 0.92 and 7.28±1.65 days, respectively, and significant variation (p=0.000) was observed in the ICU stay of both study groups. The Mean± S.D of hospital stay in both the conservative and operative group was 7.2±1.5 and 12.66±2.23 days, respectively, and significant variation (p=0.000) was observed in the hospital stay of both study groups. In both groups, dominant associated injuries were observed in CNS, 67.5% in conservative group and 30% in operative group. In the conservative group most participants have Grade I (37%) liver injuries, while in operative group most participants have Grade V (32%) liver injuries.

Table 2: Comparison between conservative and operative groups

Parameters	Conservative Group (n=150)	Operative Group (n=50)	P Value
Age			0.456
Mean± S. D	40.32±11.5	39.28±9.6	
Sex			0.253
Female	48 (32%)	19 (38%)	
Male	102 (68%)	31 (62%)	
HB (Mean ± S.D)	14.31±1.64	7.72±1.31	0.000****
GCS <8 (Mean ± S.D)	23.8±3.9	10.56±3.74	0.000****
ISS (Mean ± S.D)	19.90±3.7	25.04±3.9	0.000****
ALT (Mean ± S.D)	796.78±633.6	1424.38±809.42	0.000****
AST (Mean ± S.D)	584.2±487.7	1161.8±706.3	0.000****
Associated injuries			0.002***
Chest	18 (12%)	10(20%)	
CNS	45 (67.5%)	15 (30%)	
Diaphragm	23 (15%)	7 (14%)	
Kidney	16 (11%)	2(4%)	
Pancreas	26 (17%)	9 (18%)	
Spleen	22 (15%)	7(14%)	
ICU Stay (Mean ± S.D)	3.2± 0.92	7.28±1.65	0.000****
Hospital Stay (Mean ± S.D)	7.2±1.5	12.66±2.23	0.000****
Liver Injury Grades			0.122
Grade I	55(37%)	10(20%)	
Grade II	43(29%)	7(14%)	
Grade III	30(20%)	5(10%)	
Grade IV	17(11%)	12 (24%)	
Grade V	5(3%)	16(32%)	
FAST US			0.122
Minimal	34(23%)	0	
Mild	65(43%)	11(22%)	
Moderate	30(20%)	23(46%)	
Marked	21(14%)	16(32%)	
Mortality	10(6.7%)	15 (30%)	

DISCUSSION

Among solid organs, the liver suffers the second-highest rate of damage. Due to its anatomical position, liver injuries often result in fatal hemorrhage. Abrupt trauma is the leading cause of liver damage (14, 15). There has been a rise in the incidence of liver damage in Pakistan as the frequency of car accidents has grown over the last decade. In the present research, more than half of the patients with liver damage were men (66.5%). More than 75% of adults were treated with NOM.

Over the last 15 years, there has been a gradual shift in how liver damage is treated. The spark was first published in 1990, and it was inspired by the work of pediatrics surgeons who, in the case of liver and spleen damage, give the possibility of NOM in hemodynamically stable patients (16).

Choosing a NOM reduces both the number of needless surgeries and the rate of death and other adverse outcomes (17). Fortunately, only 75% of liver injuries (grade III or below) are minor (18). Historically, doctors have treated these individuals with liver sutures, diathermy, or hemostatic medications to stem the bleeding. This means that these individuals will have optimal levels of NOM. There is still a significant obstacle when deciding whether or not to operate on the remaining 25% of patients with serious liver damage (19).

Failure occurred in around 25% of patients during NOM in the research by Beardsley and Gananadha (18), most often because of liver necrosis, bile leak, rebleeding, or secondary sepsis. In our analysis, 10 patients (6.7%), had NOM fail, most often because of damage to other organs. Similar results were seen in Albanian research (10), which reported a success rate of 83% for NOM. In addition, 192 patients in another Turkish trial (63% stable, 37% unstable) received NOM, whereas 108 had surgery. Patients with severe liver damage grade and hemodynamic instability upon admission accounted for 13% of the fatalities (20).

Present research found that biliary leak was the leading cause of morbidity in 10 participants. In addition, 2.8% of patients diagnosed with complicated blunt hepatic injuries had biloma in the study by Carrillo et al. (21). The research by Bala et al., which analyzed 398 patients with liver injuries, found that only 16 of them had problems; these included biloma and bile leak (22). Drainage and ERCP were used in the treatment of bile leak. Pseudo-aneurysms may bleed again, requiring emergency angioembolization. Once reserved for patients with mild liver damage (grade III or less), NOM is now widely regarded as the therapy of choice for patients with a stable hemodynamic status, independent of liver injury grade or CT-estimated hemoperitoneum quantity (23). While 79% of grade IV patients were successful with NOM in the present research, 76% patients in grade V needed surgical intervention due to the restricted scope of our expertise. The goals of surgical treatment are to stem blood loss, stop bile leakage, remove dead tissue, prevent infection, and drain the abdominal wall (24).

CONCLUSION

Patients who are hemodynamically stable often benefit most with NOM, whereas those who are not or who show indications of peritonitis need surgery. Injuries to other organs, not only the liver, are the typical culprits in a failed NOM. Patients with blunt liver damage should be admitted to tertiary care facilities with the ability to closely monitor their progress.

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