

Evaluation of Outcome of Traumatic Hepatobiliary Injury

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Abstract

Background: To evaluate outcome of traumatic hepatobiliary injury. **Subjects & Methods:** One hundred ten patients with traumatic hepatobiliary injury of both genders were recruited in present study. Hepatic injury grade, associated injuries, indication for operative intervention, failure of nonoperative management and complications were recorded. **Results:** Grade of liver injury was I in 14, II was in 22, III in 35, IV in 20 and V in 19 patients. Associated injury was maxillofacial injury in 32, head injury in 45, spine injury in 11, chest injury in 52 and pelvic injury in 8. Management was operative liver related in 32, operative liver unrelated in 10 and non-operative in 68 patients. Complications were persistent bile leak in 10 and angioembolization in 4. Death occurred in 7 patients. **Conclusion:** Hepato-biliary injury are common nowadays and liver injuries are severe. Both operative and non-operative management should be employed. Persistent bile leak and angioembolization were common complications.

Keywords: Hepato-biliary injury, Hepatic injury grade, Liver, Maxillofacial injury.

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Introduction

Injuries of the pancreas, gallbladder, and bile ducts due to blunt trauma are relatively uncommon and difficult to detect but are associated with high morbidity and mortality, especially if diagnosis is delayed.^[1] The liver is the most commonly injured organ in blunt trauma patients. Although there is well-organized trauma care system in developed countries, the development of trauma care system in India is still in its infancy. Outcome of traumatic hepatobiliary injuries have significantly improved over the years due to improved trauma care system.^[2]

Extra-hepatic bile duct injury from blunt abdominal trauma is uncommon. The spectrum of severity ranges from severe ones such as transection or laceration, to contusion and haematoma.^[3] The incidence of bile leaks following hepatobiliary trauma ranges from 0.5 to 2.1% depending on the methods used to diagnose the bile leak. Accurate and early diagnosis is imperative, and imaging plays a key role in detection.^[4]

The management of traumatic biliary injury (TBI) is comparatively more challenging than the management of iatrogenic biliary injuries (IBI) due to associated organ injuries and the delayed diagnosis.^[5] Most of the patients with blunt liver trauma have minor bile leaks with a good response to conser-

vative treatment. However, the management of major bile leak is a difficult dilemma and can affect patient recovery.^[6] The time of diagnosis and the effective method of intervention is the key in the management of major bile leaks. Early treatment with the diversion of the bile flow can help in the prevention of the development of infected biloma and intraabdominal sepsis.^[7] Considering this, the present study was undertaken with the aim to evaluate outcome of traumatic hepatobiliary injury.

Subjects and Methods

One hundred ten patients visiting with traumatic hepatobiliary injury of both genders were recruited in present study. Ethical clearance was obtained from higher authorities before commencing the study and all patients were enrolled after they or their relative gave written permission.

Demographic profile of each patient was noted along with mode of injury, admission hemodynamics, hepatic injury grade, associated injuries, indication for operative intervention, failure of nonoperative management and complications. Focused assessment sonography for trauma (FAST) was performed in ED for all patients with abdominal trauma. All were subjected to contrast-enhanced computed tomography (CECT) scan. Hepatic injury was graded as per hepatic injury scale

established by the American Association for the Surgery of Trauma. Results of the present study after recording all relevant data were subjected for statistical inferences using chi-square test. The level of significance was significant if p value is below 0.05 and highly significant if it is less than 0.01.

Results

Maximum cases were seen in age group 40-50 years (males- 25, females- 13) followed by 30-40 years (males- 23, females- 12), 20-30 years (males- 12, females- 8) and >50 years (males- 10, females- 7) [Table 1].

Grade of liver injury was I in 14, II was in 22, III in 35, IV in 20 and V in 19 patients. Associated injury was maxillofacial injury in 32, head injury in 45, spine injury in 11, chest injury in 52 and pelvic injury in 8. Management was operative liver related in 32, operative liver unrelated in 10 and non-operative in 68 patients. A significant difference was observed ($P < 0.05$) [Table 2, Figure 1].

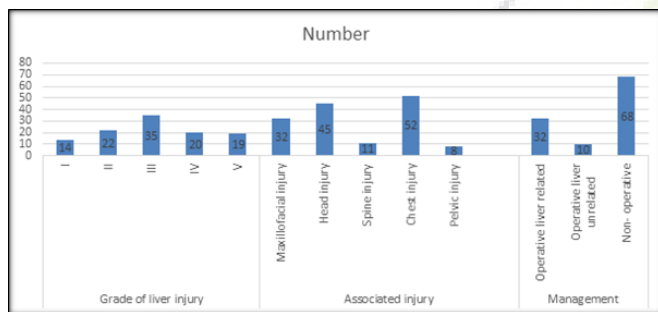


Figure 1: Assessment of parameters

Complications were persistent bile leak in 10 and angioembolization in 4. Death occurred in 7 patients [Table 3].

Discussion

Blunt abdominal trauma may result in a variety of abdominal injuries. While injuries involving the liver and spleen are common and are usually detected by imaging without difficulty, pancreatic and biliary injuries may be more subtle.^[8] Moreover, these injuries may be overlooked in patients with extensive multiorgan trauma. Pancreatic and biliary injuries are uncommon but may be associated with high morbidity and mortality, particularly if diagnosis is delayed. Hence, early diagnosis is critic.^[9]

Knowledge of the mechanisms of injury, the types of injuries, and the roles of various imaging modalities is essential for prompt and accurate diagnosis. Early recognition of disruption of the main pancreatic duct is important because such

disruption is the principal cause of delayed complications.^[10] Gallbladder injuries can be detected with CT, ultrasonography, hepatobiliary scintigraphy, or MR cholangiopancreatography. CT findings include a collapsed gallbladder, wall thickening, inhomogeneous mural enhancement, and pericholecystic fluid. Bile duct injuries can be suggested with CT, which may show ascites and associated liver injuries, and can be confirmed with hepatobiliary scintigraphy.^[11] The present study was undertaken with the aim to evaluate outcome of traumatic hepatobiliary injury.

We included 110 patients which comprised of 70 males and 40 females. Age group 40-50 years comprise of males- 25, females- 13 30-40 years males- 23, females- 12, 20-30 years males- 12, females- 8 and >50 years males- 10, females- 7. Yadav et al,^[12] conducted a study in which liver injury occurred in 7.52 % out of 20.34 % of total abdominal trauma patients. Most common mechanism of injury was blunt trauma due to road traffic injury among all age groups (n=234, 67.83 %). 75% of the patients with liver injury were hemodynamically stable at presentation (n=262, 75 %). Isolated liver injury was seen in 27 % of the patients. Grade II (n=138, 40 %) liver injury was the most common. Of the patients, 68.70 % were managed nonoperatively. Among operatively managed patients (n=100, 29 %), 38 % patient underwent immediate laparotomy due to hemodynamic instability. The failure of nonoperative management was in eight (2.32 %) patients with success rate of 96.73 %, i.e., 237 patients out of 245 were successfully managed nonoperatively. Packing was done in 27 % of the patients of high-grade liver injury and was associated with high morbidity and mortality (51 %). The morbidity and mortality of liver trauma were 28.99 % and 12.17 %, respectively. Liver injury is common in abdominal trauma patients.

In this study we observed that grade of liver injury was I in 14, II was in 22, III in 35, IV in 20 and V in 19 patients. Associated injury was maxillofacial injury in 32, head injury in 45, spine injury in 11, chest injury in 52 and pelvic injury in 8. Malhotra et al,^[13] reported 16 % incidence of isolated liver injury in adult. The reported incidence of isolated liver injury in pediatric age group (43.72 % by Landau et al and 37 % by Bajaj et al are higher than in adult. It might be due to different mechanism of injury in these different age groups.^[14,15]

The management was operative liver related in 32, operative liver unrelated in 10 and non-operative in 68 patients. Zakaria et al,^[16] included patients with blunt liver trauma and were divided into 2 groups for comparison; a group of liver parenchymal injury and group with traumatic biliary injuries (TBI). One hundred and eight patients had blunt liver trauma (46 patients with liver parenchymal injury and 62 patients with TBI). TBI were; 55 patients with bile leak, 3 patients with haemobilia, and 4 patients with late obstructive jaundice. Eight patients with major bile leak and

Table 1: Age and gender distribution

Age groups (years)	Male	Female	Total
20-30	12	8	20
30-40	23	12	35
40-50	25	13	38
>50	10	7	17
Total	70	40	110

Table 2: Assessment of parameters

Parameters	Variables	Number	P value
Grade of liver injury	I	14	>0.05
	II	22	
	III	35	
	IV	20	
	V	19	
Associated injury	Maxillofacial injury	32	<0.05
	Head injury	45	
	Spine injury	11	
	Chest injury	52	
	Pelvic injury	8	
Management	Operative liver related	32	<0.05
	Operative liver unrelated	10	
	Non- operative	68	
Hemodynamically unstable			

Table 3: Complication and outcome

Complication	Number	P value
Persistent bile leak	10	<0.05
Angioembolization	4	
Death	7	

12 patients with minor bile leak had been resolved with a surgical drain or percutaneous pigtail drainage. Nineteen patients (34.5%) with major and minor bile leak underwent successful endoscopic retrograde cholangiopancreatography (ERCP). Sixteen patients (29.1%) underwent surgical repair for bile leak. In Multivariate analysis, the possible risk factors for prediction of biliary injuries were central liver injuries ($P = 0.032$), high grades liver trauma ($P = 0.046$), elevated serum level of bilirubin at time of admission ($P = 0.019$), and elevated gamma glutamyl transferase (GGT) at time of admission ($P = 0.017$).

Conclusion

Hepato-biliary injury are common nowadays and liver injuries are severe. Both operative and non- operative management should be employed. Persistent bile leak and angioembolization were common complications.

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