ORIGINAL **PROF-713**

MANAGEMENT OF LIVER INJURIES IN ABDOMINAL TRAUMA;

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ABSTRACT

Aim & Objectives: (1): to determine the frequency of liver injuries in abdominal trauma. (2): To find out the most affected age group in abdominal trauma. (3): To describe criteria for conservative and operative management of abdominal injuries. **Design:** Prospectus **Period:** May 2001 to Oct 2002. **Setting:** Surgical Department of Allied Hospital, Punjab Medical College Faisalabad. **Material & Methods:** This study included 100 patients of abdominal trauma (Blunt / penetrating) admitted through emergency. Male to female ratio was 4 to 1 (male: 40, female: 10). The age ranged from 05-45 years (mean: 19.7 years). **Results:** Out of the total number of hundred patients, fifty patients had hepatic trauma. Out of fifty patients, 18(36%) patients had isolated liver injury and 32(64%) patients had associated organ injuries. Twenty six patients (52%) suffered from blunt abdominal trauma and twenty four patients (48%) penetrating injuries either due to firearm or stab. Forty two patients (84%) underwent surgery and 8(16%) patients were given conservative trial. Six patients (12%) recovered on conservative management while two underwent second operation for peritonitis. Grade I & II liver injuries were found to be most common while one case of Grade V or VI was noted. **Conclusion:** Blunt trauma due to toad traffic accidents is the commonest mode of abdominal injuries followed by penetrating injuries. Heamodynamically stable patients presenting within 6 hours can be treated conservatively. Haemodynamically unstable patients should be immediately operated.

Key Words: Abdominal Trauma, Liver Injury.

INTRODUCTION

At the end of the twentieth century, exploratory laparotomy remains the standard diagnostic and therapeutic approach for penetrating wounds of the abdomen. With the increase in automotive travel following World War II, motor vehicle collisions became more frequent, resulting in a greater incidence of penetrating & blunt injuries to intra-abdominal viscera.

The development of diagnostic peritoneal lavage (DPI) in the mid-1960s[1]was a tremendous advance in the management of abdominal trauma. The application of CT scans to trauma care enabled the surgeon to non-invasively visualize injuries to the solid viscera of the abdomen and the retro peritoneum[2].

Within the last decade, ultrasonography also has expanded the surgeon's diagnostic armamentarium for evaluation of patients with possible abdominal injuries[3].

During the last decade significant operative measures adopted by the trauma surgeons which improved the outcome in hepatic trauma include:

1. Pringle's manoeuver. (1908)
2. Use of Topical Hypothermia
3. Finger Fracture Technique of Lin for hepatic resections and the concept of Hepatorraphy.
4. Perihepatic packing and planned reexploration as part of "Damage Control Surgery" whereby surgery must be terminated under

circumstances of haemodynamic instability or coagulopathy and the management of juxtahepatic injuries with or without various intracaval shunts[4].

5. Cavitron Ultrasonic Surgical Aspirator (CUSA)

AIMS & OBJECTIVES

1. To determine the frequency of liver injuries in abdominal trauma.
2. To find out the most affected age group in abdominal trauma.
3. To describe criteria for conservative and operative management of abdominal injuries.

MATERIAL & METHODS

This study included 100 patients of abdominal trauma (blunt or penetrating) admitted through emergency in Allied Hospital, Punjab Medical College, Faisalabad, from May 2001 to October, 2002. Patients not responding to standard i/v fluid resuscitation underwent surgical management. Haemodynamically stable patients were kept under strict observation & relevant investigations carried out. Classification by American Society for Surgery of Trauma was used to Grade Liver Injuries.[5,6,7].

The patients were received and resuscitated in the Emergency Department. Investigations requested for ail these patients included:

- Hb % & White Cell Count
- Baseline Biochemical Tests
- Urine analysis
- Blood Grouping & Cross Matching
- Radiological examination including Plain X-ray (Abdomen / Chest) and Abdominal Ultrasonography.
- Diagnostic Peritoneal Lavage (DPI)

CRITERIA FOR CONSERVATIVE MANAGEMENT

1. Duration of more than six hours after injury without features of peritonitis.
2. Haemodynamic stability.
3. No. evidence of intra- abdominal injury on investigation (X-Rays, Ultrasonography & DPI).
4. Absence of abdominal distension suggestive of Heamoperitoneum.

CRITERIA FOR OPERATIVE MANAGEMENT.

1. Duration less than 6 hours with features of peritonitis.
2. Haemodynamically unstable patients.
3. Persistent hypotension inspite of standard resuscitation.
4. Abdominal distension
5. Evidence of intra- abdominal injury on investigations (X-Ray, DPI & USG).

OPERATIVE APPROACH

Standard technique of General Anaesthesia with Endotracheal Intubation.
Midline umbilicus saving incision.
exploration of whole abdomen.
Major/ Bleeding injuries were secured by:

- Sutures (chromic catgut)
- Cauterization by diathermy probe and interlocking mattress sutures using atraumatic needle.
- Spongiostan & omentum was used where needed.

Packing of liver in cases where homeostasis could not be secured by standard techniques in case of Grade IV injuries. Associated abdominal injuries were dealt on merit.

RESULTS

Fifty two patients presented with blunt abdominal trauma and forty eight patients had suffered penetrating injuries to abdomen. Road traffic accidents was the main cause of blunt trauma (Table-I).

Firearms were found to be the cause of penetrating injuries in majority of cases (32%). Twelve patients had stab injuries to abdomen.

Table-I. Mode of injury (n=100)		
Mode of injury	**No. of pts**	**%age**
Road traffic accident	50	50%
Assaults	30	30%
Falls	10	10%
Crushing injury	10	10%

Table-II. Blunt abdominal trauma (Age distribution)		
.Age Group	**No. of pts (n=56)**	**%age**
0 to 10 years	8	14.3%
11 to 20 years	20	35.7%
21 to 30 years	12	21.4%
31 to 40 years	8	14.3%
41 to 50 years	8	14.3%

Table-III. Penetrating abdominal trauma (Age distribution)		
Age Group	**No. of pts (n=56)**	**%age**
0 to 10 years	4	9.3%
11 to 20 years	12	27.5%
21 to 30 years	24	54%
31 to 40 years	4	9.3%
41 to 50 years	-	-

Table-IV. Blunt abdominal trauma (Frequency of organ injury)		
Organ Injured	**No. of pts (n=56)**	**%age**
LIver	8	15%
Spleen	4	7%
Small and Large gut	8	15%
Multi organ Injuries (including liver)	18	32%
Mesenteric tear	4	7%
Diaphragmatic	-	-
Pancreas	2	3.5%
Kidney	2	3.5%
Omental injuries	4	7%
Appendix	-	-
Gall bladder	-	-
Stomach	2	3.5%
Retro-peritoneal	4	7%

Table-V. Blunt abdominal trauma (Frequency of organ injury)		
Organ injury	**No. of pts (n=44)**	**%age**
Stomach	2	4.5%
Small and large gut	8	18%
Multi organ injuries (including liver)	14	3.2%
Liver	10	22.5%
Mesentery	2	4.5%
Diaphragm	2	4.5%
Spleen	4	9%
Kidney	2	4.5%
Pancreas	-	-
Retro-peritoneal hematoma	-	-

Table-VI. Grade of liver injury		
Grade of Liver Injury	**No. of pts**	**%age**
Grade I	16	32
Grade II	17	34
Grade III	10	20
Grade IV	5	10
Grade V	2	4

Grade VI	-	-
Total	50	100

S. #	No of Pts	Pts with Blunt injury	%age
Steve C	72	15	18
Pretre	115	100	88
Miller	40	24	60
Frederick	75	28	36
Shah PA	110	86	78
Present study	50	26	52

DISCUSSION

The present study consists of 100 patients out of which 50 patients presented with hepatic trauma. Decision to adapt the conservative or operative line of management was made on the basis of clinical examination and investigations. Males were found to be more prone to trauma as compared to females. The reason for this difference in our setup is due to fact that males are more involved in outdoor activities such as traveling, fighting, professional and political activities etc.

Steven C, Stain et al[e] reported in his study a male to female ratio of 9.6:1. Pretre et al (1988)[9] however found male to female ratio of 2.6:1 n his study of 99 cases.

In this study average age of patient was 19.7, the youngest patient being five year old and oldest being forty-five year old. The incidence of hepatic trauma is in relatively younger age group in this study as compared to study by R. Pretre et al[9] who reported 99 cases in which average age was 30 years (16-83 years).

Incidence of hepatic trauma due to blunt injury has been reported variously as 18% by Steve C. Stain et al[8], 88% by Pretre et al, 60% by Miller et al[10], 36% by Frederick et al[11] and Asif Zafar[12] 50%. In this study blunt trauma was responsible for liver injury in 26 patients and penetrating trauma was responsible for liver injury in 24 patients. In a study by Shah PA et al[13], out of 110 patients the mechanism of injury was blunt trauma in 86 patients (78%). In comparison to these figures Pretre et al observed 11% cases of penetrating liver trauma. Steven C. Stain[8] found it to be 81 %.

Vast majority of hepatic injuries can be successfully managed conservatively even when C T scan demonstrates parenchymal damage of more than three segments and major hemoperitoneum. In this study 6 out of 50 patients recovered with conservative management. Two cases which developed peritonitis were operated on second and third days of the observation period U S G showed free fluid in the peritoneal cavity. On exploration of abdomen ruptured subcapsular haematoma with free bile was found in one patient and perforation of ileum was found in the other patient.

Majority of the cases were of Grade I & II liver injury (36% & 34% respectively). Frederick et al[11] has reported 27% Grade I injuries, 49% Grade II injuries, 11% Grade III injuries, 8% Grade IV injuries and 5% Grade V injuries.

CONCLUSION

Most of the liver injuries are minor and non bleeding at the time of presentation. Hemodynamically stable patients with grade I, II and some of the grade III injuries can be managed conservatively provided these patients are kept under observation to deal with any missed injury or complication.

Patients with haemodynamic instability and grade V and VI injuries require immediate surgery and type of procedure will depend upon the extent of injury.

Debridement and direct repair using chromic catgut on atraumatic needle has been found to be successful in most of the cases of hepatic trauma.

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