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FREQUENCY & GRADING OF ABDOMINAL INJURIES (LIVER AND SPLEEN) FOLLOWING BLUNT TRAUMA ABDOMEN

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Abstract:

Objective: *To find out the frequency & grading of abdominal injuries (liver and spleen) following blunt abdominal trauma.*

Material and methods: *In this cross sectional study total 135 patients with history of blunt trauma abdomen having age 15-45 years either male or female were selected from Department of Surgery Dera Ghazi Khan Hospital, Dera Ghazi Khan. Duration of study was 8 months from April 2018 to December 2018. Frequency of liver and spleen injures was assessed.*

Results:*Total 135 patients of blunt abdomen trauma were selected. Mean age of the patients was 29.41 ± 8.23 years. After performing laparotomy, injury of liver was seen in 48 (36%) patients followed by spleen injury in 65 (48%) patients and both liver and spleen injury was seen in 22 (16%) patients. Regarding grades of liver and spleen injuries, grade-I liver injury was found in 18 (35%) patients followed by Grade-II in 13 (27.08%) patients, Grade-III in 6 (12.5%) patients, Grade-IV in 6 (12.5%) patients and Grade-V injures in 5 (10.42%) patients. Grade-I spleen was seen in 25 (38.46%) patients, Grade-II in 17 (26.15%) patients, Grade-III in 14 (21.54%) patients, Grade-IV in 5 (7.69%) patients and Grade-V injuries were noted in 4 (6.15%) patients.*

Conclusions: *Results of present study showed that spleen injures were most common as compared to liver injures in cases of blunt abdominal trauma. Age group 15-30 years was the most affected age group. Male are more victims as compare to female.*

Key Words: *Liver, Spleen, blunt abdominal trauma*

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INTRODUCTION:

Injury has been man's constant companion since ancient times. Modern trauma care has been increasing in sophistication all the time.[1] The abdomen is a Pandora's box. It is commonly involved following blunt trauma.[2] The trauma can be either from road traffic accidents, assault, accidental fall from a height, sports injury or fall of a heavy object. High-velocity motor vehicle accidents account for 75-80% of blunt trauma of abdomen.[3] Blunt trauma can result from either compression (secondary to a direct blow or against a fixed external object) or from deceleration forces. Abdomen is the third most common organ injured following extremities and head injury. CT scanning has increased the identification of injuries.[4] The spleen and liver are the most commonly injured abdominal organs as a result of blunt trauma. The liver is the largest solid abdominal organ with a relatively fixed position, which makes it prone to injury during blunt abdominal trauma.[5]

Liver injuries were found in 47.9% and spleen injuries in 61.7% patients of blunt abdominal trauma undergoing laparotomy.[6] The spleen lies between the fundus of the stomach and the diaphragm, under cover of the 9th, 10th and the 11th ribs, its long axis being in the line of the 10th rib.[7] Splenic injury occurs from direct blunt trauma; the spleen is often injured by direct energy applied to the overlying ribs (9th to 11th ribs).[8]

In our surgical unit, trauma constitutes one of the most common reasons for emergency hospital admission. Due to mechanization leading to increase in number of road side accidents caused by 2-wheelers on roads, the figure of victims of blunt trauma abdomen has increased in our setup. Most of the locally published literature regarding blunt trauma abdomen consists of retrospective studies which contain small and inadequate sample sizes. Therefore, a cross-sectional study with adequate sample size is proposed to determine the frequency and grading of liver & spleen following blunt trauma abdomen presenting to a tertiary care hospital.

MATERIAL AND METHODS:

In this cross sectional study total 135 patients with history of blunt trauma abdomen with hemodynamic instability (Pulse > 100 beats/min, SBP < 90 mmHg) and/or intra-abdominal hemorrhage (seen on abdominal sonography) and undergoing exploratory laparotomy having age 15-45 years either male or female were selected from Department of Surgery Dera Ghazi Khan Hospital, Dera Ghazi Khan. Duration of study was 8 months from April 2018 to December 2018.

Patients managed non-operatively, Patients suffering any kind of penetrating abdominal injury, natural disaster injuries and stampede injuries and moribund patients who are ASA-4 and above were excluded from the study.

Exploratory laparotomy was performed in all selected cases. Findings in term of liver and spleen injuries were noted in predesigned proforma. Liver and spleen injuries were labeled when on exploratory laparotomy bleeding, hematoma or wound is seen on the surface of liver or spleen. It was further graded according to classification devised by Organ Injury Scaling Committee of the American Association for the Surgery of Trauma. Demographic data of all the selected patients was also entered in pre-designed proforma.

All the data were entered in SPSS version 16 and analyzed. Mean and standard deviations were calculated for quantitative variables and frequencies and percentages were calculated for categorical data. Effect modifiers were controlled by stratification of data with reference to age and gender. Chi-square test was applied to see the effect of these on outcome variables. P-value ≤ 0.05 was taken as significant.

RESULTS:

Total 135 patients of blunt abdomen trauma were selected. Mean age of the patients was 29.41 ± 8.23 years. After performing laparotomy, injury of liver was seen in 48 (36%) patients followed by spleen injury in 65 (48%) patients and both liver and spleen injury was seen in 22 (16%) patients. (Fig. 1)

Regarding grades of liver and spleen injuries, grade-I liver injury was found in 18 (35%) patients followed by Grade-II in 13 (27.08%) patients, Grade-III in 6 (12.5%) patients, Grade-IV in 6 (12.5%) patients and Grade-V injures in 5 (10.42%) patients. (Fig. 2)

Grade-I spleen was seen in 25 (38.46%) patients, Grade-II in 17 (26.15%) patients, Grade-III in 14 (21.54%) patients, Grade-IV in 5 (7.69%) patients and Grade-V injuries were noted in 4 (6.15%) patients. (Fig. 3)

Selected patients were divided into two age groups i.e. age group 15-30 years and age group 31-45 years. Total 80 (59.26%) patients belonged to age group 15-30 years and 55 (40.74%) patients belonged to age group 31-45 years. In age group 15-30 years, liver was injured in 31 (38.75%) patients, spleen injury was noted in 36 (45%) patients and both liver and spleen was found injured in 13 (16.25%) patients. In age group 31-45 years, liver and spleen was found injured in 17 (30.91%) and 29 (52.73%) patients and both spleen and liver injury

was noted in 9 (16.36%) patients. Statistically insignificant association between organ injury and age group was noted with p value 0.615. (Table 1)

Male patients were 101 (74.81%) and liver was injured in 35 (34.65%) patients, spleen was injured in 47 (46.53%) patients and both liver and spleen was injured in 19 (18.11%) patients. Total 34 (25.19%) patients were female and liver and spleen injury was noted in 13 (38.24%) patients and 18 (52.94%) patients and both liver and spleen was found injured in 3 (8.82%) patients. Statistically insignificant association between gender and organ injury was noted with p value 0.392. (Table 2)

Fig. Frequency of organs injured

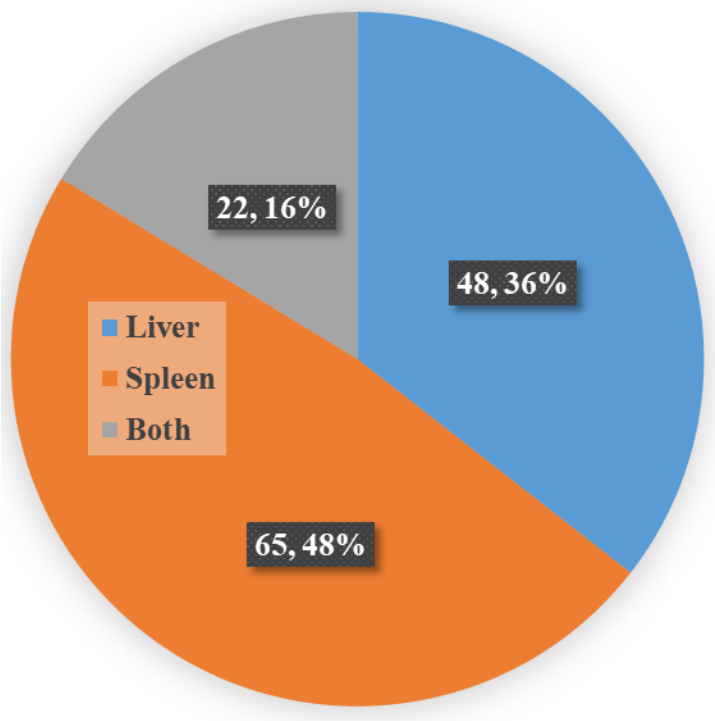

Fig. 1
Grades of liver injury

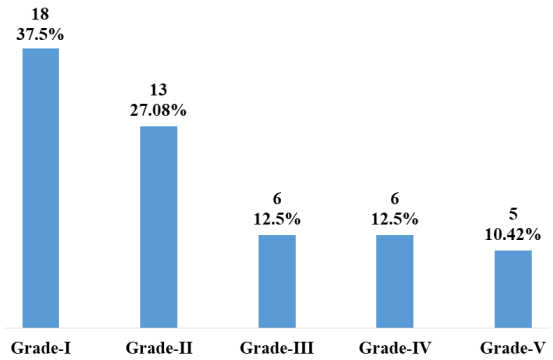

Figure 2
Grades of Spleen Injury

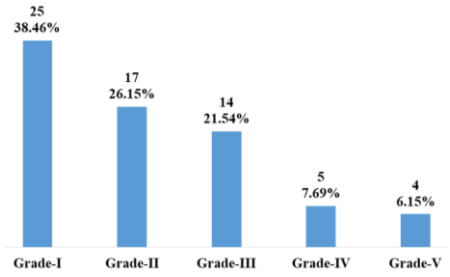

Table 1: Stratification of organ injury for age group

Age group	Organ injured			Total	P value
	Liver	Spleen	Both		
15-30	31 (38.75)	36 (45)	13 (16.25)	80 (59.26)	0.615
31-45	17 (30.91)	29 (52.73)	9 (16.36)	55 (40.74)	
Total	48 (36)	65 (48)	22 (16)	135	

Table 2: Stratification of organ injury for gender

Gender	Organ injured			Total	P value
	Liver	Spleen	Both		
Male	35 (34.65)	47 (46.53)	19 (18.11)	101 (74.81)	0.392
Female	13 (38.24)	18 (52.94)	3 (8.82)	34 (25.19)	
Total	48 (36)	65 (48)	22 (16)	135	

DISCUSSION:

The grievously injured victims require prompt enlightened care to avoid catastrophic end results. Deaths are occurring every day, in many different settings, from injuries to the upper abdomen and lower rib cage that produce damage to the liver, spleen, and pancreas.[9] The location and severity of the blow and the position of the victim when injured determine which combination of organs is affected.[10] These are life-threatening injuries. The stakes are high for the patient, and the demands on the surgical team are great. It is necessary that the early recognition and effective management of these injurious are essential for the survival and prevention of farreaching complications.[11]

In present study mean age of the patients was 29.41 ± 8.23 years. After performing laparotomy, injury of liver was seen in 48 (36%) patients followed by spleen injury in 65 (48%) patients and both liver and spleen injury was seen in 22 (16%) patients. Arumugam et al[12] reported mean age of patients of blunt abdominal trauma as 30.6 ± 13 which is

comparable with our findings. In same study, liver and spleen injury was fond in 36% and 32% patients which is also comparable with our findings. In another study by Afifi et al[13] blunt liver injury accounted for 38% of the total blunt abdominal trauma cases with a mean age of 31 ± 13 years. Liver injury grade II (44.7%) was most common followed by grade I (28.8%), grade III (19.1%), grade IV (7.0%) and grade V (0.4%). In our study, grade-I liver injury was found in 18 (35%) patients followed by Grade-II in 13 (27.08%) patients, Grade-III in 6 (12.5%) patients, Grade-IV in 6 (12.5%) patients and Grade-V injures in 5 (10.42%) patients. Total 22.7% liver injuries were reported by Hussain et al[14] and 15% by Hoyt et al.[15] Aziz et al[16] included 41 (82%) male and 9 (18%) female patients with ratio of 5.4:1 respectively. There were 15 (30%) patients who suffered from hepatic injuries. Thirteen patients (26%) had splenic injuries which is also in agreement with our study. In our study male patients were 101 (74.81%) and liver was injured in 35 (34.65%) patients, spleen was injured in 47 (46.53%) patients and both liver and spleen was injured in 19 (18.11%) patients. Total 34 (25.19%) patients were female and liver and spleen injury was noted in 13 (38.24%) patients and 18 (52.94%) patients and both liver and spleen was found injured in 3 (8.82%) patients. Statistically insignificant association between gender and organ injury was noted with p value 0.392. In study of Baygeldi et al,[17] 109 patients were followed up and treated due to isolated solid organ injury following abdominal trauma. There were 81 males (74.3%) and 28 females (25.7%). When evaluating 69 liver injuries scaled by CT the following was detected: 14 (20.3%) of grade I, 32 (46.4%) of grade II, 22 (31.8%) of grade III, and 1 (1.5%) of grade IV. In 63 spleen injuries scaled by CT the following was present: grade I in 21 (33.3%), grade II in 27 (42.9%), grade III in 11 (17.5%), and grade IV in 4 (6.3%). In our study Grade-I spleen was seen in 25 (38.46%) patients, Grade-II in 17 (26.15%) patients, Grade-III in 14 (21.54%) patients, Grade-IV in 5 (7.69%) patients and Grade-V injuries were noted in 4 (6.15%) patients.

CONCLUSIONS:

Results of present study showed that spleen injures were most common as compared to liver injures in cases of blunt abdominal trauma. Age group 15-30 years was the most affected age group. Male are more victims as compare to female.

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