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Karın travmasına bağlı ameliyat edilen hastalarda karaciğer yaralanması ve karaciğer transaminaz düzeyleri arasında bir ilişki var mıdır?

Is there a relation between liver transaminases levels and liver injury due to abdominal trauma of patients underwent operation?

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To the Editor,

Liver is the most often injured organ due to abdominal trauma with its big dimension and its fixed position (1). In recent years the management of liver injury all over the world is going to include conservative management and thus aimed to avoid from any unnecessary surgery. Patients with grade 1 and 2 liver injury usually managed with resuscitation and observations without any need for surgery (2).

Serum liver enzyme levels are measured as the part of the initial laboratory evaluation to all trauma patients. For the diagnosis of liver injury in adults, the potential value of serum liver enzymes was less in literature. Therefore, the purpose of this study is to determine whether there is an association between liver injury and liver ezymes; aspartate aminotransferase (AST), alanine aminotransferase (ALT) and lactate dehydrogenase (LDH) at admission in patients who were operated due to liver injury.

MATERIALS AND METHODS

Patients and Study Design

This retrospective clinical study was performed on patients who were admitted to Emergency Department and operated by General Surgery Department of Antalya Education and Research Hospital between January 2008 and October 2014. 90 patients were included in this study. 90 instable patients with common symptoms of the acute abdomen underwent laparotomy for liver trauma. Patients with cardiac arrest, gunshot wounds and those with chronic liver disease due to hepatitis were excluded from the study. Demographic characteristics of the patients, Hgb, WBC, AST, ALT, LDH levels, the operation results, the grade of injury and the presence of concomitant organ injury was scanned from a retrospective data record. Liver injury was graded according to the American Association for the Surgery of Trauma Organ Injury Scale (3). Patients were divided into two groups according to their liver injury, first group; grade 2 and below, second group; grade 3 and above.

Statistical analysis

Statistical analysis was performed with SPSS 15.0 (Statistical Package for Social Sciences; SPSS Inc, Chicago, Illinois, USA) for Windows and Microsoft Office Excel 2010 version for evaluating the data. For descriptive analysis of the data, numerical variables and minimum maximum values were expressed as means±standard deviation (SD) and for categorical variables number and percentage rates were used. In comparison of the categorical data the χ^2 test or Fisher exact tests were used. The Student *t* test was used to compare the mean values between groups for continuous variables showing a parametric

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distribution, the Mann-Whitney *U* test was used to compare the median values among groups for nonparametric distribution. The *p* value <0.05 was considered as statistically significant.

RESULTS

Between January 2008 and October 2014, 90 patients admitted to the emergency department presenting with liver injury were underwent surgery in Antalya Education and Research Hospital General Surgery service. 70 of 90 patients were males (77.7%) and 20 were female (23.3%). Average age was 41.8 ± 16.9 (18-81) years old. The characteristics of the patients are shown in Table 1.

The cause of injury was due to blunt trauma in 37 patients (41.1%) and 53 patients (58.9%) had stab wounds. According to the features of intra-abdominal injury 48 patients had (53.3%) accompanying abdominal injury, while 42 patients (46.7%) had isolated liver injury.

In terms of associated injuries 15 spleen, 5 small intestine, 4 diaphragm, 1 colon and 1 lung injury was accompanied in Group 1. In Group 2 there was 21 spleen, 7 small intestine, 5 diaphragm, 2 colon and 1 lung injury. According to Organ Injury Scale of American Trauma Society in patients managed surgically, they had grade 1 injury in 27 patients (30.0%), grade 2 injury in 11 patients (12.2%), grade 3 injury in 32 patients (35.5%), grade 4 injury in 13 patients (14.4%) and grade 5 injury in 7 patients (7.7%). Liver injury and patients' admission hemoglobin, leukocyte count, AST, ALT and LDH results of group 2 were found as significantly higher (Table 2).

DISCUSSION

In blunt abdominal traumas liver is the most commonly injured intra-abdominal organ (4). Complex liver injuries were a difficult problem for clinicians and the mortality rate is up to 50%. However, grade 1 and 2 liver injury can usually be treated with conservative methods. These patients are closely monitored and injury in the liver returns to normal within 4 to 6 weeks. The patients with grade 3 and above liver injury were transferred to intensive care unit, should be kept under close monitoring and must be operated if necessary.

Serum AST and ALT levels are usually found as elevated in patients with blunt traumatic liver injury. In our study, as determined earlier in animal models and human studies after blunt liver trauma of this liver enzyme levels to be increased within a few hours and was observed to be associated with the severity of injury (5,6). The few studies conducted to date, transaminases (ALT and AST) levels were associated with liver injury after abdominal trauma (2,5,7-9).

Tan et al reported that patients with 2 times the normal ALT and AST levels should be considered as a major hepatic trauma and patients with normal ALT, AST and LDH levels needed to move away from any major liver injuries (10). Tian et al have suggested that in patients with blunt abdominal trauma, abnormal transaminase levels were associated with liver injury. In patients with liver injury the levels of ALT>57U/L and AST>113U/L were strongly associated with major liver injuries and imaging modalities and need of close attention was reported (11). In our study, in grades 1 and 2 liver injury the levels of AST and ALT were detected as 154.6±96.7U/L, 84.3±58.2U/L, retrospectively.

LDH is a cytoplasmic enzyme that is expressed in virtually in all major organ systems. It passes to peripheral blood from cell death or injury caused by any ischemia. Therefore, serum LDH level is

Table 1: Demographic characteristics of the patients according to groups			
	Group 1 n=38	**Group 2 n=52**	***p***
Age (years), median (range)	42 (21-81)	38 (18-78)	0.569[&]
Gender (Female / Male)	9/29	11/41	0.097[&]
Liver injury **sharp** **blunt**	23 15	30 22	0.062[&]
Associated injuries **spleen** **Intestine** **diaphragm** **column** **lung**	15 5 4 1 1	21 7 5 2 1	0.257[&]
Grade of the injury **grade 1** **grade 2** **grade 3** **grade 4** **grade 5**	 27 11	 32 13 7	
Hospital Stay (days) **Median (range)**	14.6 ±17.3 10 (4-74)	17.9 ±21.1 15 (7-65)	0.178[*]
[&] χ^2 test or Fisher exact tests were used, * Mann-Whitney *U* test was used			

Table 2: Laboratory results of patients according to groups			
	Group 1	**Group 2**	***p***
Hgb (g/dL) **Median (range)**	14,4±2,3 14.3 (7.8-16.6)	12,3±1,9 12.8 (8.2-17.1)	0.806[#]
WBC (10^3/mm^3) **Median (range)**	12,3±1,9 10 700 (7400-23200)	10,9±3,5 10 500 (6200-27500)	0.523[*]
AST (U/L) **Median (range)**	154.6 ± 96.7 102 (32-781)	379.7 ± 285.7 354 (248-1552)	<0.001[*]
ALT (U/L) **Median (range)**	84.3 ± 58.2 77 (12-457)	247.5 ± 117.8 215 (135-1243)	<0.001*
LDH (U/L) **Median (range)**	375.4 ± 158.3 366 (98-917)	892.8 ± 453.9 802 (574-2723)	<0.001*
[#] The Student *t* test was used, * Mann-Whitney *U* test was used			

extremely sensitive, but nonspecific. In this study, we found that there is a relation between the LDH levels and severity of liver injury.

AST, ALT, LDH levels may be useful to predict the existence of a factor with liver injury. For the patient management, in the case of these enzymes were high patients must be taken to follow in the intensive care unit until if there is a need for any surgical procedure.

Weak points of our study are a condition that can cause elevated liver enzymes, whether accompanied by musculosceletal injury, being a retrospective study and the small number of patients. However, many prospective controlled studies with larger number of patients are needed.

CONCLUSIONS

As a result, at the initial evaluation of patients after abdominal trauma; determination of serum ALT, AST and LDH levels, in terms of their measurement convenience, low cost and quickest time of taking the results, and if found elevated levels of ALT, AST and LDH, we believe that liver injury was found to be much severe.

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