

# Role of Liver Function Enzymes in Diagnosis of Choledocholithiasis in Biliary Colic Patients

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**Abstract-** Liver functional tests due to inflammatory process which induced by cholecystitis might changed and some clinicians suggested that these changes might help us to stone prediction in common bile ducts and decrease hazards of performing ERCP and other invasive procedures. Present study was performed for assessment of role of liver functional test in diagnosis of common bile duct stone in patients with cholecystitis and help in their management. Present prospective study was performed between April 2010 and March 2011 on 350 patients who come to our hospital with cholecystitis or biliary colic diagnosis. Patients with cholecystitis diagnosis were underwent operation for removing gall bladder stone and retrograde cholangiopancreatography (ERCP) was performed for patients with suspicious to biliary colic and common bile duct (CBD) stones. Ultrasonography, Aspartate Aminotransferases (AST), Alanine Aminotransferases (ALT), Alkaline Phosphatase (ALP) and direct and total serum bilirubin were measured for all of participated patients. Mean of AST, ALT, ALP and total and direct bilirubin were had no significant differences between two study groups. In logistic regression analysis, after entering into the model only CBD diameter (OR:20;  $P=0.00$ ) and elevated serum level of ALT (OR:2;  $P=0.04$ ) were remained into the model and were known as independent predictor of cholelithiasis. Elevated level of liver enzymes had not main role in CBD diagnosis and ERCP had no to perform for suspicious CBD stone only with elevated liver enzyme and even with normal ultrasonography findings. Endosonography as non invasive procedure recommend for patients before ERCP.

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**Keywords:** Liver functional tests; Cholelithiasis; Common bile duct

## Introduction

Disorders of gall bladder are common and remain as one of the main patients' chief complaints that might lead to surgical interventions. For the example near to 10% of adult suffer from cholelithiasis in the Unites State and annually around 500,000 cholecystectomy operations had been performed. Previous studies reported that in 11-25% of patients, common bile duct stone was associated with gall bladder disorders (1-3).

In recent years we saw dramatically changes in management of patients with gall stone related disorders. Several modern and safe management techniques such as laparoscopic cholecystectomy, laparoscopic common bile duct exploration, magnetic resonance cholangiopancreatography (MRCP) and endoscopic retrograde cholangiopancreatography

(ERCP) had been suggested for management of patients with gall bladder stone related disorders (4).

Liver functional tests due to inflammatory process which induced by cholecystitis might changed and some clinicians suggested that these changes might help us to stone prediction in common bile ducts and decrease hazards of performing ERCP and other invasive procedures. Few studies assessed impacts of gall bladder stone related disorders on liver functional tests and reported varied and even controversial results (5-9).

We think that abnormal function liver tests were common in cholecystitis patients and in some of them might present underlying pathophysiological causes of clinical picture of patients. We also hypothesises that liver function tests can help us to better selection of patients who will benefit from preoperative ERCP to clear common bile duct. Thus present study was performed

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for assessment of role of liver functional test in diagnosis of common bile duct stone in patients with cholecystitis and help in their management.

### Patients and Methods

Present prospective study was performed between April 2010 and March 2011 in Shahid Sadoughi Hospital of Shahid Sadoughi University of medical sciences and health services. Shahid Sadoughi University of medical sciences and consent informs were taken from all of participants. Study population was all (n=350) patients who come to our hospital with cholecystitis or biliary colic diagnosis within the study period. Diagnosis in patients was according results of history taking, physical examination and ultrasonography of liver and gall bladder. Patients with cholecystitis diagnosis were underwent operation for removing gall bladder stone and retrograde cholangiopancreatography (ERCP) was performed for patients with suspicious to biliary colic and common bile duct (CBD) stones.

Participated patients were classified into the two groups: (1) patients with biliary colic stone and (2) patients without biliary colic stone. Ultrasonography, Aspartate Aminotransferases (AST), Alanine Aminotransferases (ALT), Alkaline Phosphatase (ALP) and direct and total serum bilirubin were measured for all of participated patients. We considered 40 mg/dl as for AST and ALT and 150 mg/dl for ALP and 2 mg/dl for bilirubin as high values. In ultrasonography CBD diameters more than five centimeters was considered as elevated diameter. We compared results of laboratory managements and ultrasonography between study participants for determining role of liver enzymes in prediction of biliary colic stones. We compared ALP situation into the two groups between patients with and without CBD stones to determination role of ALP in

CBD stone. As test in patients we considered ALP two times higher than normal value as abnormal values and this measurement was compared between two study groups.

### Statistical analysis

Data were entered into the SPSS 16.0 software for statistical analysis. We considered serum level of AST, ALT, ALP and bilirubin as qualitative variables and were compared between study groups with chi-square test. Logistic regression model was used for determining independent predictor of CB stones. We entered age, sex, serum level of AST, ALT, ALP and bilirubin and CBD diameters and covariance and CBD stones as dependent variable with enter model. All *P*-values less than 0.05 were assumed as significant results.

### Results

In the study period, 350 patients were included and mean of their age was 48.34±6.34 years and 174 (49.72%) patients were male. Mean of AST, ALT, ALP and total and direct bilirubin were had no significant differences between two study groups (Table 1).

Number of patients with elevated serum ALP level had no significant differences between patients with and without CBD stones in both study groups. In logistic regression analysis, after entering into the model only CBD diameter (OR:20; *P*=0.00) and elevated serum level of ALT (OR:2; *P*=0.04) were remained into the model and were known as independent predictor of cholelithiasis.

In comparing serum situation of ALP according to new cut-point (two times higher than normal) there is significant difference in number of patients with elevated ALP between study groups (*P*=0.00) (Table 2).

**Table 1.** Comparison of liver functional tests between patients with and without cholecystitis

Study variables	patients	With cholecystitis		Without cholecystitis		Total		P-value
		Number	Percent	Number	Percent	Number	Percent	
AST	Normal	26	14.44	154	85.56	180	100	0.42
	Elevated	31	18.24	139	81.76	170	100	
ALT	Normal	25	43.86	32	56.14	57	100	0.14
	Elevated	163	55.63	130	44.37	293	100	
Bilirubin	Normal	25	43.86	32	56.14	57	100	0.09
	Elevated	167	56.99	126	43.01	293	100	
ALP	Normal	6	10.53	51	89.47	57	100	0.23
	Elevated	53	18.09	240	81.91	293	100	

**Table 2.** Comparing normal and elevated level of ALP in study patients with and without cholecystitis

Cholecystitis	Normal		Elevated		Total	
	Number	Percent	Number	Percent	Number	Percent
Yes	9	3.69	48	45.28	57	16.28
No	235	96.31	58	54.72	293	83.72
Total	244	100	106	100	350	100

$P=0.00$

## Discussion

Present study was performed for assessment role of liver enzymes in prediction of CBD stones and if it possible reducing number of unnecessary invasive ERCP procedure. Study findings showed that liver enzymes had no significant difference between study groups. In patients with dilated CBD diameter, serum level of ALP had no significant difference between patients with or without CBD stones. On the literature, several studies with controversial results were performed for assessment value of liver enzymes measurements in patients with CBD stone. Peng *et al.* compared liver enzymes between acute and chronic cholecystitis patients and reported that there was no significant difference between them (10). Kaldor *et al.* reported determined predictability of liver enzymes in patients with cholecystitis who were undergone laparoscopy for cholecystectomy. He believed that liver enzymes were remind high even after laparoscopy and were not suitable tools for complication predictions between patients (11). Evaluating role of liver enzymes in prediction of extra liver obstruction in patients with delay diagnosis of CBD stone. He found that serum level of bilirubin was the best predictor CBD stenosis due to stone or malignancy (12). In our study serum level of bilirubin had higher none significant difference between two study groups. Periaera *et al.* was assessed power liver enzymes in prediction of CBD stone in 448 patients who suspicious for CBD stone. He advocated that liver enzymes were sensitive tests for diagnosis of CBD stones and were negative only in five percentages of patients (13). This study was against our results and this difference might be due to including only CBD suspicious patients. In the other hand we included all patients with cholecystitis. Meroni *et al.* in his study on 587 patients with laparoscopic cholecystectomy reported that only 8% of patients had abnormal values in liver enzymes measurements. They concluded endosonography before operation can decline unnecessary ERCP procedure (14). We purpose non invasive endosonography in our hospital for reducing unnecessary invasive ERCP.

Hayat *et al.* performed his study on 207 patients with hepatitis and reported that elevated ALP in compare with elevated ASP had more sensitive in diagnosis of CBD stone. He added in some cases only serum level of AST might elevate in the patients with hepatitis (15). In against Hayat *et al.* study, regression analysis in our study showed that ALT had more value than other liver enzymes in prediction of CBD stones. Parra *et al.* in his study on 151 patients underwent ERCP, found that none of studied factors such as liver enzymes and ultrasonography alone cannot suitable predictor of CBD stone (16). Shozowara *et al.* believed that we can reduce number of ERCP procedures with preoperative laparoscopy in patients with CBD stone specious. In our study ALP level with new cut-point (two times higher than normal) was significantly higher in patients with CBD stones. We purpose that next study will perform with ROC curve analysis for determining most serum level of ALP as cut-point for prediction of CBD stone. Our study had some limitations. Firstly we performed study only on patients with cholecystitis and it is better that we perform study on general population for better assessment of prediction of liver enzymes in CBD stones. Secondly, we performed our study in one clinical center, multicenter study and analysis in separated age and sex groups recommend for next studies. In conclusion, our study showed that elevated level of liver enzymes had not main role in CBD diagnosis and ERCP had no to perform for suspicious CBD stone only with elevated liver enzyme and even with normal ultrasonography findings. Endosonography as non invasive procedure recommend for patients before ERCP.

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