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Analysis of Liver Function Test in Common Bile Duct Stone: A Descriptive Cross Sectional Study

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ABSTRACT

Introduction

Liver function test (LFT) is a useful tool to differentiate between the obstructive and hepatocellular cause for biliary obstruction. Therefore this study was done to see the accuracy of LFT in predicting common bile duct (CBD) stones.

Methods

A descriptive cross sectional study was carried out on patient undergoing endoscopic retrograde cholangiopancreatography for CBD stones at Bharatpur Hospital from 2021 June 15 to 2022 October 15. Ethical clearance was taken from Institutional Review Committee Bharatpur Hospital. Non probability (convenient) sampling technique was used for data collection. Data was analyzed by using SPSS-18.

Results

Out of 95 patients higher aged female predominance was seen. The overall incidence of abnormal LFT in CBD stones was 85.3%. All the parameters of LFT were raised in majority of the cases of CBD stones and among these, SGOT was mostly increased (75.6%). In patients with ERCP findings of sludge in bile duct have increased total, direct and indirect bilirubin than in patient with CBD stone and this finding was found to be statistically significant. However, other liver parameters were comparable. Similarly, total, direct and indirect bilirubin, serum glutamic oxaloacetic transaminase (SGOT), serum glutamic pyruvic transaminase (SGPT) and alkaline phosphatase (ALP) were equally raised with both group of CBD stones with and without cholecystitis.

Conclusions

Liver function test was equally raised in both case of CBD stone with and without cholecystitis. Although ALP and total bilirubin represented the most reliable predictors in obstructive jaundice, SGOT might also be added tool to exclude choledocholithiasis.

Keywords: cholecystitis; common bile duct stones; liver function test;

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INTRODUCTION

The prevalence of common bile duct (CBD) stones is approximately 10-15% in patient with cholelithiasis.[1] However, the incidence of CBD stones is decreasing probably due to early diagnosis and treatment of patient with cholelithiasis using standard risk criteria.[2] The aim of this study was to evaluate prospectively a scoring system designed to improve the accuracy of CBD stone prediction before laparoscopic cholecystectomy. This is known clinical, biochemical and radiological risk factors for CBD stones were analysed retrospectively in 233 patients. The presence (n = 77 CBD stone is one the common cause of biliary obstruction and liver function test (LFT) helps to differentiate between biliary obstructive and hepatocellular process.[3] LFT includes total serum bilirubin, direct and indirect bilirubin, aminotransferases, alkaline phosphatase (ALP), albumin and prothrombin time (PT). Patients with hepatocellular disease have disproportionate rise in aminotransferases compared to ALP, whereas in case of cholestatic pathology there will be marked raise in ALP in relation to aminotransferase. A low albumin suggest chronic disease like cirrhosis and normal albumin directs toward acute condition like viral hepatitis and CBD stones. Similarly, abnormal PT reflects either Vitamin K deficiency or hepatocellular injury and no improvement of PT even after parenteral supplementation of Vitamin K directs towards hepatocellular pathology.[4] The evaluation of different components of LFT usually indicates whether a jaundiced patient has a hepatocellular or cholestatic disease. Hence this study was conducted to see the correlation of LFT in CBD stone cases.

METHODS

A retrospective cross sectional study was conducted in Bharatpur Hospital who were posted for Endoscopic Retrograde Cholangiopancreatography (ERCP) for CBD stone from 15th June 2021 to 15th October 2022. Ethical clearance was taken from Institutional Review Committee Bharatpur Hospital (Ref. No.079/80-013). The sample size was calculated using this formula (Where, n= minimum required sample size, the Z= 1.96 at 95% Confidence Interval (CI), p= prevalence of CBD stones = 4.04%,[5] q= 1-p = 95.96%, e = margin of error = 5%. The minimum sample size is 60. However, there were total of 95 patient analyzed in this study who underwent ERCP for radiologically diagnosed CBD Stone. Radiologically diagnosed cases of CBD stone (Ultrasound or Magnetic Resonance Cholangiopancreaticography) with age more than 19 were included in this study. Suspected case of CBD stones without radiological evidence were excluded from the study. Data was analyzed by using SPSS version 18. Continuous variables were presented as mean ± Standard Deviation while for categorical variables were presented as frequencies and percentages. Independent t-test was used to compare mean between two continuous variables after checking the normality of the data. P- value< 0.05 was considered statistically significant.

RESULTS

There were a total of 95 patients who underwent ERCP with radiological diagnosis of CBD stone. During the procedure, CBD stones were found in 90 patients and in 5 patients CBD stones were not present but sludge was present with positive predictive value 94.73%. Among 90 patients with CBD stone, 28.9% patients (26 patients) had cholecystitis and 71.1 % (64 patients) had no cholecystitis (Table 1).

Table 1. Sociodemographic and clinical parameters of patients (n = 90).	
Variables	**Frequency (%)**
Age (years)	
<40	26(28.9)
≥40	64(71.1)
Mean±SD (years)	52.61±16.91
Gender	
Female	68(75.6)
Male	22(24.4)
Female:Male	01:03.1
Diagnosis	
CBD stone without cholecystitis	64(71.1)
CBD stone with cholecystitis	26(28.9)
Stone	**Frequency (%)**
Present	90(94.7)
Sludge	5(5.3)

Liver functions were assessed in terms of total bilirubin, direct and indirect bilirubin, serum glutamic oxaloacetic transaminase (SGOT), serum glutamic pyruvic transaminase (SGPT) and ALP. Patients with ERCP findings of sludge in bile duct have increased total, direct and indirect bilirubin than in patient with CBD stone and this finding was found to be statistically significant. However, SGOP, SGPT and ALP were comparable (Table 2).

The overall incidence of abnormal LFT in CBD stones was 85.3%. All the parameters of LFT were raised in majority of the cases of CBD stones and among these, SGOT was mostly increased(75.6%).

Similarly, Liver enzymes were analyzed between patients with CBD with cholecystitis and without cholecystitis. Total, direct and indirect bilirubin, SGOT, SGPT, ALP were comparable (Table 3).

Table 2. Comparison of liver function in patients with stone removal and sludge removal (n = 90).			
Variables	**Stone removal**	**Sludge removal**	**p-value**
Total bilirubin	2.59±0.34	8.99±1.97	<0.001
Direct	1.78±0.31	5.59±0.49	<0.001
Indirect	0.85±0.33	3.39±0.42	0.005
SGOT	151.01±15.7	150.13±17.2	0.98000
SGPT	253±14.5	152±12.5	0.48000
ALP	455.18±16.2	418.92±13.7	0.89000

Table 3. Comparison of liver function in patients with or without Cholecystitis (n = 90).			
Variables	**OT**		**p-value**
	CBD stone with Cholecystitis	**CBD stone without Cholecystitis**	
Total bilirubin	4.31±0.53	4.63±0.66	0.98
Direct	2.31±0.96	3.10±0.93	0.40
Indirect	2±0.84	1.25±0.52	0.39
SGOT	152.33±16.8	149±15.6	0.94
SGPT	155.82±16.4	262±17.5	0.42
ALP	455.79±12.8	407.60±14.6	0.13

DISCUSSION

In our study, out of 95 patients who were radiologically diagnosed with CBD stone only 90 patients were found to have CBD stone

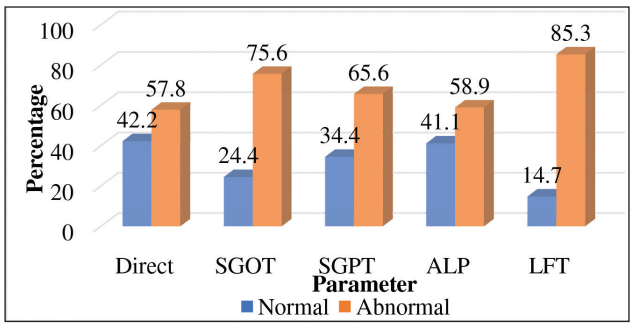

Figure 1. Over all LFT Result.

during ERCP. The positive predictive value of radiological diagnosis was found to be 94.7% which is similar to the study done by Mandelia and colleagues where their positive predictive value for ultrasound is 76.47% and MRCP is 95%.[6] Among CBD stones patients 71.1% were above 40 years of age group and 75.6% were female similar to findings in study by Zgheib H etal.[7] Similar demographic pattern was also seen by Song Y et al. and Hosseini SV et alfrom China and Iran. Although there was a marked geographical variation in prevalence of biliary stone disease, it was more common in female and with increasing age of people.[8,9] LFT is considered as moderate predictor for suspected case of choldecholithiasis.[10,11] We found liver enzymeswere deranged in both cases of CBD stones and patient with sludge only.In an animal module study done by Harran N, they had also found significantly higher level of aminotransferase, ALP and total bilirubin in cases of biliary sludge.[12] The incidence of abnormal LFT in CBD stone was 85.3%. Liver enzymes summit in most of the CBD stone cases however in maximum case SGOT was increased followed by SGPT, ALP and direct bilirubin respectively. Eventhough, dictum of ALP rises in obstructive holds true, SGOT can also rise equally or more then ALP in case of obstructive jaundice as seen in other studies by Hayat JO et al and Isogai M and colleagues.[13] Rather than aspartate transaminase (AST).[14] In cases of CBD stone with or without cholecystitis, liver enzymes were increased in both groups and were comparable. This is in contrast to Ahn KS et al where LFT was significantly raised in cholecystitis with CBD stone group compared to CBD stones without cholecystitis.[1] However, in a study by Padda MS et al, LFT was abnormal whether cholecystitis was associated or not associated with CBD stone.[15]Likewise in population base cohort study by Videhult P et al, they concluded liver enzymes are not reliable predictors as false positive and negative values were common so other mechanism must be involved.[16] Similarly Zare M et al studied in biliary colic patients and found no major role of abnormal LFT in diagnosing CBD stones.[17] Systemic review and Meta analysis done by Chen H et al also found abnormal LFT in CBD stones. However, in setting of acute cholecystitis Gamma-glutamlytransferase was detected most specific and sensitive markersimilar to studydone by Peng WK.[18,19]

CONCLUSION

The prevalence of CBD stone was more in female and higher age group people in our study whereas, LFT was deranged in majority of cases with no significant difference between CBD stones with or without cholecystitis. We also observed abnormal LFT in cases of biliary sludge and there was profound rise in SGOT than ALP in CBD stone. However, this is a single center study and the prevalence seen in this study cannot be generalized to the whole country population.

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