ALTERATION OF LIVER FUNCTION TESTS IN EXTRAHEPATIC BILIARY LITHIASIS: EXPERIENCE IN A TEACHING HOSPITAL OF ASSAM

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ABSTRACT

INTRODUCTION

Basic liver function test is a part of preoperative evaluation of biliary lithiasis. It is seen in many worldwide reports about significant alterations of liver function both in pre and post-operative period. As a unique geographical placement and different dietary habit adopted by North East Indian population, this present study will stress upon the significance of alteration of liver function in biliary lithiasis cases.

MATERIALS AND METHODS

A total of 400 patients of extrahepatic biliary lithiasis, subjected to either open or laparoscopic procedure, are prospectively analysed by examining LFTs pre-operatively, the 1st day after surgery and on completion of 4 weeks in a tertiary teaching hospital of North East India.

RESULTS

Alteration in AST, ALT, GGT were seen with minor changes in serum bilirubin and proteins on 1st post-operative day noticed in two-third of the patients. After 4 weeks, these tests came down to almost their normal values.

CONCLUSION

Though mild-to-moderate alterations of LFTs are seen during initial period, after 4 weeks, values came to their base level.

KEYWORDS

Extrahepatic Biliary Lithiasis, Liver Function Test, Laparoscopy, Cholecystectomy.

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INTRODUCTION: Biliary lithiasis is one of the commonest upper abdominal conditions causing general ill health & reduced physical activity. The extra hepatic biliary tract diseases constitute about one third of all ailments in India. Chronic Cholecystitis is the principal disease among them (80%); mostly due to gallstones (95%). "Diseases of the gall bladder is rare unless it is associated with stones" Sheila Sherlock.[1] The occurrence of gallstone was recorded since Egyptian civilisation. The sensitivity of LFTs in detecting obstructions in bile flow has been found to be greater than 90%.[2] Any increase in their values is always a matter of concern for clinicians and warrants further investigation.

AST and ALT are considered a measure of hepatocellular function. ALP level increases in obstructive biliopathy. Bilirubin levels can elevate in cases of haemolysis or bile outflow obstruction. A very high level of transaminases can also point towards common bile duct obstruction. Post-operative persistent increasing trend of liver function tests commonly raise suspicion for underlying bile duct injury.

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A significant number of patients with biliary tract diseases showed abnormal liver function tests.[3,4] Though alteration is more in obstructive biliary lithiasis, non-obstructive diseases like acute and chronic cholelithiasis with stone, choledochal cyst or non-advanced carcinoma gall bladder with stones cases too are found to have some amount of LFT alterations both pre and post-operative period.[5,6] Geographically and from dietary habit, North East India is significantly different from rest of the country. Here people mostly take bland boiled food containing lots of red meat and animal proteins.[7] Even then, the present study was carried out in this tertiary centre to compare the findings.

METHOD AND MATERIALS: The present work is based on randomised sampling of 400 cases with prediagnosed extrahepatic biliary stone diseases. Aim is to study the LFT alteration in different extrahepatic biliary lithiasis in this part of the country and to study the hepatic functions as a guide for pre & post-operative management of extrahepatic lithiasis. The cases of this present study are screened out by USG & MRCP following thorough clinical examination and randomly picked up 400 cases. Inclusion criteria are 18-70 years' age group of both sexes and those subjected to operation. Non-operated, comorbid conditions like cirrhosis, recent history of hepatitis, alcoholics and extreme-age patients are excluded from this study.

Under LFT–serum bilirubin & its fraction, AST, ALT, Alkaline phosphatase, Serum protein & its fraction, Prothrombin time INR, Gamma-glutamyl transferase are estimated in a govt. standardised laboratory. Both laparoscopic & open procedures are included. LFT is checked preoperatively and Day 1 & 4 weeks postoperatively.

RESULTS: Out of 400 cases, 296 were females and 104 were males. Most of the patients belong to 18 to 40 years of age group with a median age of 29 years. Though laparoscopy is the gold standard for biliary surgery, 248 patients either opted themselves or planned preoperatively for open surgery. 28 cases of laparoscopy converted to open surgery also included in this group, (6.9%).

[Table 1] In the present study, raised ALP, AST, ALT and GGT are mostly found in obstructive biliary lithiasis like choledocholithiasis, choledochal cyst with impacted stone. Out of 96 cases of choledocholithiasis, 24 cases were with near normal LFTs because of small floating calculi in CBD. In contrary, 62 patients with acute cholecystitis were observed to have elevated AST, ALT as well as ALP level. Increased level of serum bilirubin was found in 12 cases of acute cholecystitis. [Table 2] [Figure: 1-6]. Liver Function Tests are repeated after 4 weeks on follow-up. The cases operated by laparoscopy have shown more alteration of LFT than open approach. Obstructive biliary lithiasis took longer period for normalisation of LFTs. [Table 3].

	Acute Cholecystitis		Chronic Cholecystitis		Choledocholithiasis		Carcinoma Gallbladder		Choledochal cyst	
Age Group	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
10-20	0	1	0	20	0	0	0	0	0	0
21-30	2	3	12	78	4	21	0	0	0	0
31-40	2	19	16	53	12	37	0	0	0	2
41-50	1	10	13	38	6	31	0	8	0	1
51-60	1	4	3	6	2	4	2	2	0	0
61-70	0	2	2	4	0	3	0	0	0	0

Table 1: No. of Patients of Extra Hepatic Biliary Lithiasis According to Age Group

Sl. No.	LFT	Acute Cholecystitis	Chronic Cholecystitis	Choledocholithiasis	Carcinoma Gall Bladder	Choledochal Cyst
1	S. Bilirubin	35%	23%	79%	40%	22%
2	AST	17%	13%	22%	29%	17%
3	ALT	27%	11%	18%	19%	27%
4	ALP	22%	27%	79%	67%	40%
5	S. Albumin	5%	7%	39%	82%	46%
6	PT INR	-	-	20%	34%	12%
7	GGT	2%	7%	12%	33%	12%

Table 2: Pre-operative altered Liver Function Tests in different Extra Hepatic Biliary Lithiasis

	Acute Cholecystitis		Chronic Cholecystitis		Choledocholithiasis		Carcinoma Gallbladder		Choledochal Cyst	
LFT	**Lap**	**Open**	**Lap**	**Open**	**Lap**	**Open**	**Lap**	**Open**	**Lap**	**Open**
S. Bilirubin	22%	13%	12%	11%	50%	29%	31%	9%	-	22%
AST	10%	7%	9%	4%	12%	10%	19%	10%	-	17%
ALT	17%	10%	9%	2%	14%	4%	14%	5%	-	27%
ALP	14%	8%	18%	9%	52%	27%	54%	13%	-	40%
S. Albumin	3%	2%	2%	5%	22%	17%	60%	22%	-	46%
PT INR	-	-	-	-	14%	6%	22%	12%	-	12%
GGT	2%	-	2%	5%	3%	9%	15%	8%	-	12%

Table 3: Post-operative Day 1 Altered Liver Function Tests in different Extra Hepatic Biliary Lithiasis

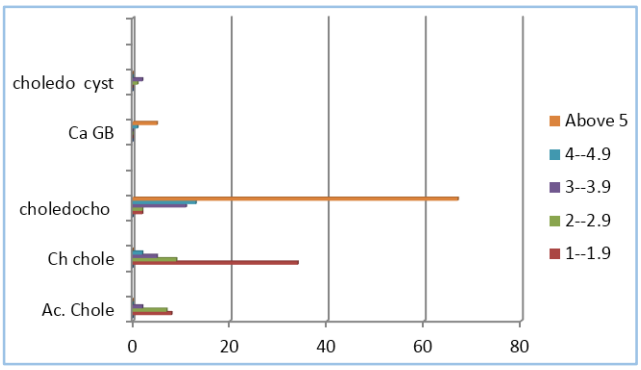

Fig. 1: Range of Alteration of S. Bilirubin in Different Biliary Lithiasis

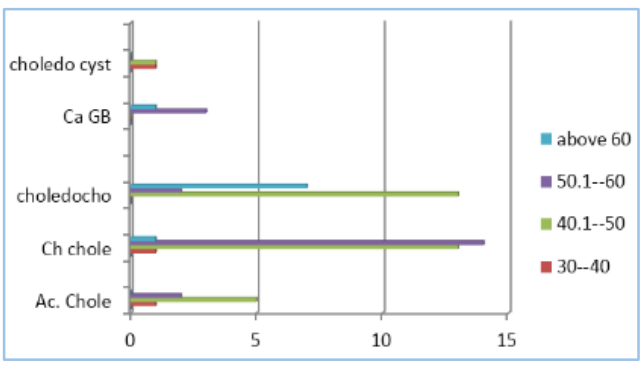

Fig. 2: Range of Alteration of AST in Different Biliary Lithiasis

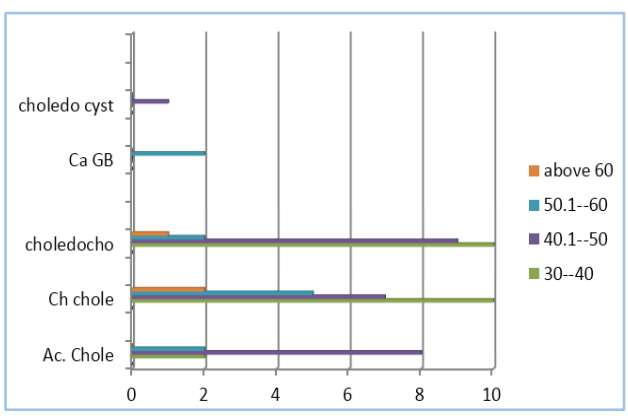

Fig. 3: Range of Alteration of ALT in Different Biliary Lithiasis

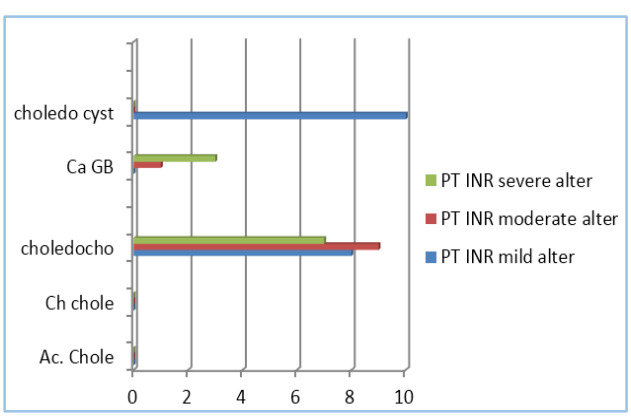

Fig. 4: Range of Alteration of PT INR in Different Biliary Lithiasis

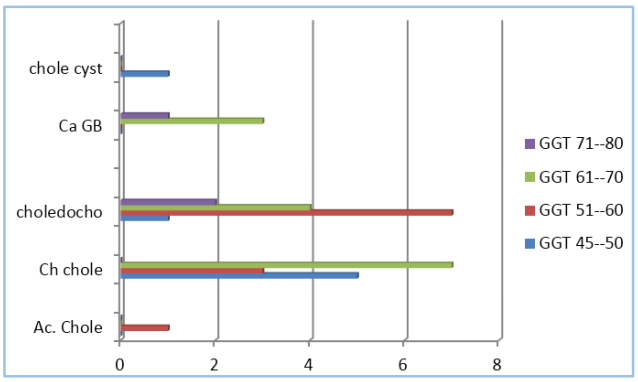

Fig. 5: Range of Alteration of GGT in Different Biliary Lithiasis

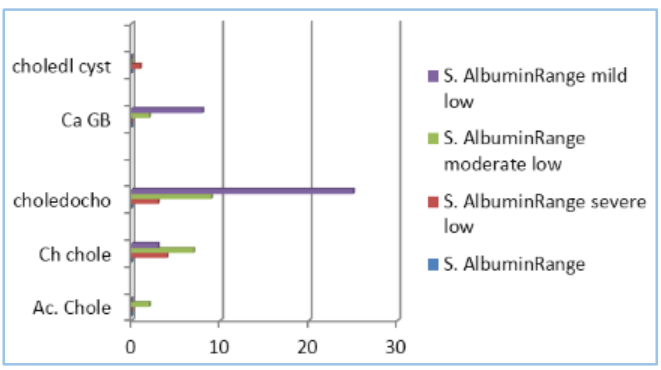

Fig. 6: Range of Alteration of S. Albumin in Biliary Lithiasis

DISCUSSION: Liver function tests are considered to be a baseline investigation to monitor hepatocyte activities as well as their wellbeing.[8] It is directly related to hepatocyte injuries. On the other hand, LFT alteration is also found in extrahepatic biliary lithiasis cases, like choledocholithiasis, acute or chronic cholecystitis, CA GB or choledochal cyst.[8] Any elevated value higher than upper normal reference range is considered to be altered LFT except albumin level. Present study findings are comparable to other observations. Preoperative alterations in some cases are may be due to dietary habit or unexplained, which is to be further evaluated. Extrahepatic biliary lithiasis is a common ailment presented to surgical departments.

Though laparoscopy is the gold standard for this problem, due to lack of proper surgical expertise, patient's misconception regarding the procedure, in this series, more no of patients are dealt with open method. The degree of alteration of individual liver enzyme varied from patient to patient. An elevated ALP is possibly the most sensitive and specific indicator of hepatocyte injury as well as biliary lithiasis of all kinds. In absence of clinical jaundice and radiological evidence, CBD calculi of obstructive type, LFTs are near normal.

Level of AST and ALT may be elevated with strenuous exercise.[9] Hospital admission has been observed to induce a 5% in AST and a 17.5% increase in ALT level.[9] It has been reported that up to 10% of patients with unexplained increase in AST, ALT actually have underlying celiac disease and mild alteration in these enzyme levels may be Celiac Iceberg.[10] Varying degrees of ALP alteration in patients with IBS is also noted.[11]

Disturbances in liver enzymes after laparoscopic cholecystectomy was first observed by Halvey et al in 1994.[12] The possible explanations included increased intra-abdominal pressure, squeeze pressure effect on liver, excess use of diathermy, pulling on the gall bladder, or passage of microcalculi into the bile duct. Low pneumoperitoneum pressure was associated with fewer adverse effects on liver function.[4] Pneumoperitoneum pressure impedes portal circulation and reduces portal flow up to 50%, which may cause depression of the hepatic reticuloendothelial system.[4,13] The degree and rate of enzyme alteration may provide minor and non-specific clues to diagnosis, but the presence of symptoms and positive history with particular emphasis on comorbid condition may provide fundamental clues. Drug-induced liver injury may present with a cholestatic pattern (preferentially increase in ALP or ALT/ALP is <2), may be accompanied by increased bilirubin level. Common drugs are antihypertensive, anaesthetic medications and hormones.[14]

Postoperatively all categories of patients showed liver function tests almost within normal range. The obstructive biliary cases took longer time period for the same. Postoperative periods were almost uneventful except 7 cases which suffered from wound infection, mild bile leakage, etc. which were managed satisfactorily.

CONCLUSION: Altered Liver Function Tests means hepatocellular dysfunction. Any rise in ALP and Bilirubin suggests to biliary outflow obstruction. Mild-to-moderate elevations in hepatocellular enzymes can be without any deleterious effect. In absence of clinical signs, this geographically different area of India also shows almost comparable observations regarding Liver Function Tests.

REFERENCES

1. Sherlock Sheila. Diseases of the Liver and Biliary System. National Institute of health 14th edition 2010;37(43):22-24.
2. Bivins BA, Meeker WR, Griffen WO. Importance of histologic classification of carcinoma of the gallbladder. Am Journal of Surgery 1975;41(3):121-125.
3. Tan M, Xu FF, Peng JS, et al. Changes in the level of serum liver enzymes after surgery. World J Gastroenterol 2003;9(2):364-367.
4. Hasukic S. Postoperative changes in liver function tests: randomised comparison of low and high pressure laparoscopic cholecystectomy. Surg Endosc 2005;19(11):1451-1455.
5. Marino M, Giraudo G, Festa V. Alterations in hepatic function during laparoscopic surgery, an experimental study. Surg Endosc 1998;12(7):968-972.
6. Jarvinen H. Abnormal liver function tests in acute cholecystitis: the predicting of common duct stones. Ann Clin Res 1978;10(6):323-327.
7. Colleen Taylor Sen. Food culture in India. Greenwood publishing group 2004;P 94. ISBN 978-0-313-32487-1. Retrieved 28 June 2012.
8. Dufour DR, Lott JA, Nolt FS, et al. Diagnosis and monitoring of hepatic injury. II. Recommendations for use of laboratory tests in screening, diagnosis, and monitoring. Clin Chem 2000;46(12):2027-2049.
9. Narjes H, Nehmiz G. Effect of hospitalization on liver enzymes in healthy subjects. Eur J Clin Pharmacol 2000;56(4):329-333.
10. Abdo A, Meddings J, Swain M. Liver abnormalities in celiac disease. Clin Gasterol Hepatol 2004;2(2):107-112.
11. Ponsioen CI, Tytgal GN. Primary sclerosing cholangitis: a clinical review. Am J Gastrol 1998;93(4):515-523.
12. Halevy A, Gold –Deutch R, Negri M, et al. Are elevated liver enzymes and bilirubin levels significant after laparoscopic cholecystectomy in absence of bile duct injury? Ann Surg 1994;219(4):362-364.
13. Jakimowicz J, Stultiens G, Smulders F. Laparoscopic insufflation of abdomen reduces portal venous flow. Surg Endosc 1998;12(2):129-132.
14. Vanderlinde RE. Review of pyridoxal phosphate and transaminase in liver disease. Ann Clin Lab Sci 1968;16(2):79-93.