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Research article

EVALUATION OF LFT AND SERUM IRON IN OBSTRUCTIVE JAUNDICE DUE TO CHOLEDOCHOLITHIASIS AND CARCINOMA HEAD OF PANCREAS

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ABSTRACT: BACKGROUND: Obstructive jaundice is caused due to obstruction to the biliary flow via the biliary system. The most common benign condition causing this obstruction is Choledocholithiasis and the most common malignant cause is Carcinoma head of pancreas. MATERIALS AND METHODS: 40 cases of Choledocholithiasis and 40 cases of Carcinoma head of pancreas were included in this study. Liver function tests and serum iron and its related parameters were estimated in both the groups and were statistically compared. RESULTS: A statistically significant increase in Total bilirubin, Direct bilirubin, Alkaline phosphatase and 5'Nucleotidase was seen among Group 2 cases when compared to Group 1 cases. Serum iron levels showed a statistically significant decrease among Group 2 cases when compared to Group 1 cases. DISCUSSION: Early evaluation of obstructive jaundice to establish the etiology is crucial to avoid secondary pathological changes. Liver function tests provide a simple and non-invasive means of diagnosis. In this study it is observed that the magnitude of alteration of LFT is higher in Carcinoma head of pancreas when compared to Choledocholithiasis thus differentiating the two. Serum iron levels are elevated in hepatocellular injury and as there is hepatocellular injury in obstructive jaundice, serum iron levels were estimated in both the groups of patients. However serum iron levels were within the normal range but the mean value was lower in the group 2 compared to group 1 which demands further study in this field.

Keywords : Carcinoma head of pancreas, Choledocholithiasis, Obstructive jaundice, LFT

INTRODUCTION

Obstructive Jaundice is often a clinical manifestation of the disease of extrahepatic biliary system where bile fails to reach the intestine, due to physical obstruction of the biliary tract (J.O. HAYAT et al.,2005). Choledocholithiasis is the commonest benign cause and Carcinoma head of pancreas is the commonest malignancy (Khurram Siddique et al.,2008). Early evaluation to establish the etiology of the cholestasis is crucial to avoid secondary pathological changes (C D BriggsM Peterson., 2007). In liver diseases, the signs and symptoms become evident only after a significant portion of the liver is damaged. For this reason, clinicians are trying to find ways for the proper diagnosis of liver diseases. LFT's provide simple, easily assessable noninvasive means of detecting and monitoring abnormalities of liver function and cellular integrity (Shaha Ranajit Kumar et al.,2004; Sherlock. D. S,1981). Patients with chronic liver disease have a tendency to accumulate an excessive amount of iron in the liver parenchyma (Thomas R et al.,2001; T. Kawana 1,T et al.,1990). Serum iron values and total iron binding capacity are elevated in conditions like hepatitis and hepatocellular injury (Carl A Burtis, et. al., Tietz textbook of Clinical Chemistry and Molecular Diagnosis, 4th ed., pg-1190; Scriver, Textbook of Metabolic and Molecular Basis of Inherited Disease, 8th ed. Vol.2, pg- 3128-3143). In this study we aim to compare the LFT and Iron and its related parameters in the most common benign and malignant disorders producing obstructive jaundice.

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The low compliance of extrahepatic biliary system results in high bilirubin levels in obstructive jaundice (C. Kucuk et al.,2003; Copeland W.H.,et.al.,1985; I J Beckingham and S D Ryder,2001). Serum bilirubin levels indicate severity of jaundice (D.S. Raghavendra and Shrinivas 2000). In obstructive jaundice there is a predominant increase in direct component (Shaha Ranajit Kumar et al.,2004; Nobuo Terada et al.,1993). Serum enzymes and their altered activities give useful information about the nature of the liver insult and aid in the diagnosis of different liver diseases (I J Beckingham and S D Ryder,2001; Varley, Practical clinical BioChemistry, 4th edition, pg no.465). The most common alterations in liver enzymes can be divided into 2 major subgroups-Hepatocellular predominant and Cholestatic predominant (Edoardo G. Giannini et al.,2005; Gopal DV, Rosen HR,2000; Green RM, Flamm S,2002). Hepatocellular injury results in an elevation of serum transaminases. The magnitude and rate of change of transaminases may provide initial insight into a differential diagnosis. In obstructive jaundice cases, only mild elevation of Alanine transaminase(ALT) enzyme is observed (Thomas R et al.,2001; Sanjay Singh et al.,2004). In cholestasis the following enzymes are elevated-Alkaline phosphatase(ALP), 5'Nucleotidase(5'NT), Gamma glutamyl transferase(GGT). An elevated ALP is always present in obstructive jaundice due to obstruction of the biliary tract by any cause (Nobuo Terada et al.,1993). 5'NT has been reported to be a more sensitive index of biliary obstruction than ALP. It has hepatobiliary origin and thus its estimation has relevance for the differential diagnosis of obstructive jaundice (Schumann G.,et. al.,2002). The liver occupies a central role in the protein synthesis and albumin is quantitatively the most important plasma protein synthesized. Total serum proteins may be decreased in obstructive jaundice. A low level of serum albumin suggests chronic liver disease (I J Beckingham and S D Ryder,2001) and it is a good indicator of liver function derangement (Edoardo G. Giannini et al.,(2005). In obstructive jaundice, the retention of biliary constituents and high biliary pressure causes hepatocellular injury (L. H. Blumgart, Surgery of the liver and biliary tract, 3rd ed., pg. 137). TSAI et al have reported that in obstructive jaundice, lipid peroxidation is responsible for hepatocellular damage (C. Kucuk et al.,2003). As in hepatocellular injury serum iron and TIBC values are elevated and as hepatocellular injury is seen in obstructive jaundice, serum iron and its related parameters are estimated in this study.

MATERIALS AND METHODS

In this study, the patients were divided into two groups based on the etiological cause - 40 cases of Choledocholithiasis (Group1) and 40 cases of Carcinoma head of pancreas(Group2). The cases were selected based on radiological diagnosis, choledocholithiasis by ultrasound and carcinoma head of pancreas by CT scan. They should not have underwent any form of drainage procedure like ERCP,PTC. All patients with medical jaundice and cirrhosis of liver were excluded. The levels of serum total bilirubin, direct bilirubin, indirect bilirubin (Method of Malloy and Evelyn, Practical clinical Biochemistry Varley 4th edition), serum total proteins (Biuret method I.D.P Wooton 3rd ed, pg-138), albumin (Bromocresol green method(BCG), Practical clinical Biochemistry Varley 4th edition, pg-244), globulin, A/G ratio, alkaline phosphatase (pNPP-AMP(IFCC), Kinetic Assay, reference: Tietz .W.,et.al.1983, Clin.Chem.,29/5,751), alanine transaminase Modified UV (IFCC), KineticAssay,reference:SchumannG.,et.al.,2002Clin.Chem,Lab.Med.,40,718), 5'nucleotidase (Campbell colorimetric Method, Practical clinical BioChemistry,Varley 4th edition, pg no.465), iron, total iron binding capacity (Ferrozine method Reference: Siedel,J.,et.al.(1984) Clin Chem. 30 : 975), unbound iron binding capacity, percent saturation of transferrin were estimated in these two groups of patients. The data was statistically analyzed using SPSS software version 16. Independent sample 't' test and 'p' value were used to assess the significance of difference of means between the two groups.

RESULTS

Overall 80 cases of obstructive jaundice were included in the study, of which 40 cases were due to stone in the CBD and 40 cases were due to Carcinoma head of pancreas. LFT and Iron related parameters were estimated in the two groups and the data represented in the form of tables showing the differences between the means of individual parameters of both the groups.

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Total bilirubin, Direct bilirubin, ALP and 5'NT showed a statistically significant increase among Group2 cases when compared to Group1 cases ($p<0.05$)(Table1). The decrease in the value of Serum Iron among Group2 cases when compared to Group1 cases was statistically significant ($p<0.05$) (Table2).

Table 1- COMPARISION 0F LFT AMONG Group1 Vs Group2 :

Parameter	Mean ± SD of Group1 (n=40)	Mean ± SD of Group2 (n=40)	P-value
Total Bilirubin	5.81 ± 4.61	8.36 ± 4.52	0.003
Direct Bilirubin	4.37 ± 3.52	6.57 ± 3.33	0.001
Indirect Bilirubin	1.34 ± 1.59	1.77 ± 2.62	0.284
Total Serum Proteins	6.47 ± 0.67	6.76 ± 0.77	0.094
Albumin	3.66 ± 0.50	3.76 ± 0.81	0.477
Globulin	2.83 ± 0.57	2.97 ± 0.65	0.257
A/G	1.33 ± 0.36	1.33 ± 0.48	0.977
ALP	345.21 ± 123.28	433.79 ± 159.33	0.001
ALT	96.54 ± 59.92	84.41 ± 39.12	0.201
5'NT	40.79 ± 10.61	46.83 ± 14.46	0.013

(p-value<o.o5 is considered as significant)

Table 2-Group1 Vs Group2 Iron, TIBC,UIBC,%Saturation of Transferrin

Parameter	Mean ± SD of Group1 (n=40)	Mean ± SD of Group2 (n=40)	P-value
Serum Iron	115.38 ± 37.12	97.95 ± 34.27	0.038
TIBC	317.95 ± 51.05	302.05 ± 47.86	0.156
UIBC	202.56 ± 38.16	204.10 ± 46.38	0.877
% Saturation of Transferrin	35.92 ± 9.34	32.51 ± 10.94	0.162

TIBC- Total iron binding capacity; UIBC-Unsaturated iron binding capacity

DISCUSSION

In this study LFT patterns and serum iron values differed in obstructive jaundice due to Carcinoma head of pancreas and that due to Choledocholithiasis. This is in accordance with the observations of J.O.Hayat et al that LFT patterns differ based on the cause of obstructive jaundice. Total bilirubin, Direct bilirubin, ALP and 5'NT values were higher in Group 2 cases when compared to Group 1 cases, thus suggesting their utility in differentiating between the malignant cause from benign cause of obstructive jaundice. These tests being non-invasive and simple to perform can be used as an initial evaluating diagnostic tool for confirmation of the cause of obstructive jaundice whether malignant or benign. As per Scriver and Tietz textbooks, serum iron values are usually elevated in hepatocellular injury and as in obstructive jaundice there is hepatocellular injury, we expected elevated levels of serum iron but in contrast the values were within the normal range. However when compared to Group 1 cases, Group 2 cases showed lower values of serum iron.

CONCLUSION

The findings of this study pertaining to serum iron levels indicate that there is a need for further study in this field.

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