IMPORTANCE OF LIVER FUNCTION TESTS IN DIFFERENTIAL DIAGNOSIS OF JAUNDICE

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ABSTRACT: BACKGROUND: Liver function tests (LFT) still play a pivotal role in investigating a case of jaundice and hence helps in the diagnosis of a liver disease. In a developing country like India, doctors come across multiple cases of jaundice in day to day practice. Liver functions tests continue to be one of the oldest and basic investigations which a clinician trusts upon to reach the diagnosis of underlying etiology. Liver function tests include liver enzyme studies – SGPT, SGOT, Alkaline phosphatase, GGTP along with S. Bilirubin and S. Protein levels. With the help of liver function tests we can easily assess the cause of jaundice, whether it is due to prehepatic causes, hepatic causes or posthepatic causes.

MATERIAL AND METHODS: A study carried out at Parul Institute of Medical Sciences, Vadodara, Gujarat, included 200 patients with jaundice among which were men, women and children of age group – 1 day to 80 years. The study was carried out over a span of 6 months. Liver function tests were performed by collecting samples in plain vacutainer and tests were carried out on Fully Automated Biochemistry Analyzer – SELECTRA BY Merck diagnostics. All the patients had minimum serum total bilirubin levels of greater than 1.5 mg%.

RESULTS: Our study included total 200 patients of jaundice with serum bilirubin >1.5 mg%. Among them 55 were females and 145 were males. Patients were of age group 1 day to 80 years. Data revealed that approximately 30% of patients had prehepatic jaundice, 60 % had hepatic type, whereas 10 % had post hepatic type. In pre-hepatic jaundice, liver function tests show increase in indirect bilirubin with minimal or slight increase in the liver enzymes. In hepatic jaundice there is marked elevation in serum enzyme levels principally SGPT and SGOT while slight elevation in alkaline phosphatase and GGTP, elevated serum bilirubin levels is mainly of direct type and serum protein levels were altered. In post hepatic jaundice there is marked elevation in serum direct bilirubin along with marked elevated levels of Serum alkaline phosphatase.

CONCLUSION: Liver function tests are used as a primary tool by the clinicians in differential diagnosis of a case of jaundice as they definitely give us a clue to reach to the root cause of jaundice.

KEYWORDS: Liver enzyme levels, Serum protein, Serum bilirubin.

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INTRODUCTION: Liver function tests (LFTs) are groups of blood tests that give information about the state of functioning of patient liver. These tests include bilirubin (direct and indirect), liver transaminases (SGOT and SGPT), Alkaline phosphatase, Gamma glutaryl transferase and Serum protein levels (total protein, albumin and globulins).[1] Most liver diseases cause only mild symptoms initially, but these diseases must be detected early. Hepatic (liver) involvement in some diseases can be of crucial importance. This testing is performed on a patient's blood sample. Some tests are associated with functionality (e.g., albumin), some with cellular integrity (e.g. transaminases), and some with conditions linked to the biliary tract (Gamma glutaryl transferase and alkaline phosphatase) these biochemical tests are useful in the evaluation and management of patients with hepatic dysfunction. These tests can be used to detect the presence of liver disease, distinguish among different types of liver disorders, gauge the extent of known liver damage, and follow the response to treatment.[2] Reference ranges of these tests; vary depending on age, gender, ethnicity, method of analysis, and units of measurement. The reference ranges of liver function tests in adults are serum total bilirubin 0.2-1.0 mg%, SGPT 0 – 40 U/L, SGOT 0 – 40 U/L, GGT 0 – 45 U/L, Alkaline phosphatase 0-240 U/L and Serum Proteins 6-8 gm%. However the reference ranges vary depending on the age and methods/kits used to perform the tests.[3,4,5]

AIMS AND OBJECTIVES: To study the role of liver function tests in diagnosing and differentiating a case of jaundice.

MATERIAL AND METHODS: An observational study was carried out in year 2015 over a period of six months at Parul Institute of Medical Sciences and Research, Vadodara, Gujarat. Ethical clearance was sought from organizational ethical committee. Information like age, sex, clinical diagnosis and lab parameters which included all standard liver function tests like serum bilirubin (total, direct and indirect), SGPT,SGOT, Alkaline phosphatase,

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Gamma glutaryl transferase and Serum Protein levels (Total protein, albumin and globulin) were recorded in each case. Data was entered in Microsoft excel and mean, standard deviation and proportion were calculated.

RESULTS: Study was carried out at PIMRS; it included 200 patients with jaundice including men, women, neonates & children.

DISCUSSION: Present study includes 200 patients belonging to the age group, neonates up to 80 years. Among these patients significant percentage fall in 2nd to 4th decade.(Table 1) Clinical diagnosis has been divided into three categories – Prehepatic, Hepatic, Posthepatic, of which significant percentage of patients fall in hepatic group (60.5%) followed by prehepatic group (29%). (Table2) Similar results were obtained in study by Ellis G. et al. Alcoholic hepatitis (22%), viral hepatitis (17%) & neonatal jaundice (13%) are the leading causes of hepatic jaundice. Sickle cells are leading cause of prehepatic type of jaundice as study is carried out at PIMRS, which lies in area where sickle cell and thalassemia are more prevalent whereas in study by Wesley et al viral hepatitis was most common cause of jaundice in his study.

There is a mild rise in s.biliburin in chronic patients with autoimmune disorders, hemolytic anemia, malaria, megaloblastic anemia and drug induced hepatitis without much significant rise in liver enzymes levels. It has been noted that severe rise in SGPT, SGOT has been found in infective viral hepatitis and toxic fulminating hepatitis, whereas mild to moderate rise is seen in alcoholic hepatitis and cirrhosis. In the post hepatic form jaundice there is significant rise in s. bilirubin (conjugated) and s.alkaline phosphates level. In an uncomplicated case of jaundice, a detailed clinical history of the patient along with liver function tests is sufficient to reach a clinical diagnosis. These tests are affordable and thus investigations like MRI and CT scan which are very expensive can be avoided.

CONCLUSION: Interpreting abnormal LFTs and trying to diagnose any underlying liver disease is a common scenario in Primary Care. Single abnormalities in LFTs are difficult to localize and diagnose. However, the pattern of abnormalities tests helps determine origin of the issue. This usually means dividing the clinical picture into –Pre hepatic, hepatocellular and post hepatic or cholestatic patterns of abnormality. When this is then combined with a clinical history, medication and drug history and the presence of any current or recent symptoms, it is usually possible to develop a differential diagnosis.

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Sl. No.	Age groups	Cases in %
1	00 – 10	21.0
2	11 – 20	10.5
3	21 – 30	23.0
4	31 – 40	15.5
5	41 – 50	10.0
6	51 – 60	11.5
7	61 – 70	06.5
8	71 – 80	02.0

Table 1: Age wise Distribution of the patients

Sl. No.	Clinical Diagnosis	N = 200	Frequency (%)
	Prehepatic		
1	Malaria	18	9 %
2	Sickle cell disease	21	10.5 %
3	Thalassemia	5	2.5 %
4	Megaloblastic anemia	14	7 %
	Hepatic		
5	Neonatal jaundice	26	13 %
6	Viral hepatitis	34	17 %
7	Alcoholic hepatitis	44	22 %
8	Toxic hepatitis	3	1.5 %
9	Cirrhosis	10	5 %
10	Autoimmune hepatitis & drugs	4	2 %

	Posthepatic		
11	Gall stones	18	9 %
12	Malignancy	3	1.5 %

Table 2: Clinical diagnosis & % cases

Disease	**T.bili**	**D.bili**	**I.bili**	**SGPT**	**SGOT**	**ALP**	**T.Pro**	**Alb**	**Glob**	**A:G**
Malaria	Mild	Mild	Mild	N	N	N	N	N	N	N
Sickle	Mod	Mild	Mod	N	N	N	N	N	N	N
Thalassemia	Mild/Mod	N	Mild/Mod	N	N	N	N	N	N	N
Megaloblastic Anemia	Mild	N	Mild	N	N	N	N	N	N	N
Neonatal jaundice	Mod/Severe	Mild	Mod/Severe	N	N	N	N	N	N	N
Viral hepatits	Mild/Severe	Mild/Severe	Mild/Severe	Mod/ Severe	Mod/ Severe	Mild	N	N	N	N
Alcoholic hepatitis	Mild/Mod	Mild/Mod	Mild/Mod	Mild/ Mod	Mild/ Mod	Mild	↓	↓	↑	R
Toxic hepatitis	Mod/Severe	Mod/Severe	Mod/Severe	Severe	Severe	Mild	N	N	N	N
Cirrhosis	Mild/Severe	Mild/Severe	Mild/Severe	Mod	Mod	Mod	↓↓	↓↓	↑↑	R
Autoimmune hepatitis & Drugs	Mild/Mod	Mild/Mod	Mild	Mild	Mild	N/ Mild	N	N	N	N
Gall stones	Mod	Mild/Mod	Mild/Mod	N/Mild	N/Mild	Mild/ Mod	N	N	N	N
Cancer	N/Mild/Severe			Mild	Mild	Mild	↓	↓	N	N

Table 3: Analysis of liver function tests in various cases of jaundice

N-Normal, R- Reverse. S. Bilirubin: Mild – 1-3, Moderate – 3-6, severe - >6.
SGPT, SGOT: Mild –45-100, Moderate – 100-500, Severe->500.
ALP: Mild -250-400, Moderate – 400-600, Severe->600.