Original Research Article

Association between chronic liver disease and thyroid function test

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Abstract

Chronic liver disease is well known to affect various organ of body. This study was done to see the relation between chronic liver disease and thyroid function test. Study was conducted at department of physiology of Darbhanga medical college Leheriasarai Bihar subject were recruited from outpatient department and inpatient ward of general medicine. Sample size was 100 patients. All patients were diagnosed on usage or upper gl endoscopic finding typical of chronic liver disease. Thyroid function test of all the patients were done at regular interval. In this study, we found significant inverse relation is comparatively less marked with f14, whereas no relations exist with tsh. So ft3 level can be used as prognostic tool to assess the severity of liver disease.
Key Word: Chronic liver disease.

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INTRODUCTION

Chronic liver disease refers to disease of the liver which last for a period of six months or more. It consist of a wide range of liver pathologies which includes inflammation (chronic hepatitis) liver cirrhosis and hepatocellular carcinoma. It is diagnosed on the basis of persistent symptomatology and laboratory parameters and ultrasonoghraphic finding consistent with a diagnosis of liver dysfunction. There are various etiology which can lead to chronic liver disease. These includes-

- Chronic viral hepatitis-specially hepatitis B and Hepatitis C.
- Alcohol
- Drugs and chemicals-acetaminophens, isoniazid, rifampicin, pyrazinamide, nitrofurantoin, propylthiouracil etc.
- Non-alcoholic fatty liver disease.
- Immune
  - Primary sclerosing cholangitis.
  - Autoimmune liver disease.
- Biliary
  - Primary biliary cirrhosis.
  - Secondary biliary cirrhosis
  - Cystic fibrosis.
- Genetic
  - Haemochromatosis.
  - Wilsons disease.
  - Alfa1-antitrypsin deficiency.
- Chronic venous outflow obstruction.
- Cryptogenic-cause unknown.

There are various clinical as well as laboratory parameter for chronic hepatocellular failure. Clinical parameters includes general failure of health; jaundice; skin changes(spider naevi, palmer erythema), diffuse pigmentation, ascites; endocrine changes which includes loss of libido, hair loss, gynaecomastia, testicular atrophy and impotence in case of male ,and breast atrophy, irregular menstruation, ammenorhoea in case of female; haemorrhagic tendency like bruises, purpura, epistaxis; portal hypertension- splenomegaly, collateral vessels,

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variceal bleeding; hepatic encephalopathy; other features-pigmentation, digital clubbing, dupuytrens contracture. Laboratory parameter includes deranged LFT, RFT and CBC, prolonged Prothrombin Time, low albumin etc. Chronic liver disease usually passes through a long periods of minimum non-specific symptoms like fatigue, flatulence, dyspepsia, anorexia-known as compensated cirrhosis; and appearance of one or more features of ascites, encephalopathy, G.I bleeding and pre-coma are known as decompensated cirrhosis. Most cases of chronic liver disease either have underlying cirrhosis or eventually progresses to liver cirrhosis. Cirrhosis of liver is mainly a tissue diagnosis and characterised by diffuse hepatic fibrosis and nodule formation.

The relationship between the thyroid gland and the liver: Thyroxine and tri-iodothyronine are essential for normal organ growth, development and function. These hormones regulate the basal metabolic rate of all cells, including hepatocytes, and thereby modulate hepatic function; the liver in turn metabolizes the thyroid hormones and regulates their systemic endocrine effects. Thyroid dysfunction may perturb liver function, liver disease modulates thyroid hormone metabolism, and a variety of systemic diseases affect both organs.

AIMS AND OBJECTIVES

1. To study thyroid hormone abnormality in chronic liver disease patients.
2. To find out whether these abnormality co-relate with severity of chronic liver disease.

MATERIAL AND METHODS

This study was conducted at Department of Physiology of Darbhanga Medical College, Laheriasarai, Bihar. Subjects with chronic liver disease were recruited from out patients department and in patients ward in General Medicine. Thyroid function test of all cases were done. Chronic liver disease was diagnosed on the basis of liver disease more than 6 month duration and/or evidence of portal hypertension on USG or upper GI endoscopic finding typical of CLD. These subjects **were classified as per child Pugh criteria**

A. Child Pugh Stage – A(Chronic liver disease 1 or CLD 1)
B. Child Pugh Stage – B or C (CLD 2)
1. STUDY AREA: Dept. of Physiology, DMC, Laheriasarai, Bihar.
2. SAMPLE SIZE: 100 Patients.

Sample Criteria: All patients were above 16 years old.

Exclusive Criteria: Patients who have received thyroid hormone and alcoholic liver disease were excluded.

OBSERVATION AND DISCUSSION

The liver has an important role in thyroid hormone metabolism and the level of thyroid hormones is also important to normal hepatic function and bilirubin metabolism. Besides the associations between thyroid and liver diseases of an autoimmune nature, such as that between primary biliary cirrhosis and hypothyroidism, thyroid diseases are frequently associated with liver injuries or biochemical test abnormalities. Liver diseases are also frequently associated with thyroid test abnormalities or dysfunctions. In this study, We have found, there is significant inverse relationship between FT3 level along with severity of liver disease. in CLD 1 group of patients, mean free T3 was 3.06 ±SD ±0.78 and in CLD-2 group, it was 1.79,SD±0.89. and p value between CLD-1 and CLD-2 group was < 0.001 which is statistically highly significant. In this study ,we also have found that FT4 concentration was normal in CLD-1 group (mean-1.47 and SD± 0.31) but decreased significantly in CLD-2 group of patient (mean F4 level 1.31,SD±0.29).Here p value is 0.20.Our study does not any significant relationship between TSH level along with severity liver disease(Mean TSH 2.54 in CLD-1 group with SD± 1.6,and mean TSH 2.94 in CLD-2 group with SD± 2.03).p value here is 0.92 which is statistically insignificant. Though in various previous study, it was found that serum TSH level increased significantly with severity of liver disease, our study does not found it. Cause of it may be we have vigorously excluded patient with known thyroid disorder or any patient with primary thyroid disorder. We have also excluded the patient with alcohol related chronic liver disease because the effect of alcohol on the HPT axis is significant and alcohol consumption affects almost all aspects of the functioning of the thyroid gland. The strengths of this study are the assessment of thyroid functions at various stages of liver disease and exclusion of patients with alcoholic liver disease because alcohol is known to affect hypothalamo-thyroid axis. Serum FT3 significantly correlated with serum bilirubin, prothrombin time, ascites and hepatic encephalopathy grading (p value is <0.001 in all) in CLD patients. It shows negative co-relation with serum bilirubin, PT, ascites severity and hepatic encephalopathy grading. The present data confirm the existence of several abnormalities of thyroid function tests in patients with chronic liver disease, although showing that euthyroidism is almost always maintained, probably as a result of low-normal FT3. Furthermore, FT3 in serum levels appear to parallel the severity of liver dysfunction. Low free T3 levels may be regarded as an adaptive hypothyroid state that serves to reduce the basal metabolic rate within hepatocytes and preserve liver function and total body proteins stores. Indeed, a recent

study in cirrhotic patients showed that onset of hypothyroidism from intrinsic thyroid disease of various etiologies during cirrhosis resulting in a biochemical improvement in liver function (e.g. coagulation profile) as compared to controls. Hypothyroidism has also associated with lesser degree of decompensation in cirrhosis. Low FT3 level can be explained from this fact. As FT3 level fall with progression of chronic liver disease, FT3 can a useful marker to access the severity of CLD. According to this study all cirrhotic patients should undergo thyroid function evaluation as these patients are definitely associated with development of alteration of thyroid function test and test abnormality increases with progression of chronic liver disease.

CONCLUSION

From present study, we concluded that there is significant inverse relationship between severity of chronic liver disease irrespective of etiology and FT3 and FT4.This inverse relation is more marked in case of FT3 compared to FT4.However relationship between TSH and severity of liver disease is statistically not significant. We have recommended the baseline assessment of thyroid function test in all patient with chronic liver disease. An etiology wise study may help better to understand thyroid dysfunction in chronic liver disease. However ,from our current study ,we can concluded that FT3 measurement can be used as a marker to assess the severity of chronic liver disease.

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