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General Medicine

A STUDY OF CLINICAL PROFILE OF CHRONIC LIVER DISEASE PATIENTS WITH SPECIAL REFERENCE TO THYROID FUNCTION TESTS

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ABSTRACT Chronic liver disease (CLD) is a spectrum of disorders characterized by deterioration of liver functions for six months or more. Its pathogenesis includes inflammation of hepatic tissue, destruction, and regeneration of liver parenchyma, which ultimately leads to fibrosis and cirrhosis and in few cases can progress to hepatocellular carcinoma. Liver plays an important role in the metabolism of thyroid hormones, as it is the most important organ in the peripheral conversion of tetra iodothyronine (T4) to triiodothyronine (T3) by Type 1 deiodinase. In this Study, we found that low Free T3 levels were correlated with the chronic liver disease severity score (child-Pugh score and MELD score) .In Patients with chronic liver disease, peripheral conversion of tetra iodothyronine (T4) to triiodothyronine (T3) is impaired due to deficiency in the enzyme Type-1 deiodinase, resulting in the low T3 levels .Therefore, we conclude that Low Free T3 levels can be considered as good predictor of severity of illness in patients with chronic liver disease.

KEYWORDS : Chronic Liver Disease, Thyroid Function Tests

INTRODUCTION:

Liver plays an important role in metabolism of thyroid hormones, as it is the most important organ in the peripheral conversion of tetraiodothyronine (T4) to triiodothyronine (T3) by Type 1 deiodinase. Type 1 deiodinase is the major enzyme in the liver and accounts for extrathyroidal production of T3, it can carry out both 5' and 5-deiodination of T4 to T3. Moreover, the Liver is involved in the thyroid hormone conjugation and excretion, as well as the synthesis of Thyroid binding globulin.T4 and T3 regulates the basal metabolic rate of all the cells, including hepatocytes, and thereby modulate hepatic function. There are clinical and laboratory associations between Thyroid and liver diseases. A complex relationship exists between the thyroid and liver in health and disease.

A second pathway of thyroid hormone metabolism involves the conjugation of the phenolic hydroxyl group of the outer phenolic ring with sulfate or glucuronic acid. These conjugation occur primarily in the liver and to a lesser degree in the kidney and result in transformation of T4 and T3. Although T4 and T3 are generated within the thyroid gland. T4 is major secretory Product. All T4 found in circulation is Produced in the Thyroid unless exogenously administered .In peripheral tissues T4 is either converted to T3 or rT3 or eliminated by conjugation, deamination or decarboxylation reactions .It is estimated that more than 70 percent of T4 Produced in the thyroid eventually deiodinated in Peripheral tissues .T3 is considered to be the most metabolically active thyroid hormone.

METHODOLOGY

MATERIALS AND METHODS :

Source Of Data: Patients who were attending the either the out-patient department or the in-patient department of General Medicine, diagnosed with Chronic Liver disease at Rajarajeswari medical college and hospital, Bengaluru.

Study Design: Cross-sectional study

Study Area: Rajarajeswari medical college and hospital, Bengaluru.

Study Duration: 18 months

Inclusion Criteria:-

- All Chronic liver disease patients who are willing to participate in the study
- Patients with clinical, biochemical and radiological evidence of chronic liver disease attending the Medicine OPD and IPD of RAJARAJESWARI MEDICAL COLLEGE AND HOSPITAL were included in this study.
- Age group >18 years
- written informed consent

Exclusion Criteria:

- Patients with chronic liver disease with known thyroid disease, thyroid surgery
- Pregnant Females.
- Patients receiving drugs that may interfere with thyroid hormone metabolism and function

RESULTS :

• Distribution Of The Study Participants According To Their Child-pugh Score:

Child-Pugh score	Frequency N	Percentage %
A	15	30.0
B	17	34.0
C	18	36.0

36% of the study participants was found to have Child-Pugh score-C, 34% of the study participants was found to have Child-Pugh score-B and 30% of the study participants was found to have Child-Pugh score-A.

• Distribution Of The Study Participants According To Their MELD Score:

MELD score	Frequency N	Percentage %
<20	21	42.0
>20	29	58.0

58% of the study participants was found to have MELD score >20 and 42% of the study participants was found to have MELD score <20.

•Distribution Of The Study Participants According To The Complication Of Chronic Liver Disease:

Complication Of Chronic Liver Disease	Frequency N	Percentage %
Ascites	29	58.0
Variceal bleeding	16	32.0
Hepatic Encephalopathy	5	10.0

58% of the study participants was found to have Ascites, 32% of the study participants was found to have Variceal bleeding and 10% of the study participants was found to have Hepatic Encephalopathy.

• Association Of Child-pugh Score With Ft3:

Child-Pugh score	Normal FT3(n=22)		Low FT3(n=28)	
	N	%	N	%
A	10	66.7%	5	33.3%
B	9	52.9%	8	47.1%
C	3	16.7%	15	83.3%
P value	0.010			

83.3% of the study participants with Child-Pugh score C and 47.1% of the study participants with Child-Pugh score B were found to have low FT3. The association was found to be statistically significant between Child-Pugh score and Ft3.

• Association Of MELD Score With FT3:

MELD score	Normal FT3		Low FT3	
	N	%	N	%
<20	13	61.9%	8	38.1%
≥20	9	31.0%	20	69%
P value	0.030			

38.1% of the study participants with MELD score <20 and 69% of the study participants with MELD score >20 was found to have low FT3. The association was found to be statistically significant between MELD score and FT3.

Association Of Complications Of Chronic Liver Disease With FT3

Complications of chronic liver disease	Normal FT3		Low FT3		P value
	N	%	N	%	
Ascites	13	44.8%	16	55.2%	0.890
Variceal bleeding	7	43.8%	9	56.3%	0.981
Hepatic Encephalopathy	2	40.0%	3	60.0%	0.849

• The proportion of complications of chronic liver disease was found to be higher among study participants with low FT3 in the present study.

Association of Child-Pugh score with Ft4:

Child-Pugh score	Normal FT4		Low FT4	
	N	%	N	%
A	13	86.7%	2	13.3%
B	10	58.8%	7	41.2%
C	14	77.8%	4	22.2%
P value	0.181			

• 22.2% of the study participants with Child-Pugh score C and 41.2% of the study participants with Child-Pugh score B were found to have low FT4. The association was not found to be statistically significant between Child-Pugh score and Ft4.

• Association of MELD score with FT4:

MELD score	Normal FT4		Low FT4	
	N	%	N	%
<20	15	71.4%	6	28.6%
>20	22	75.9%	7	24.1%
P value	0.784			

28.6% of the study participants with MELD score <20 and 24.1% of the study participants with MELD score >20 was found to have low FT4. The association was not found to be statistically significant between MELD score and Ft4.

• Association Of Complications Of Chronic Liver Disease With FT4:

Complications of chronic liver disease	Normal FT4		Low FT4		P value
	N	%	N	%	
Ascites	23	79.3%	6	20.7%	0.340
Variceal bleeding	13	81.3%	3	18.7%	0.241
Hepatic Encephalopathy	4	80.0%	1	20.0%	0.747

The complications of liver cirrhosis was not found to be significantly associated with FT4 in the present study.

CONCLUSION:

Derangements in thyroid profile (FreeT3, Free T4, and TSH) are common among patients with chronic liver disease. In our study, we found that low Free T3 levels were correlated with the severity of the Child-Pugh Score and MELD score. In patients with chronic liver disease, peripheral conversion of tetra iodothyronine (T4) to triiodothyronine (T3) is impaired due to a deficiency in the enzyme Type-1 deiodinase, resulting in low T3 levels. Therefore, we conclude that low FT3 levels can be considered a good predictor of the severity of illness in patients with chronic liver disease.

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