Original Research Paper

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General Medicine

PREVALENCE OF THYROID DYSFUNCTION IN CIRRHOSIS OF LIVER

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ABSTRACT **Background:** The liver is essential in regulating thyroid hormone metabolism, binding, and conversion. In cirrhosis, these functions are impaired, potentially leading to thyroid dysfunction. This study investigates the prevalence of thyroid dysfunction in cirrhotic patients and its correlation with disease severity.

Objectives:

1. To evaluate the thyroid profile (Total T3, Total T4, Free T3, Free T4, TSH) in cirrhosis patients.
2. To correlate the severity of liver dysfunction (using Child-Pugh score) with thyroid abnormalities.

Methods: A cross-sectional observational study was conducted on 100 cirrhotic patients at a tertiary care center. Patients were evaluated for thyroid hormones and stratified using Child-Pugh scoring. Statistical analyses including ANOVA and chi-square were used to assess correlations. **Results:** Out of 100 patients, 56% had hypothyroidism, 13% had subclinical hypothyroidism, and 31% were euthyroid. No cases of hyperthyroidism were observed. A strong inverse relationship was found between Child-Pugh grade and Free T3 ($r = -0.567$) and Free T4 ($r = -0.294$), while TSH increased with worsening liver function ($r = 0.669$) (all $p < 0.001$). **Conclusion:** Thyroid dysfunction is prevalent in cirrhosis, increasing in frequency and severity with worsening liver disease. Routine thyroid assessment in cirrhotics is recommended for better prognostication.

KEYWORDS : Cirrhosis, Hypothyroidism, Thyroid function, Child-Pugh score, Free T3, TSH

INTRODUCTION

The liver plays a pivotal role in thyroid hormone metabolism by producing transport proteins (TBG, transthyretin, albumin) and converting thyroxine (T4) into the biologically active tri-iodothyronine (T3) via deiodinases [1]. It is also involved in hormone clearance through glucuronidation and sulfation [1,2]. Therefore, liver dysfunction can impair thyroid function.

Cirrhosis is a progressive liver disorder marked by fibrosis and architectural distortion. Globally, it is the 11th leading cause of death and accounts for significant morbidity [3]. In India, cirrhosis-related deaths comprise 18.3% of global liver-related mortality [4].

Patients with cirrhosis frequently exhibit alterations in thyroid profile resembling non-thyroidal illness syndrome or "euthyroid sick syndrome" [5,6]. This study was conducted to investigate the prevalence of thyroid dysfunction in cirrhotic patients and its relationship to disease severity using the Child-Pugh score.

Objectives

1. To assess the prevalence and patterns of thyroid dysfunction in cirrhosis.
2. To correlate thyroid dysfunction with the severity of liver disease as determined by the Child-Pugh classification.

Materials and Methods

Study Design: Cross-sectional observational study

Duration: March 2023 to September 2024

Setting: Sri Siddhartha Medical College and Hospital, Tumakuru.

Sample Size: 100 (calculated from prevalence of 64% based on previous literature [7])

Inclusion Criteria:

Adults (>18 years) with clinical, biochemical, and radiological evidence of cirrhosis

Exclusion Criteria:

- History of thyroid disease
- Pregnancy
- Use of drugs affecting thyroid metabolism (e.g., amiodarone, lithium)

Investigations:

- Serum Total T3, Total T4, Free T3, Free T4, TSH (via chemiluminescence assay)
- Liver function tests (photometric method)
- Ultrasound of abdomen
- Child-Pugh score calculation based on standard criteria [8]

Statistical Analysis:

Data were analyzed using SPSS v25. ANOVA, chi-square, and Pearson's correlation were applied. $p < 0.05$ was considered statistically significant.

RESULTS

Demographics:

- Mean age: 45.27 ± 9.6 years
- Males: 90%; Females: 10%

Thyroid Dysfunction In Cirrhosis:

- Hypothyroidism: 56%
- Subclinical hypothyroidism: 13%
- Euthyroid: 31%
- Hyperthyroidism: 0%

Prevalence Of Hypothyroidism By Child-pugh Class:

Child-Pugh Grade	Hypothyroidism (%)
A	0.0
B	37.0
C	79.6
p-value	**<0.001**

Correlation Of Hormone Levels With Child-pugh Score And INR

Hormone Level	Correlation with Child-Pugh Score (r)	p-value	Correlation with INR (r)	p-value
Free T3	-0.567	<0.001	-0.464	<0.001
Free T4	-0.294	<0.001	-0.374	<0.001
TSH	+0.669	<0.001	+0.512	<0.001

Patients with Child-Pugh C had the highest prevalence of hypothyroidism (79.6%), followed by Grade B (37%) and Grade A (0%).

DISCUSSION

This study confirms a high prevalence of hypothyroidism in cirrhosis (69% total, including subclinical cases), with strong correlation to disease severity. As the liver becomes more dysfunctional, its capacity to convert T4 to T3 declines, resulting in reduced serum T3 [9]. This resembles the euthyroid sick syndrome seen in critical illnesses [10].

Several prior studies support these findings. Verma et al. reported low

Free T3 and T4 levels in advanced cirrhotics, with strong inverse relation to Child-Pugh class [11]. El-Feki et al. found decreased Free T3 and increased TSH in cirrhotic hepatitis C patients [12]. Takahashi et al. demonstrated that Free T3 levels correlated with prothrombin time and albumin, suggesting it as a marker of liver function [13].

Interestingly, 33% of hypothyroid patients in our study were asymptomatic, suggesting the need for routine screening irrespective of clinical symptoms.

CONCLUSION

Thyroid dysfunction is prevalent in cirrhotic patients and significantly worsens with increasing liver dysfunction. Routine thyroid function testing is recommended in all cirrhotic patients for early detection and management. Free T3 may serve as a surrogate marker of liver severity.

REFERENCES

1. Malik R, Hodgson H. The relationship between the thyroid gland and the liver. QJM. 2002;95(9):559-69.
2. DeGroot LJ. Dangerous dogmas in medicine: the nonthyroidal illness syndrome. J Clin Endocrinol Metab. 1999;84(1):151-64.
3. Asrani SK, et al. Burden of liver diseases in the world. J Hepatol. 2019;70(1):151-71.
4. Dandona L, et al. Nations within a nation: variations in epidemiological transition across the states of India, 1990–2016. Lancet. 2017;390(10111):2437-60.
5. Wartofsky L, Burman KD. Alterations in thyroid function in patients with systemic illness: the "euthyroid sick syndrome". Endocr Rev. 1982;3(2):164-217.
6. Christ-Crain M, et al. Elevated C-reactive protein and procalcitonin in thyroid dysfunction. J Clin Endocrinol Metab. 2003;88(3):1629-34.
7. Samarthana V, Mamatha BP. Prevalence of Thyroid Dysfunction in Liver Cirrhosis. Int J Adv Med. 2017;4(2):429–34.
8. Pugh RN, et al. Transection of the oesophagus for bleeding oesophageal varices. Br J Surg. 1973;60(8):646-9.
9. Sanul A, et al. Thyroid profile in liver cirrhosis. Int J Sci Res. 2016;5(5):1640–4.
10. Chopra IJ. Euthyroid sick syndrome: is it a misnomer?. J Clin Endocrinol Metab. 1997;82(2):329-34.
11. Verma S, et al. Evaluation of thyroid profile in patients with cirrhosis and its correlation with disease severity. J Assoc Physicians India. 2020;68(1):43-7.
12. El-Feki A, et al. Thyroid hormones in patients with chronic hepatitis C virus infection. Egypt J Intern Med. 2016;28(1):13-18.
13. Takahashi Y, et al. Changes of thyroid hormones in various liver diseases. Endocr J. 1994;41(1):109-15.