

Original Research Article

To study thyroid dysfunction in patients with chronic liver disease.

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Abstract:

Background & Method: The aim of the study is to study thyroid dysfunction in patients with chronic liver disease.

96 Patients with symptoms and signs with biochemical and radiological evidence of chronic liver disease who were admitted in medicine ward of JAH and KRH. All patients underwent a detailed clinical examination at admission. Relevant history and physical examination including symptom and signs of liver failure, hepatomegaly, splenomegaly and abdominal vein collaterals were recorded. Ascites was graded as none, mild, moderate and severe.

Result: Alcohol was most common (53 cases) Etiology for Chronic Liver Diseases, Hepatitis B and C is responsible for 12 and 9 cases of CLD respectively. Other causes were responsible for 21 cases. 28 cases had raised serum TSH levels while low T3 and T4 levels were seen in 8 and 7 cases respectively. 26 cases turned out to be subclinical hypothyroidism while hypothyroid and sick euthyroid category had 3 cases each.

Conclusion: There is significant occurrence of hypothyroidism in patients of chronic liver disease. Chronic Liver Disease is one of the commonest causes of morbidity and mortality all over the world. Liver plays an important role in metabolism of thyroid hormone and vice versa. Chronic liver disease can lead to thyroid dysfunction resulting in derangement of thyroid functions.

Keywords: thyroid, dysfunction & chronic liver disease.

Study Designed: Observational Study.

1. Introduction

Liver diseases are a common cause of morbidity and mortality all over the world as well as in India with burden of liver disease in India is significant as it alone contributed to 18.3% of two million global liver disease-related deaths.⁽¹⁾

Liver plays an important role in metabolism of hormones and synthesis of carrier proteins and is associated with various endocrinal disturbances.^(2,3)

In normal people, thyroid gland secretes 110nmol of thyroxine(T4) and 10nmol of triiodothyronine(T3). T3 has ten times greater affinity and greater efficacy than T4 for nuclear receptors, thus T4 can be regarded as a pro-hormone which needs to be converted to T3 for its actions. There are 3 groups of Enzymes that regulate thyroid hormone metabolism forming part of iodothyronine seleno-deiodinase enzyme system- Type1/D1, Type2/D2, Type3/D3. They are responsible for further activation and deactivation of thyroid hormone. The conversion of T4 to T3 occurs rapidly by D1 and slowly by D2. The D1 is mainly found in liver and kidney and accounts for approx. 30-40% of extrathyroidal production of T3. The

D2 enzyme is found in pituitary, CNS and skeletal muscles and contributes 60-70% of extrathyroidal production of T3⁽⁴⁾. Although both D1 and D2 can also inactivate T4 but the main inactivator is D3 which causes inner ring deiodination instead of outer ring as in case of D1 and D2 leading to formation of inactive metabolites rT3, rT2 and T3 to T2. D3 is mainly found in liver, CNS and skin.

2. Material & Method

Present study was conducted at Department of General Medicine, G.R. Medical College, Gwalior (M.P.) from Jan 2021 - Jun 2022. 96 Patients with symptoms and signs with biochemical and radiological evidence of chronic liver disease who were admitted in medicine ward of JAH and KRH were selected. All patients underwent a detailed clinical examination at admission. Relevant history and physical examination including symptom and signs of liver failure, hepatomegaly, splenomegaly and abdominal vein collaterals were recorded. Ascites was graded as none, mild, moderate and severe.

INCLUSION CRITERIA:

1. >18 years of age
2. Chronic Liver disease patients

EXCLUSION CRITERIA:

1. Known case of hypothyroidism on treatment
2. Pregnant female
3. Medications that affect study like phenytoin,
4. Amiodarone, NSAIDS, Salicylates.
5. Patients with sepsis

3. Results

Table 1: Demographic profile of study participants

Demographic profile	Frequency	Percent	
≤30 Year	5	5.2	
31-40 Year	16	16.7	
Age Groups	41-49 Year	34	35.4
	50-59 Year	30	31.3
	≥60 Year	11	11.5

Only 5.2% (5 cases) study participants were ≤ 30year age and 16.7% (16) were between 31-40 year age group. Majority of study participants were belonging to 41-49 Years (34 cases) and 50-59year (30 cases) age groups. 11 participants belong to ≥ 60year age group.

Table 2: Distribution of cases according to etiology

Etiology of CLD	Frequency	Percentage
Ethanol	53	55.2
HBsAg	12	12.5
HCV	9	9.4
Congestive	1	1
Others	21	21.9

Alcohol was most common (53 cases) Etiology for Chronic Liver Diseases, Hepatitis B and C is responsible for 12 and 9 cases of CLD respectively. Other causes were responsible for 21 cases.

Table 3: Thyroid Function Test

		Frequency	Percent
	<0.69 ng/ml	8	8.3
T3	0.69-2.15 ng/ml	88	91.7
	>2.15 ng/ml	0	0
	<52 ng/ml	7	7.3
T4	52-127 ng/ml	88	91.7
	>127 ng/ml	1	1.0
	<0.3 mIU/ml	0	0
TSH	0.3-4.5 mIU/ml	68	70.8
	>4.5 mIU/ml	28	29.2
	Hypothyroid	3	3.1
Thyroid	Normal	64	66.7
Function	Sick Euthyroid	3	3.1
	Subclinical	26	27.1
	Hypothyroidism		

28 cases had raised serum TSH levels while low T3 and T4 levels were seen in 8 and 7 cases respectively. 26 cases turned out to be subclinical hypothyroidism while hypothyroid and sick euthyroid category had 3 cases each.

Table 4: Association between Thyroid Function and Etiology of CLD of study participants

Gender	Thyroid Function				Total	P value
	Hypo-thyroid	Normal	Sick Euthyroid	Subclinical Hypothyroidism		
	N (%)	N (%)	N (%)	N (%)		0.866
Congestive	0 (0%)	1 (1.6%)	0 (0%)	0 (0%)	1 (1%)	
Ethanol	1 (33.3%)	36 (56.3%)	2 (66.7%)	14 (53.8%)	53 (55.2%)	

					12	
HBsAg	0 (0%)	7 (10.9%)	0 (0%)	4 (15.4%)		
					(12.5%)	
HCV	0 (0%)	7 (10.9%)	0 (0%)	2 (7.7%)	9 (9.4%)	
Others	2 (66.7%)	13 (20.3%)	1 (33.3%)	6 (23.1%)		
					21	
					(21.9%)	
Total	3 (100%)	64 (100%)	3 (100%)	26 (100%)	96	
					(100%)	

4. Discussion

Patient characteristics: 96 patients with chronic liver disease were enrolled in this study with age ranging between 30-60 years. (Mean -46.5 ± 10.3). 21(21.9%) patients were females while 75 (78.1%) were males. In a similar study by Nilesh Kumar Patira et al⁽⁵⁾ Majority of patients 36 (72%) belonged to age group 41-60 yrs., 9 (18%) patients were below 40 yrs. of age and 5 (10%) patients were above 60 yrs. of age. 39 (78%) patients were male, and 11 (22%) were female. Study by Samarthana Vijaykumar et al⁽⁶⁾ had majority of patients 63(63%) belonging to age group 41-59 yrs., 17 (17%) patients were below 40 yrs. of age and 20 (20%) patients were above 60 yrs. of age. 78 (78%) patients were male, and 22 (22%) were female. These results suggests prevalence of CLD more in males as compared to females with 30-60 years being the predominant age group.

In our study, most common etiology was found to be Ethanol with 53 cases (55.2%) followed by Hep B with 12 cases (12.5%) and Hep C with 9 cases (9.4%). Similar results were seen in a study by PS Mukherjee et al⁽⁷⁾ conducted in 2010-2020 in which alcohol was the most common cause of cirrhosis (33.9%) while hepatitis B was second most common(33.3%). In contrast to our study, Gourdas Choudhuri et al⁽⁸⁾ showed Nonalcoholic fatty liver disease as the most common cause (39.7%) followed by alcoholic liver disease(25.6%), Hepatitis B(17.5%) and hepatitis c(7.9%). However, AASLD (American Association for the Study of Liver Disease) still mentions Hepatitis B as the most common cause of CLD including both cirrhosis and Hepatocellular carcinoma although Alcohol abuse is rapidly increasing and is showing trends to replace HBV as the predominant cause of CLD.

In our study 49 cases had raised bilirubin while remaining 47 cases had normal serum bilirubin. Similar results were seen in a study by SK Sayal et al⁽⁹⁾ in which 27 cases (57%) had raised bilirubin while 19 cases had normal serum bilirubin levels suggesting deranged bilirubin metabolism in patients of CLD. Although no correlation was found to be statistically significant between severity of liver disease and levels of serum bilirubin.

5. Conclusion

There is significant occurrence of hypothyroidism in patients of chronic liver disease. Chronic Liver Disease is one of the commonest causes of morbidity and mortality all over the world. Liver plays an important role in metabolism of thyroid hormone and vice versa. Chronic liver disease can lead to thyroid dysfunction resulting in derangement of thyroid functions.

6. References

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