

Hypothyroidism in Patients with Hepatitis C Infection Visiting a Tertiary Care Hospital

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ABSTRACT

Objective: The goal of this study is to assess the prevalence of hypothyroidism among hepatitis C patients, presenting to a tertiary care center.

Study Design: A cross-sectional study

Place and Duration of Study: This study was conducted at the Department of Medicine, Liaquat University of Medical & Health Sciences, Jamshoro between January 2022 and June 2022.

Materials and Methods: All patients who were aged between 18 and 65 years, irrespective of gender, who had been diagnosed with hepatitis C infection for more than 6 months and did not take any treatment for thyroid dysfunction were included in the study. Patients who were already diagnosed with thyroid diseases before the hepatitis C infection and were on treatment for thyroid dysfunction or underwent surgery or radiation were excluded from the study. All the information was collected on a prescribed proforma.

Results: A total of 151 patients were included in the study. A mean age of 45.7 ± 13.4 was observed, and a mean duration of 6.4 ± 3.8 months of hepatitis C infection was noted. A total of 37 out of 151 patients (24.5%) had hypothyroidism in our study. It was found that age between 18-40 years correlated substantially with a higher prevalence of hypothyroidism.

Conclusion: The study concluded that hypothyroidism was documented in a large number of patients presenting with hepatitis C infection.

Key Words: Hepatitis C Infection, Hypothyroidism, Thyroid Stimulating Hormone, Hyperthyroidism

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INTRODUCTION

Chronic hepatitis, hepatic cirrhosis progressing to hepatic failure, and hepatocellular cancer are almost always caused by the hepatitis C virus (HCV). Treatment for HCV infection often begins with interferon and continues with ribavirin. Some patients with HCV experience thyroid problems due to the virus itself, but prospective studies have shown that patients receiving interferon therapy may develop clinical thyroid disease, which may result in the discontinuation of therapy.

Interferon and ribavirin may trigger the production of different antibodies, which could be a possible cause of

thyroid dysfunction. Early thyroid disease diagnosis and treatment are crucial to preventing problems¹⁻².

HCV infection rates in Pakistan are 30%, with a 2.3% prevalence in children, a 5.2% prevalence in pregnant women, a 3.1% prevalence in army recruits, a 3.6% prevalence in blood donors, a 5.4% prevalence in healthcare workers, a 10.3% prevalence in those at high risk, a 12% prevalence in those with a provisional diagnosis of HCV infection, and a 54% prevalence in those with chronic HCV infection³. Thyroiditis, which can be classified as autoimmune or non-autoimmune is mostly caused by FN- α . 20-40% of patients have subclinical thyroiditis but only 5-10% show clinically evident thyroiditis.⁴⁻⁵ Autoimmune thyroiditis, often known as Hashimoto's thyroiditis, is characterized by the presence of or increase in antithyroid antibodies, regardless of the presence or severity of hypothyroidism. Destructive thyroiditis as well as hypothyroidism⁶ are symptoms of Non-autoimmune IIT. The therapeutic effectiveness of IFN- in the management of chronic hepatitis C is well established. In fact, between fifty percent and seventy percent of patients can be cured when IFN- and RBV are used in tandem⁷. However, IFN- therapy is not without its own risks, and discontinuing treatment could lead to complications and even death.⁸ Thyroid dysfunction was shown to affect between 3 and 14% of individuals

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in research done by Ward et al. in 2001,⁹ 8.2% of HCV-infected patients and 10.7% of those with thyroid dysfunction were given IFN- medications in 2004, according to a study by Bini et al.¹⁰

Chachar AZ et al, concluded that 18.8% of patients had thyroid dysfunction, while 6.59% had hypothyroidism and 23.4% had hyperthyroidism.¹¹ Another study reported the incidence of hypothyroidism as 26% in patients with positive HCV.¹²

One of the most remarkable therapeutic successes of IFN- has been in the management of chronic hepatitis C, in which the combination of IFN- as well as RBV has been shown to promote remission in as many as 50% of patients.¹¹ However, there are several potential side effects of IFN- treatment, some of which are so severe that they can lead to morbidity and the need to stop therapy.¹² It has been established that infection with the hepatitis C virus is associated with both localized and systemic autoimmune disorders. Thyroid problems have been linked to chronic viral hepatitis in a number of ways. The cornerstone treatment medication for HCV infection is pegylated interferon.¹³

Numerous studies conducted in different parts of the world have attempted to quantify the frequency of hypothyroidism among patients with hepatitis C, but adequate data on this issue is absent in Pakistan. It is imperative that patients be identified sooner and that early therapy be enhanced in order to prevent consequences. The results of this research would be useful in estimating how common hypothyroidism is among people with hepatitis C.

MATERIALS AND METHODS

The endocrinology division at Liaquat University of Medical & Health Sciences, Jamshoro, conducted a cross-sectional study between January 2022 and June 2022. The institutional review board gave their blessing to the study before it began. Participants were recruited in the study by using a non-random sampling technique. All patients who were aged between 18 and 65 years, irrespective of gender, who had been diagnosed with hepatitis C infection for more than 6 months and did not take any treatment for thyroid dysfunction were included in the study. Patients who were already diagnosed with thyroid diseases before the hepatitis C infection and were on treatment for thyroid dysfunction or underwent surgery or radiation were excluded from the study.

By using the W.H.O sample size calculator using the frequency of hypothyroidism of 26% in the HCV-positive patients,¹² margin of error (d) = 7%, and confidence level (C.I) = 95%, the estimated sample size of n = 151 patients was included. With a TSH over 4.0 mIU/l and a free T4 below 11.0 pmol/l, hypothyroidism was diagnosed¹². A patient with positive serology of anti HCV antibodies which were confirmed by ELISA

method and HCV RNA by PCR were labeled as having hepatitis C infection.

All patients who visited the outpatient Department of Gastroenterology and fulfilled the inclusion criteria were included in the study. After outlining the technique, hazards, and advantages of the study, informed permission was obtained. Initially, each patient was evaluated based on their clinical, hematological, biochemical, and serological characteristics. Biochemical (liver function test, renal function test) and hematological (blood counts) routine testing were performed with the help of automated methods. Third-generation commercial enzyme-linked immunosorbent assay testing for HCV antibodies was used for detection. Determination of the RNA load of HCV was performed. Free thyroxine (FT4), free triiodothyronine (FT3), and serum thyrotropin (TSH) were measured using ultrasensitive immunological chemiluminescent noncompetitive assay to assess thyroid function (Access 2, Beckman Coulter). All the procedure was performed by the researcher himself under the supervision of a consultant > 5 years of experience. All the information was collected on a prescribed proforma. Biases and confounders were controlled by strictly following the inclusion and exclusion criteria.

The data was imported into SPSS version 21.0 and analyzed appropriately. For quantitative factors such as age, duration of hepatitis C infection, FT3, FT4, and TSH; the standard deviation and median were determined. Gender, hypertension, diabetes mellitus, and hypothyroidism were all provided as frequencies and percentages. To examine the influence of age, gender, duration of hepatitis C infection, FT3, FT4, TSH, length of hepatitis C infection, hypertension, and diabetes mellitus on outcome variables, data was stratified by age, gender, and duration of hepatitis C infection. Following post-hoc stratification, Chi-Square was used with a two-sided P 0.05 as the statistical significance criterion. For graphical data display, bar graphs and pie charts were employed as needed.

RESULTS

There were a total of 151 patients in the research group. The average age was 45.7 ± 13.4 years old and a mean duration of 6.4 ± 3.8 months of hepatitis C infection was noted. Mean levels of thyroid hormones are illustrated in Table 1. The majority of the patients were male and almost one-half of the patients had hypertension. A total of 37 out of 151 patients (24.5%) had hypothyroidism in our study.

Stratification of age group (18-40) & >40, gender (male/female), FT3, FT4, TSH, hypertension and diabetes mellitus were done with respect to hypothyroidism in order to check significant differences as shown in Table 2. Hypothyroidism was shown to occur more often in people aged 18 to 40.

Hypothyroidism and diabetes mellitus were also strongly linked with hypertension, with a frequency of 23 (15.2%) and 21 (13.9%), respectively.

Table No.1: Distribution of patient characteristics

Characteristics	Mean \pm SD
Age (years)	45.7 \pm 13.4
Hepatitis C duration (months)	6.4 \pm 3.8
FT3 (pg/ml)	2.65 \pm 0.91
FT4 (ng/ml)	0.81 \pm 0.19
TSH (uIU/ml)	2.37 \pm 1.3
Gender	N (%)
Male	89 (58.9%)
Female	62 (41.1%)
Hypertension	70 (46.4%)
Diabetes mellitus	52 (34.4%)
Hypothyroidism	37 (24.5%)

Table No.2: Stratification of patient characteristics with respect to hypothyroidism

Charac- teristic	Hypothyroidism		P-value
	Yes	No	
Age			
18-40 years	20 (13.2%)	26 (17.2%)	<0.001
>40 years	17 (11.3%)	88 (58.3%)	
Gender			
Male	25 (16.6%)	64 (42.4%)	0.22
Female	12 (7.9%)	50 (33.1%)	
Hepatitis C duration			
6-8 months	28 (18.5%)	94 (62.3%)	0.363
>8 months	9 (6.0%)	20 (13.2%)	
FT3			
0.76-2 pg/ml	18 (11.9%)	44 (29.1%)	0.28
>2 pg/ml	19 (12.6%)	70 (46.4%)	
FT4			
0.77-1 ng/dl	26 (17.2%)	81 (53.6%)	0.927
>1 ng/dl	11 (7.3%)	33 (21.9%)	
TSH			
0.2-2 uIU/ml	24 (15.9%)	69 (45.7%)	0.637
> 2 uIU/ml	13 (8.6%)	45 (29.8%)	
Hypertension			
Yes	23 (15.2%)	47 (31.1%)	0.027
No	14 (9.3%)	67 (44.4%)	
Diabetes Mellitus			
Yes	21 (13.9%)	31 (20.5%)	0.001
No	16 (10.6%)	83 (55.0%)	

DISCUSSION

Hepatitis C has an extremely high prevalence in Pakistan, second only to Egypt. Right now, HCV infection affects roughly 10 million persons in Pakistan.¹⁴ Many people who have had HCV infection have been treated with interferon injections. Several regional studies,¹⁵⁻¹⁷ have reported on the occurrence of thyroid dysfunction with hepatitis C patients after interferon treatment, but only a few have assessed the prevalence

of this issue before beginning treatment.^{17,18} Twenty percent of untreated HCV patients in the area carried TPO-Ab, making them at increased risk for thyroid problems during and after interferon therapy.¹⁹

The mean lifespan of our patients was 43.712.4 years, which is in line with the findings of Vezali et al.²⁰ as well as Yan et al.²² Whereas 89 (58.9%) of our patients were male and 62 (41.1%) were female, whereas Vezali et al.²⁰ comprised 33 (54.1%) male participants and 28 (45.9%) female participants. The average TSH levels of the participants was 2.371.3 mIU/L, while the average TSH level in the study by Vezali et al.,²⁰ was 1.620.92 mIU/L. Therefore, it is analogous to our research. In our sample, there were 37 cases with hypothyroidism, or 24.5%. According to Vezali et al.²⁰, 18% of people have hypothyroidism. Research by Yan et al.²¹ found that 6.4% of the population has hypothyroidism. Twelve out of 138 patients (8.7%) were found to have hypothyroidism, as reported by Foldes et al.²² The findings of this study are consistent with those of all other investigations undertaken by various researchers.

The present study highlighted that a total of 37 out of 151 patients (24.5%) had hypothyroidism in our study. It was found that age between 18-40 years were significantly associated with higher frequency of hypothyroidism. Hypertension was also significantly associated with a higher frequency or hypothyroidism as well as diabetes mellitus with a frequency of 23 (15.2%) and 21 (13.9%), respectively.

Very little research has been done in Pakistan on the prevalence of hypothyroidism in infected individuals on interferon therapy. All patients with hepatitis C who are on pegylated interferon treatment for hypothyroidism can be tracked in this way, and medical staff can actively manage them to increase adherence.

CONCLUSION

It is to be concluded that hypothyroidism was documented in substantial numbers of newly diagnosed Hepatitis C patients. The study was applied only to a small sample of a single hospital, and the results may not reflect the scenario countrywide. It needs to be evaluated further in a larger group of patients at different hospitals in the country to generalize the findings of our study.

Author's Contribution:

Concept & Design of Study:	Ihsanullah Rajar
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Conflict of Interest: The study has no conflict of interest to declare by any author.

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