ABSTRACT

Aim: The aim of the present study was to investigate the association between hypothyroidism and non-alcoholic fatty liver disease (NAFLD).

Methods: In a prospective observational study, the hypothyroidism patients were evaluated for NAFLD using ultrasonography. The participant’s characteristics such as age, gender, thyroid profile, history of diabetes, hypertension, ischemic heart disease (IHD) were recorded using a data gathering form.

Results: A total of 51 participants were included in this study. From 51 participants, 47 (92.18%) individuals were females whereas 4 (7.82%) individuals were males. Out of 51 participants 27 individuals had NAFLD. There was statistically significant difference in FT4 levels with the participants with NAFLD.

Conclusion: Results from this study suggested that low FT4 concentration is associated with increased risk of NAFLD.

Keywords: Hypothyroidism, NAFLD, ultrasonography, FT4.
improved understanding and treatment of its risk factors (e.g., diabetes and dyslipidemia), prevalence of NAFLD has rapidly increased \[20\]. NAFLD has no definitive biochemical markers or peculiar clinical signs. A simple and effective screening approach for NAFLD should include inquiry into other common causes of fatty liver (alcohol, drugs, hepatitis C virus-related chronic hepatitis, hemochromatosis), an ultrasound scan of the liver and assessment of serum transaminase levels. All over the world, hypothyroidism is one of the most common disease. Thyroid hormones play a fundamental role in the lipid metabolism. Results of some of the reviewed studies showed that hypothyroidism play an important role in the development of NAFLD. This may lead us to find out the association between hypothyroidism and NAFLD. It is remains unclear that whether the hypothyroidism is the risk factor for the progression of NAFLD, or if it, then to what extent hypothyroidism affects the NAFLD. Studies confined to euthyroid subjects have been inconsistent as well, reporting that free T4 (FT3) alone (12), TSH alone (13), both (5), or neither of them (14) are linked with NAFLD. These discrepancies are mainly due to small sizes and cross-sectional design of previous studies. Hypothyroidism is a modifiable risk factor and can easily be treated with thyroid replacement therapy. In this study, we will rule out that whether the hypothyroidism is a risk factor for the progression of non-alcoholic fatty liver disease or not.

MATERIALS AND METHODS:

This prospective observational study was conducted at Shri Mahant Indiresh Hospital, Patel Nagar, Dehradun. From February 2019 to July 2019, patients coming to the medicine OPD department with the complaints of thyroid dysfunction (hypothyroidism) were enrolled in this study. Statics of results are show in table no\(|3|\). Association between thyroid dysfunction and NAFLD:

Association between thyroid dysfunction and NAFLD: T test was performed to check the accuracy of the data. Total 6 parameters were taken in the test and total 51 patients were investigated in this procedure. Statics of results are shown in the table no 1 and table no 2.

Table 1. Statistics using Student T-test

|    | N   | Mean | Std. Deviation | Std. Error Mean |
|----|-----|------|----------------|----------------|
| Age | 51  | 39.24| 10.792         | 1.511          |
| Gender | 51  | 1.92 | .272           | .038           |
| FT3 | 51  | 4.7871| 1.47901       | 2.0710         |
| FT4 | 51  | 14.7853| 5.33802     | .74747         |
| TSH | 51  | 14.2778| 31.14473    | 4.36114        |
| USG | 51  | 1.63 | .692           | .097           |

Table 2. Statistics using 2 tailed Student T-test

|    | t    | df | Sig (2-tailed) | Mean Difference | Confidence Interval of the Difference |
|----|------|----|----------------|-----------------|-------------------------------------|
| Age | 25.964| 50 | .000           | 39.235          | Lower 36.20                         |
| Gender | 50.540 | 50 | .000           | 1.922           | Upper 4.227                         |
| FT3 | 23.114| 50 | .000           | 4.78706         | Lower 4.3711                        |
| FT4 | 19.780| 50 | .000           | 14.78529        | Upper 5.2030                        |
| TSH | 3.274 | 50 | .002           | 14.27784        | Lower 5.5182                        |
| USG | 16.803| 50 | .000           | 1.627           | Upper 1.82                         |

Correlation: To find out the strength of the association of FT3, FT4 and TSH with the ultrasonography, Karl Pearson’s correlation was studied at the base line. A significant correlation was studied at the base line. A significant correlation was studied at the base line. A significant correlation was studied at the base line. A significant correlation was studied at the base line. A significant correlation was studied at the base line. A significant correlation was studied at the base line. A significant correlation was studied at the base line. A significant correlation was studied at the base line. A significant
DISCUSSION:

Hypothyroidism is a metabolic disorder in which the thyroid gland can’t produce the required amount of thyroid hormones (FT3 & FT4) which can be lead to the malfunctioning of the metabolism of the human body. This metabolic disorder causes decreased absorption of the carbohydrate, protein and lipid from the synthesis site that is hepatocytic cells. The inability of the lipid utilization causes storage of the lipid content in the hepatocytes that causes progression of NAFLD. In this study the relation of the Hypothyroidism was checked with the NAFLD. The patients of Hypothyroidism were investigated and diagnosed pathologically for the amount of serum TSH, FT4 and FT3 hormones in their body. And they were also tested for NAFLD by ultrasonography. The results showed that 51 patients were suffering from Hypothyroidism out of which 27 patients were also suffering from NAFLD. Results indicate that there is an association of NAFLD with the Hypothyroidism which may due to the malfunctioning of the metabolism caused by hyper production of serum TSH and insufficient amount of FT4 and FT3 hormones in the body. So it is important to control the level of FT3 and FT4 hormones in the body to prevent the risk of NAFLD and in the patients that are suffering from both Hypothyroidism and NAFLD, they should be first prioritized for the control of Hypothyroidism, that will support the proper function of the metabolic reactions leading to good health of the liver and reduction in the amount of fat in the hepatocytes. So control of Hypothyroidism is necessary for it. Hypothyroidism can be easily treated with the help of thyroid replacement therapy (LEVOTHYROXINE). There is no effective drug is yet discovered for the treatment of NAFLD but liver has regeneration ability, so maintaining good level of thyroid hormones by thyroid replacement therapy with good diet and proper exercise can help in NAFLD.

CONCLUSION:

Results from the study suggested that the lower concentration of the FT4 in the body have significant role in progression of the NAFLD. To treat NAFLD it is required to first control hypothyroidism with the significant use of Thyroid replacement therapy. It is also suggested that the control balanced diet and exercise is required to get rid from NAFLD.

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Table No. 3. Correlation between thyroid functions and USG

|        | FT3        | FT4        | TSH        | USG        |
|--------|------------|------------|------------|------------|
| **FT3**| Pearson Correlation | Sig. (2-tailed) | N | .230 | .105 | -2.91* | .038 | .668 | 51 |
| **FT4**| Pearson Correlation | Sig. (2-tailed) | N | .291* | -1.403** | .003 | .564 | 51 |
| **TSH**| Pearson Correlation | Sig. (2-tailed) | N | -1 | -1 | 1 | .083 | 51 |
| **USG**| Pearson Correlation | Sig. (2-tailed) | N | .062 | .334* | .017 | 51 |

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).