CORRELATION OF THYROID-STIMULATING HORMONE AND PROLACTIN LEVELS IN NON-PREGNANT FEMALE

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Introduction

Hypothyroidism—a very common clinical syndrome results from thyroid hormone deficiency. Hypothyroidism, in turn, slows down the generalized metabolic processes [1]. Hyperprolactinemia may result from different causes, namely, hypothyroidism, medication, and pituitary disorders. Hyperprolactinemia may result from primary hyperthyroidism mediated by several mechanisms [2].

The thyroid-stimulating hormone (TSH) and prolactin are under the control of central hypothalamic pituitary axis. Hyperprolactinemia is a common condition encountered in hypothyroidism and infertility. This may be due to – (i) a compensatory increase in the discharge of central hypothalamic thyrotropin-releasing hormone, which results in stimulation of prolactin (PRL) secretion [3], (ii) decreased PRL elimination from the systemic circulation [3,4], (iii) decreased sensitivity to the suppressant effect of dopamine on PRL synthesis [5], and (iv) increased PRL messenger RNA levels in the presence of lower thyroid hormone levels [6].

This study was conducted to correlate different levels of TSH and PRL irrespective of thyroid status.

Methods

The study was conducted at Kasturba Medical College and Hospital, Mangalore, over a period of 8 months from January 2012 to August 2012. The study group comprised 221 non-pregnant female in the age group of 16–43 years visiting the infertility clinic. Proper consent from subject was taken. The 5 ml of blood was drawn with all aseptic measures. PRL and TSH were measured by immunoassay method using autoanalyzer COBAS e411. Subjects were divided into three groups based on their TSH levels as follows:

- Group 1 – low TSH levels (<0.4 µIU/ml),
- Group 2 – normal TSH levels (0.4–4.27 µIU/ml),
- Group 3 – high TSH levels (>4.27 µIU/ml).

The comparison between three groups was done using ANOVA test. The correlation of PRL levels with TSH was performed using Pearson’s correlation test statistically.

Results

The mean TSH and PRL levels in all the three groups are displayed in Table 1, Fig. 1. The correlation between TSH and PRL was found significantly positive with r=0.239 and p<0.001 (Fig. 2).

Discussion

In the current study involving different ranges of TSH levels from 0.045 to 10.39 µIU/L, a statistically significant positive association was found with PRL (p<0.001) and a positive trend was observed (r=0.239).

In most previous studies demonstrating a positive association were the subjects with established subclinical or overt hypothyroid, PRL was found higher with higher TSH levels. This study showed strong positive association between TSH and PRL irrespective of the thyroid status. Zeliha et al. [2] studies found the similar significant positive association of TSH and PRL (p=0.003). They also found that 36% of overt hypothyroid and 22% of subclinical hypothyroid patients had increased PRL levels. Raber et al. [7] also noticed hyperprolactinemia in 8% of hypothyroid patients, but pregnancy and lactating women were included in the study. Meir et al. [8] found higher PRL in 19% of subclinical hypothyroid patients. They also noticed normalization of PRL.
levels after treatment with L-thyroxine. In studies by Shrestha et al. [9], positive association was observed between PRL, body mass index, and TSH whereas negative with fT3 and fT4. Sharma et al. [10] observed hyperprolactinemia highest in primary hypothyroidism followed by subclinical hypothyroidism and euthyroid individuals. They also noticed significant positive association between TSH and PRL in subclinical hypothyroidism and primary hypothyroidism. Anwary et al. [11] found that only 36% of subfertile women had normal serum PRL and 56% of same normal TSH. The study of hormonal status is very important in diagnosis and initiating treatment of infertility [12,13].

However, the positive trend was observed and the hypothesis framed can be tested in the continuation study involving exclusion of other causes of hyperprolactinemia.

Table 1: TSH and PRL levels in three groups

|            | Group-1 (n=8) | Group-2 (n=183) | Group-3 (n=30) | p-value |
|------------|---------------|----------------|---------------|---------|
| TSH (μIU/ml) (mean±SD) | 0.096±0.08 | 1.98±0.94 | 6.45±3.91 | <0.01 |
| PRL (ng/ml) (mean±SD) | 9.8±6.25 | 16.58±8.78 | 26.5±15.98 | <0.01 |

TSH: Thyroid-stimulating hormone, SD: Standard deviation, PRL: Prolactin

CONCLUSION

The thyroid function tests may be considered in evaluation in case of hyperprolactinemia or in infertility profile.

AUTHORS’ CONTRIBUTIONS

Dr. Sulekha Sinha – doing the research, Dr. Anupama Hegde – guiding and writing of article, Dr. Poornima A Manjrekar – guiding and writing of article, Dr. Rukmini MS – guiding and writing of article.

CONFLICTS OF INTEREST

None.

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