

IMPORTANCE OF THYROID PROFILE IN FERTILITY

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ABSTRACT

Objective: Present study was conducted to see the effect of thyroid profile in different menstrual problems and their effects on fertility.

Study Design: Prospective study

Methodology: A total of eighteen hundred and seventy eight patients reported during the year 2006-8, for the present study to see the role of thyroid hormone in fertility. Out of them, 580(30.9%) males and 1298(69.1%) were females with mean age 35±5 yr and 32±5 yr respectively.

Results: All data analysis were performed using statistical package SPSS version 12.0 (SPSS, Inc., Chicago IL, USA). Mean T3, T4 and TSH levels were found to be 0.85, 0.94 and 0.56. However, significant correlation was found between the thyroid profile and fertility ($r=0.535$ at $p<0.01$ with 99% CI).

Conclusion: The contribution of thyroid profile in fertility and menstrual disturbances are substantial. Therefore, it is recommended to know the thyroid status in these cases to minimize the problem.

Keywords: Thyroid profile, Fertility, Hypothyroidism, Hyperthyroidism.

INTRODUCTION

Fertility is influenced by the moral attitudes of society. The understanding of the causes of infertility has made enormous progress during the past 20 years.¹ Infertility is recognized and defined as a public health problem and is the manifestation of one or more pathological conditions either of female or male origin.² The optimal approach in the management of infertility requires that the timing and method of the routine investigation are beneficial for the couple by avoiding both under- and over treatment.

Unfortunately, infertility is a disorder in which the diagnosis and consequently reliable treatments are frequently unduly and excessively delayed.³ Significant awareness has occurred in the diagnosis and, more importantly, in the treatment of reproductive disorders over the past decade but the overall incidence of infertility has remained stable.⁴ In this regard, thyroid plays an important role in the reproductive activity of males and females. Disorders of thyroid function interfere with several aspects of reproduction.^{5,6} Thyroid hormones are essential for normal growth, sexual development and reproductive function.⁷ Thyroid dysfunction is prevalent in the population and affects many organs including gonads, thus interfering with the reproductive physiology. Hypothyroidism and hyperthyroidism are considered

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to give rise to menstrual irregularities. However, sub-clinical hypothyroidism is also associated with ovulatory dysfunction. Thyroid dysfunction is quite prevalent in the population and affects many organs including the males and females gonads, interferes with human reproductive physiology, and reduces the chance of conception.⁸

Hypothyroidism results in to an insufficient production of the thyroid hormone and can cause a delay in the onset of puberty or incomplete isosexual precocity in girls and increased testis volume in boys without adrenarche.⁷ Severe and prolonged hypothyroidism in male during childhood may be associated with permanent abnormalities in gonadal function.⁹ Approximately 2-5% of all women in the reproductive age group suffer from hypothyroidism.¹⁰ The disease is associated with cycle disturbances / menstrual such as oligomenorrhea and amenonhea. Low levels of thyroid hormone can interfere with ovulation, which impairs fertility.^{11,12} These observations show a link between hypothyroidism and infertility. Present study was conducted to see the effect of thyroid profile in different menstrual problems and infertility.

PATIENTS AND METHODS

Study design

A Prospective study was conducted during the year 2006-8 on 1878 patients, reported at diagnostic centre Karachi, presenting for the various causes such as amenorrhea, menorrhagia, dysmenorrhagia in females and infertility in both males and females.

Serum assay

Collected samples were measured using ELISA based technology (Monobind kit method, USA) for the estimation of serum T3, T4 and TSH levels. The reference values were 0.6-1.85 ng/ml for T3, 5.0-13.0 ng/dl, for T4, and 0.4–7.0 miu/ml for TSH,

Statistical analysis

All data analysis were performed using SPSS version 12.0 (SPSS, Inc., Chicago IL, USA). Mean T3, T4

and TSH levels and correlation with their presentation (menorrhagia, amenorrhea, and infertility) were observed.

RESULTS

Among 1878 cases, 580(30.9%) males and 1298(69.1%) were females; with mean age was 35±5 yr and 32±5 yr respectively. The mean T3, T4 and TSH levels were found to be 0.85, 0.94 and 0.56. The distributions of different presentation (menorrhagia, amenorrhea, and infertility) of the individuals are 78.2% infertile, 20.1% menorrhagia and 1.7% found to be amenorrhea (Fig-1). The levels of T4 and TSH significantly correlated to each other (r = 0.377 at p<0.01), while TSH levels is substantially correlated with hypothyroidism (r = 0.592 at p< 0.01), (Table 1). On the other hand, infertility is found in high TSH levels (r = 0.535 at p<0.01), and at low T4 levels (r = 0.422 at p<0.05), (Table-2).

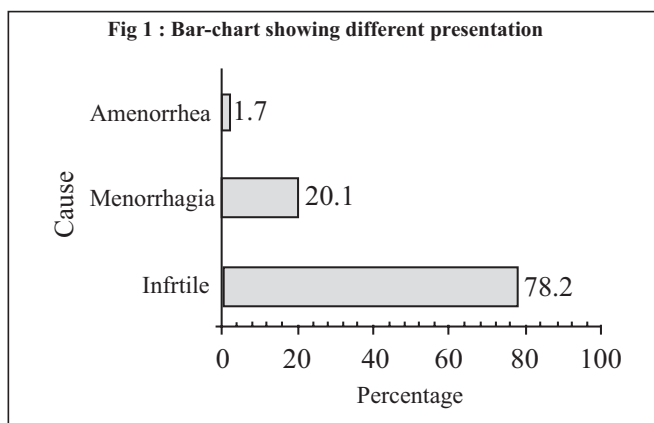


Figure 1: Bar-chart showing different presentation

Table 1: Correlation between thyroid profile, hyperthyroidism and hypothyroidism

	T ₃	T ₄	TSH	Hypothyroid	Hyperthyroid
T ₃	1.000	0.535**	0.106	0.684	0.728
T ₄		1.000	0.377**	0.366**	0.922
TSH			1.000	0.592**	0.178*
Hypothyroidism				1.000	0.030
Hyperthyroidism					1.000

*p<0.05
**p<0.01

Table 2: Correlation between presentation of the individual and thyroid profile:

	T ₃	T ₄	TSH	Menorrhagia	Amenorrhoea	Infertility
T ₃	1.000	0.555**	0.106	0.622	0.722	0.626
T ₄		1.000	0.377**	0.426*	0.389*	0.422*
TSH			1.000	0.329*	0.428*	0.535**
Menorrhagia				1.000	0.962	0.866
Amenorrhoea					1.000	0.881
Infertility						1.000

* p<0.01

** p<0.05

DISCUSSION:

Infertility is one of the major social problems of the new millennium worldwide, which affects women's health and leads to social and psychological disturbances in their life especially in our population. The percentage of couples experiencing infertility involves all regions of the world¹³, and in some countries it may be growing.¹⁴ There could be many reasons for this phenomenon (spread of sexually transmitted diseases, pushing back the age at which reproduction attempts are begun, environmental factors interfering for example with sperm production, etc.).

Conception involves spatiotemporally regulated endocrine, cellular and molecular events. Generally, measurement of serum TSH level among infertile women is employed for detection of hypothyroidism. High serum TSH level and presence of anti-thyroid antibodies was the major risk factors of infertility (Table 1, 2). Thyroid disease can interfere with the process of getting pregnant; by ovulation and irregular menstruation.¹⁵ Male infertility was observed in 21% among the Makkans population with correlated abnormalities of gonadotrophins, thyroid stimulating hormone, and thyroid and testosterone hormone, they reported 35% cases of hypothyroidism while hyperthyroidism was found to be 14%, where as 28% of thyroid abnormality constituted an independent infertile group.¹⁶ Hypothyroidism may also be associated with an increased frequency of menstrual period in patients with mild to moderate

thyroid failure, and a lack of menstruation (amenorrhoea) when hypothyroidism is severe.

In our study, significant correlation of serum TSH level, menorrhagia, amenorrhoea and infertility were found at p<0.01 (Table-2). Similar study was conducted in Belgium on a cohort of 438 infertile couples, 45% females were identified as infertile; endometriosis (11%), tubal disease (30%) and ovarian dysfunction (59%). However, Male infertility was diagnosed in 38% and idiopathic infertility in 17% of the couples.¹⁷ The origin of infertility is similarly due to male or female factors; the causes are multiple. Female factors account for 46.7% of infertility. Male factors account for 19.0% of infertility. Male and female factors combined cause 18.2% of fertility. The etiology is unknown in 11.2%, and other causes are identified in 5.2%. About 25% infertility and 15% menstrual cycle disorders result from thyroid dysfunction. This prevalence of sub-clinical hypothyroidism has also been reported in population of Pragu.¹⁸ Therefore, thyroid function must be examined in female with unclear infertility or menstrual problems.¹⁹

CONCLUSION:

The contribution of thyroid in fertility and menstrual disturbances are substantial. So, it is recommended to know the thyroid status in these cases. Further more, thyroid profile estimation cannot be ignored in the infertile couples. Awareness of the thyroid status in the infertile couple is crucial, because of its significant, frequent and often reversible or preventable effect on infertility. These abnormalities reverse after restoration of euthyroidism.

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