International Journal of Health Sciences and Research
www.ijhsr.org ISSN: 2249-9571

Original Research Article

The Association of Thyroid Profile with Primary Infertility in Females.

Surekha T. Nemade[1*], Abdulrahaman A. Momin[1], Pankaja S. Naik[1], Yashwant R. Patil[2], Tushar V. Nemade[2]

[1]Department of Biochemistry, Dr. Vasantrao Pawar Medical College, Adgaon, Nashik
[2]Department of Obstetrics & Gynecology, Dr. Vasantrao Pawar Medical College, Adgaon, Nashik

[*]Correspondence Email: surekhabhandari@rediffmail.com

Received: 29/11//2011 *Revised: 13/12/2011* *Accepted: 24/12/2011*

ABSTRACT

In the present study age matched primary infertile females were compared with normal fertile females to assess thyroid status. Serum T_3 and T_4 levels were increased in patient group than fertile females which is highly significant ($p<0.01$), While the decrease in serum TSH level in the patient group is also highly significant ($p<0.01$). 52% patients were in euthyroid state which directs the clinician to assess other causes of infertility. Study also showed 30% hyperthyroid and 18% hypothyroid patients with infertility. This data indicates the association of thyroid dysfunction with infertility. Thyroid profile should be assessed to rule out infertility and the disorder is to be treated accordingly to revert back to fertility. This research also opens the route to rule out other endocrinal disorders associated with infertility.

Keywords: infertility, thyroid profile, hyperthyroidism, hypothyroidism.

INTRODUCTION

Infertility is defined as the inability to conceive after one year of regular intercourse without contraception. [1] The prevalence of infertility is estimated between 12 and 14 % and remains stable in recent years. It thus represents a common condition with important medical, economic and psychological implications. According to the standard protocol, infertility evaluation usually identifies different causes including male infertility (30%), female infertility (35%); the combination of both 20% and finally unexplained or idiopathic infertility 15%.

Female causes of infertility comprise of endometriosis, tubal damage and ovulatory dysfunction. [2, 3] Thyroid dysfunction itself is a condition interfering with normal

ovarian function. Thyroid hormones have profound effects on reproduction and pregnancy. There is known association of hyperthyroidism and hypothyroidism with menstrual disturbances and decreased fecundity.[4]The most frequent thyroid syndromes like hypothyroidism and thyrotoxicosis are accompanied with menstrual disturbances. [5]

Thyroid dysfunction which is quite prevalent in the population affects many organs including male and female gonads, interferes with human reproductive physiology, reduces the likelihood of pregnancy and adversely affects pregnancy outcome, thus becoming relevant in the algorithm of reproductive dysfunction. Although menstrual irregularities are common, ovulation and conception can still occur in hypothyroidism where thyroxine treatment restores normal menstrual pattern and reverses hormonal changes. Subclinical hypothyroidism may be associated with ovulatory dysfunction and adverse pregnancy outcome. Menstrual disturbances, frequent in thyrotoxicosis are restored following treatment. [6]

Awareness of thyroid status in the infertile couple is crucial because of its significant, frequent and often reversible or preventable effect on infertility. Many aspects of the role of thyroid disorders in infertility, however, need further research. [5] A systematic screening of T3, T4 and TSH could be considered in all the females with infertility. Hence this study was undertaken to evaluate the role of thyroid profile in primary infertility

MATERIAL AND METHODS

The case control study was carried out in central clinical laboratory in collaboration with department of Gynecology, in Dr. Vasantrao Pawar Medical College, Hospital and research centre, Nashik. The study was approved by institutional ethics committee.

Females which are being examined by the gynecologist and diagnosed as primary infertility were included in this study. The females with preexisting thyroid disorders, heart diseases or any other endocrine disorders were excluded from the study. The study included 50 females between age group 20-40 years, diagnosed as primary infertility and compared with 50 age matched fertile females. About 5 ml of blood sample was collected in plain bulb. This blood is allowed to clot and then centrifuged to obtain clear, transparent, non hemolyzed sera. These sera samples are then subjected for the serum T_3, T_4 and TSH estimation.

These samples may be refrigerated at 2-8^{0}C for the maximum period of 5 days if not tested immediately. Serum T_3, T_4 and TSH levels were determined by immunoenzymatic method using Acculite CLIA microwells manufactured by LUMAX. Before processing the samples, each method was calibrated. The normal ranges for T_3, T_4 and TSH are as follows:

T_3 = 0.52-1.90 ng/ml
T_4 = 4.5-12.0 µg/dl
TSH = 0.4-5.4 µIU/ml

To calculate the prevalence of hyperthyroidism and hypothyroidism serum TSH level was considered: 1. When serum TSH was <0.4 µIU/ml, hyperthyroidism was diagnosed.
When serum TSH was >5.4 µIU/ml, hypothyroidism was diagnosed.
Data was analyzed statistically using ‘z’ test for which if $p<0.01$, the results are highly significant.

RESULTS

The infertile female patients were compared with the fertile females (controls) for thyroid profile. Serum T_3, T_4 levels were found to be increased in infertile females compared to controls as shown in Table 1. These increases were statistically highly significant ($p<0.01$). Serum TSH levels were found to be decreased in infertile females compared to controls as shown in Table 1. This decrease was also statistically highly significant ($p<0.01$). Table 2 summarizes the percentage prevalence of thyroid status in primary infertile females.

Table 1: T3, T4 and TSH levels in control (fertile) and primary infertility females

	T_3 (ng/ml)	T_4 µg/dl	TSH µIU/ml
Fertile females (Control) (n=50)	0.89 ± 0.35	6.90 ± 1.97	4.81 ± 2.14
Primary infertile females (n=50)	1.4 ± 0.56**	8.60 ± 3.04**	3.46 ± 1.85**

**p< 0.01- highly significant

Table 2: Thyroid status in primary infertile females

Age Group	No. of cases	Thyroid status		
		Hypothyroidism	Hyperthyroidism	Euthyroidism
20-40 yrs	50	09 (18%)	15 (30%)	26 (52%)

DISCUSSION

One of the oldest human problems with widespread prevalence is infertility. Apart from the social, economic consequences, infertility has a serious impact on husband-wife relationship including their physical and mental health. In the society childlessness is a challenging condition to the couple and has to face many social and family problems. To overcome this, a large number of investigations as well as hormonal assessments are done to diagnose and manage the infertility.

Extensive studies have proved that normal functioning of thyroid glands is needed for normal sexual function. The action of thyroid hormones cannot be pinpointed to a specific function but probably results from a combination of direct metabolic effects on gonads and excitatory and inhibitory effects operating through anterior pituitary hormones that control sexual functions. [7]

In the present study, though the levels of T_3, T_4 and TSH are within normal limits in patients group, there is wide variation in the range. When compared to the normal controls, there is statistically highly significant increase in T_3 and T_4 levels and decrease in TSH levels. These results are in accordance with the report of Sharma et al [7], Hassler et al [8] and Singh et al. [9]

Present study also shows that on assessing the thyroid function in primary infertile females, about 52% were in euthyroid state, and about 30% were with hyperthyroidism while 18% were in hypothyroid state (Table 2). Majority of

patients were in euthyroid state which shows that in infertility, thyroid status may not play significant role in euthyroid infertile females and which could be due to the other organ disorders like menstrual cycle disturbances or other hormonal disorders. This result is also in accordance to Sharma et al [7] and Goswami et al. [10]

The prevalence of hypothyroidism in this age group was about 2-4 % [11, 12] which is found to be 8% by Goswami et al [10] and 20% by Sharma et al [7] while in our study this prevalence is 18%.

About 30% females were with hyperthyroidism in this study, which may be due to the special referral pattern of the patients from a specific area for thyroid profile. This prevalence is about 8% in the study by Goswami et al [10] it is 5.8% evaluated by Joshi et al [13] and 3.07% by Sharma et al. [7] In addition to thyroid profile other endocrine hormones like prolactin should be considered in infertility. Hyperprolactinemia and hypothyroidism are associated with infertility in females [10, 14] need further research.

CONCLUSION

Our study reveals that there is high prevalence of hyperthyroidism as well hypothyroidism in primary infertile women. These disorders may lead to menstrual irregularities resulting in infertility. Hence, serum T_3, T_4 and TSH investigations are very important in screening of infertile patients, so that the patient may be treated accordingly with medications and can revert back to the fertile state. Along with the thyroid hormones other endocrine hormones are also need to be assessed.

ACKNOWLEDGEMNT

We would like to thank the technical staff of central clinical laboratory of our medical college for their co-operation.

REFERENCES

1. Guy S: In Infertility: What is infertility? Ehealth MD, September 2009.
2. Poppe K, Velkeniers B: Thyroid and infertility. Verh K Acad Geneeskd Belg, 2002; 64(4):389-99.
3. Poppe K, Glinoer D, Van S. A, Tournaye H, Devroey P, Schiettecatte J et al: Thyroid dysfunction and autoimmunity in infertile women. Thyroid, 2002:12(11):997-1001.
4. Poppe K, Velkeniers B: Thyroid disorders in infertile women. Ann Endocrinol (Paris), 2003; 64(1): 45-50.
5. Maruna P: Gynecological aspects of thyroid disorders-A review. Ceska Gynekol, 2006; 71(4):332-338.
6. Trokoudes K M, Skordis N, Picolos M K: Infertility and thyroid disorders. Curr Opin Obstet Gynecol, 2006; 18(4):446-51.
7. Sharma U R, Parmar C: Thyroid profile in infertile women and menstrual dysfunction. Source Indian Medical Gazette, updated 2007, www.endocrineindia.com/thyroidne wsite.
8. Hassler F S: Lithyronine therapy in female infertility. J Fertile and Sterile, 1958; 9(6):555-559.
9. Singh L, Agarwal C, Chaudhary C R: Thyroid profile in infertile women. Ind J Gynae and Obst, 1990; 37(12):248-253.
10. Goswami B, Patel S, Chatterjee M, Koner B C, Saxena A.: Correlation

of prolactin and thyroid hormone concentration with menstrual patterns in infertile women. J Reprod Infertil, 2009; 10(3):207-212.
11. Wang C, Crapo L M: The epidemiology of thyroid disease and implications for screening. Endocrinol Metab Clin North Am, 1997; 26(1):189-218.
12. Bjoro T, Holmen J, Kruger O, Midthjell K, Hunstad K, Schreiner T et al: Prevalence of thyroid disease, thyroid dysfunction and thyroid peroxidase antibodies in a large unselected population. The Health Study of Nord-Trondelag (HUNT). Eur J Endocrinol, 2000; 143(5):639-647.
13. Joshi J V, Bhandarkar S D, Chadha M, Balaih D, and Shah R: Menstrual irregularities and lactation failure may precede thyroid dysfunction or goiter. J Postgrad Med, 1993; 39(3):137-141.
14. Kumkum A, Jasmine K, Shweta G, Pal A N: Hyperprolactinemia and its correlation with hypothyroidism in infertile women. J Obstet Gynecol India, 2006; 56(1):68-71.

****