Association of thyroid dysfunction among infertile women visiting infertility center of Om Hospital, Kathmandu, Nepal

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ABSTRACT

Infertility is one of the medial, social and psychological burdens in this part of world. Thyroid dysfunction can lead to menstrual disturbance, anovulatory cycles, and decreased fecundity. Proper management ofthyroid dysfunction canresult restoration of normal fertility. Therefore it is very important to screen thyroid abnormalities among women with infertility. This study aimed to determine association of thyroid dysfunction among infertile women. This study comprises total of 735 primary infertile women with age ranging from 20 to 35 years. Blood samples were collected and subjected for estimation of thyroid hormones. Out of 735 cases 547 (74.4%) were euthyroid. 56 (7.6%) have primary hypothyroidism, 31 (4.2%) have primary hyperthyroidism, 87 (11.8%) have subclinical hypothyroidism, and 8 (1.1%) have subclinical hyperthyroidism.

Keywords: Infertility, Thyroid hormone, Thyroid dysfunction

INTRODUCTION

Infertility is defined as the inability to conceive after one year of regular intercourse without contraception. It is one of the medial, social and psychological burden in this part of world. About 18–20% of couples in reproductive age are infertile.[1] Endocrines play central role in maintaining fertility. Thyroid hormones have profound effects on reproduction and pregnancy. There is a known association of hyperthyroidism and hypothyroidism with menstrual disturbances and decreased fecundity. Therefore assessment of thyroid dysfunction has been considered as an important component of infertility work up in women.[2] There are several experimental evidences, both on animals and humans, indicating association of hyperthyroidism or hypothyroidism with menstrual disturbance, anovulatory cycles, decreased fecundity and increased morbidity during pregnancy.[3-5] Most importantly proper management of such thyroid dysfunction results in improvement in health status, normalization of menstrual abnormalities and restoration of normal fertility.[6] Therefore it is very important to screen thyroid abnormalities among women with infertility, particularly in countries like us, considered as areas with endemic goiter. Infertility associated with thyroid dysfunction in these areas is not uncommon.[7]

The aim of this study was to find association of thyroid dysfunction among infertile women visiting our infertility and IVF center.

MATERIALS AND METHODS

This study comprises total of 735 primary infertile women with age ranging from 20 to 35 years, visiting infertility and IVF center of Om Hospital and Research Centre, Kathmandu, Nepal. The cases were selected over period of two years (March 2009 to 2011). The inclusion criteria for the selection of cases were diagnosis of primary infertility, age between 20-35 years with duration of marriage more than one year. Infertility due to male factor and the female factors with any congenital anomaly of urogenital tract, or any obvious organic lesion were excluded. Any history of thyroid disease, thyroid surgery and those treated with thyroid medication were also excluded.

Five milliliters of venous blood was collected in fasting state. Serum was prepared within one hour of blood collection and stored at -20°C till get analyzed for thyroid function test. All samples were analyzed within 15 days from blood collection date. Serum free 3,5,3'-triiodothyronine (fT3), free 3,5,3',5'-tetraiodothyronine (fT4) and thyroid- stimulating hormone (TSH) were analyzed using VitrosECi™ analyzer (Ortho Clinical Diagnostics; OCD, Rochester, NY). Measurement of fT3 and fT4 was based on a direct, labeled antibody, competitive immunoassay, whereas immunometric immunoassay technique was used in measurement of TSH. The bound HRP conjugate was measured by a luminescent reaction.[8] Assay validity and reliability was determined by use of control sera provided by OCD. Normal range used for the third generation TSH assay was 0.46 to 4.5 ìIU/mL, and cut off range for fT3 and fT4 used were 4.26 to 8.10 pmol/L and 10.0 to 28.2 pmol/L respectively.

As per thyroid profile cases were categorized into 7 groups- Euthyroidism, primary hypothyroidism, primary hyperthyroidism, secondary hypothyroidism, secondary hyperthyroidism, subclinical hypothyroidism, and

Table-1: Categorization of cases on the basis of thyroid profile

	fT3 (pmol/L)	fT4 (pmol/L)	TSH (?IU/mL)
Euthyroid	4.26 - 8.10	10.0 - 28.2	0.46 - 4.5
Primary Hypothyroid	< 4.26	< 10.0	> 4.5
Primary Hyperthyroid	> 8.1	> 28.2	< 0.46
Secondary Hypothyroid	< 4.26	< 10.0	< 0.46
Secondary Hyperthyroid	> 8.1	> 28.2	> 4.5
Subclinical Hypothyroid	4.26 - 8.10	10.0 - 28.2	> 4.5
Subclinical Hyperthyroid	4.26 - 8.10	10.0 - 28.2	< 0.46

subclinical hyperthyroidism (Table-1).[9-14] The statistical analysis was carried out using Statistical Package for Social Sciences SPSS 14 software for windows.

RESULTS

The thyroid function status of our study population was elucidated in Table-2. Mean age of the study subjects were 26.3± 3.1 years. There was no significant difference in age among different groups according to thyroid status ($p>0.05$). Out of 735 cases 547 (74.4%) were euthyroid. Large proportion of the cases that is 25.6% of the cases have different types of thyroid dysfunction ($p<0.05$). Among cases with thyroid dysfunction, 56 (7.6%) have primary hypothyroidism, 31 (4.2%) have primary hyperthyroidism, 87 (11.8%) have subclinical hypothyroidism, and 8 (1.1%) have subclinical hyperthyroidism. Only 5 (0.7%) and 1 (0.1%) have secondary hypothyroidism and secondary hyperthyroidism respectively.

DISCUSSION

This study revealed that 25.6% of our study populations have thyroid dysfunction and possibly resulted infertility. Majority of thyroid dysfunction was hypothyroidism comprising almost 20.1%, out of which subclinical hypothyroidism being most common (11.8%). Subclinical hypothyroidism appears to one of the important thyroid dysfunction resulting infertility.[15] Subclinical hypothyroidism may be associated with ovulatory dysfunction and adverse pregnancy outcome.Our results of high prevalence of hypothyroidism in infertile women is also compatible with study conducted in our neighborhood countries.[16,17] Higher prevalence of hypothyroidism may be precipitated due to higher prevalence of iodine deficiency in this country, as it lies in iodine deficient range.[18] Overall prevalence of iodine deficiency in Nepal is 13.6%.[19] Prevalence of hypothyroidism is even high in pregnant women in compare to non-pregnant women as demonstrated by one of study conducted in Nepal.[20] Hypothyroidism due to chronic autoimmune thyroiditis may also contribute significantly.Relatively higher prevalence rate of hypothyroidism in our study can be also due to special referral pattern of the patients who were referred to the hospital based on suspicion of thyroid abnormalities.

Inwomenof fertile age, hypothyroidismresults oligomenorrhea and amenorrhea, polymenorrhea, and menorrhagia. High frequency of infertility in hypothyroidism maybe due to altered peripheral estrogen metabolism, hyperprolactinemia, and disturbances in gonadotropin releasing hormone (GnRH) secretion that result in an abnormal pulsatile releaseofLH.[21] Moreover, thyroid hormones appear necessary to achieve maximum fertilization rates and have special role in oocyte physiology.Furthermore, serum TSH levelscan be a significant predictor of fertilization failure in womenundergoing IVF.[22] Most importantly, treatment of hypothyroidism with thyroid drugs has beenshown to normalize prolactin levels as well as normal LH responsesto LHRH, reduce menstrual disturbances, and finallyincrease the chances of spontaneous fertility.[23,24] Although menstrual irregularities are common, ovulation and conception can still occur in hypothyroidism, where thyroxine treatment restores a normal menstrual pattern and reverses hormonal changes.Therefore, it is very important to identify the hypothyroidism in infertility.

Overall prevalence of hyperthyroidism in our study population is 5.4%, in which primary hyperthyroidism is most common. Another study conducted in India in similar setting also have similar prevalence of hyperthyroidism in

Table-2: Distribution of cases according to thyroid status and mean of thyroid hormone

	N (735)	%	fT3 (pmol/L)	fT4 (pmol/L)	TSH (?IU/mL)
			Mean ± SD	Mean ± SD	Mean ± SD
Euthyroid	547	74.4	5.3 ± 1.5	15.1 ± 3.1	2.1 ± 1.6
Primary Hypothyroid	56	7.6	2.1 ± 1.1	4.2 ± 2.5	10.3 ± 5.2
Primary Hyperthyroid	31	4.2	14 ± 1.8	36 ± 3.3	0.2 ± 0.1
Secondary Hypothyroid	5	0.7	2.2 ± 1.0	5.1 ± 2.0	0.3 ± 0.1
Secondary Hyperthyroid	1	0.1	15 ± 1.2	33 ± 1.8	9.1 ± 1.5
Subclinical Hypothyroid	87	11.8	5.5 ± 1.4	14.6 ± 2.8	9.5 ± 1.2
Subclinical Hyperthyroid	8	1.1	5.2 ± 1.3	16.0 ± 2.1	0.3 ± 0.1

infertile women.[25] Thyrotoxicosis results change in serum sex hormone binding globulin, thus result changes in sex hormone concentration. Changes in sex hormone concentration including LH and FSH, result menstruation disturbance including oligomenorrhea, hypomenorrhea, and anovulation.[26-29] menstrual disturbances, frequent in thyrotoxicosis are restored following treatment.

One of the major drawback of this study was other possible hormonal causes of infertility was not investigated. Specific pattern of thyroid dysfunction in our study patients were not analyzed.

There is high prevalence of thyroid dysfunction among the infertile women. Proper management of the thyroid dysfunction can result regain of fertility. Therefore, routine screening is required to all cases of infertility for possible thyroid disorders.

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