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ORIGINAL ARTICLE

Role of Thyroid Dysfunction in Patients with Menstrual Disorders in Tertiary Care Center of Walled City of Delhi

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Abstract

Objective To study the prevalence of thyroid disorders and its correlation with menstrual disorders.

Methods 100 women aged between 15 and 45 years who attended gyne OPD in Kasturba Hospital, Delhi, were included for this cross-sectional study. The study group comprised 50 patients presented with menstrual complaints. The control group consisted of 50 women of same age group with complaints other than menstrual disorders. Thyroid function tests, anti-TPO antibody estimation, and endometrial sampling were done in all patients.

Results In patients with menstrual disorders, 44 % had thyroid disorders in which subclinical hypothyroidism was prevalent in 20 %, overt hypothyroidism in 14 %, and overt hyperthyroidism in 8 % of the women. Autoimmune thyroid antibodies were present in 30 % patients of women with menstrual disorders. On endometrial sampling, hypothyroid patients mainly had proliferative endometrium (42.85 %) whereas hyperthyroid had atrophic endometrium (60 %).

Conclusions Thyroid dysfunction is an important causative etiology of menstrual abnormalities. Assessment of thyroid function should be done in all patients with menstrual disorders to avoid unnecessary interventions like curettage and hysterectomy.

Keywords Menstrual disorders · Thyroid dysfunction · Subclinical hypothyroidism · Thyroid autoimmunity

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Introduction

Menstrual disorders pose a huge burden on gynecology OPD, accounting for approximately 20 % of attendance [1].

Thyroid hormones play an important role in normal reproductive physiology through direct effects on the ovaries and indirectly by interacting with sex hormone-binding globulin. Thyroid dysfunction can lead to menstrual irregularities and infertility [2]. In India, thyroid disorders are among the most common endocrine diseases [3].

Onset of thyroid disorders increases with age, and it is estimated that 26 % of premenopausal and menopausal women are diagnosed with thyroid disease [4]. Thyroid disorders are more common in women than in men and in older adults compared with younger age groups [5].

Hypothyroidism is associated with a wide spectrum of reproductive disorders ranging from abnormal sexual development, menstrual irregularities, and infertility [6]. The impact of hypothyroidism on the menstrual cycle has been identified since the 1950s and leads to changes in cycle length and blood flow [6]. Subclinical hypothyroidism has been associated with occult menorrhagia (mild disturbances in menstrual amount and duration) before becoming symptomatic [7]. The prevalence of subclinical hypothyroidism is as high as 9.5 % in women [8].

Hyperthyroidism occurring before puberty has been reported to delay the onset of menses [9]. In women of fertile age group, oligomenorrhea and amenorrhea are the commonest abnormalities associated with hyperthyroidism [9]. These irregularities sometimes precede thyroid dysfunction. In the present times, subclinical hyper- and hypothyroidism can be diagnosed very early, whereas these would have passed unnoticed a few decades ago.

Timely detection of Thyroid disorder in patients presenting with menstrual disorders and their management can prevent surgical intervention like curettage and hysterectomy.

Thyroid autoimmunity has been shown to have association with various kinds of thyroid dysfunction. Although there are foreign studies to relate the occurrence of thyroid dysfunction in women with menstrual disorders, but there are not many Indian studies in this regard [10, 11].

Objective

To study the prevalence of thyroid dysfunction and thyroid autoimmunity in patients with menstrual disorders and to study their correlation.

Methods

The present study was conducted in the Department of Obstetrics and Gynecology, Kasturba Hospital, New Delhi, in the period of 12 months between March 2013 and March 2014. 100 women of reproductive age group 15–45 years were selected. Study group comprised 50 women with menstrual disorders like menorrhagia, oligomenorrhea, hypomenorrhea, polymenorrhea, metrorrhagia, and amenorrhea and, and control group comprised women with complaints other than menstrual disorders. Patients with menstrual disorder having any known organic pathology like uterine fibroid, adenomyosis, tubercular endometriosis, polyp, uterine malignancy, etc. and patients with IUCD in utero were excluded from study.

After taking detailed history regarding age, parity, age of menarche, menstrual disorders and dysmenorrhea, general physical examination along with pelvic examination was carried out in women with menstrual complaints. Routine investigation like Hb, Platelet count, TLC, DLC, ESR, ABO-Rh, and thyroid profile that includes T3, T4, TSH, and anti-TPO antibody was performed in all patients. Direct quantitative determination of T3, T4, and TSH by ELISA using human serum-based calibration was performed. The calibrators were calibrated using a reference preparation, which has been assayed against the WHO 2nd IRP 80/558. They were also subjected to special investigations which include Trans-abdominal scan, endometrial sampling, and hysteroscopy (wherever indicated).

Patients were considered as euthyroid if the TSH, T3, and T4 were within normal range (TSH level = 0.39–6.16 μIU/ml, free T3 level = 1.4–4.2 pg/ml, and free T4 level = 0.8–2.0 ng/ml); when TSH was high with T3 and T4 within normal range, they were labeled as subclinical hypothyroidism. Overt hypothyroidism was diagnosed with high TSH and low T3 and T4 levels, subclinical hyperthyroidism if the TSH was low and T3 and T4 levels were in normal range, and overt hyperthyroidism when TSH level was low and T3 and T4 levels were high.

Chi-square test and fisher exact test have been used for qualitative data to calculate p value, and unpaired student t test and non-parametric Wilcoxon–Mann–Whitney test were used to statistically compare quantitative data for T3, T4, TSH, and anti-TPO antibody values in between two groups. Difference with a p value of <0.05 was considered statistically significant.

Results

The study and control groups were comparable in respect of age, religion, and socioeconomic status.

Out of all the types of menstrual irregularities, 25 (50 %) presented with menorrhagia, 10 (20 %) had hypo/oligomenorrhea, 8 (16 %) had polymenorrhea, 6 (12 %) had metrorrhagia, and 1 (2 %) had amenorrhea (Table 1).

80 % of women ($n = 40$) were found to be euthyroid in the control group, while in the study group 56 % ($n = 28$), patients were euthyroid and rest 44 % ($n = 22$) were associated with some or other forms of thyroid dysfunction.

Table 1 Presenting complains in study group

Presenting complaints	Study group	
	Number	Percentage (%)
Amenorrhea	1	2
Hypo/Oligomenorrhea	10	20
Metrorrhagia	6	12
Menorrhagia	25	50
Polymenorrhea	8	16
Total	50	100

Thyroid dysfunctions were also found in 20 % cases ($n = 10$) of control group. Hypothyroidism was the commonest abnormality as seen in 34 % cases in the study group, out of which 20 % had subclinical hypothyroidism, while in the control group, hypothyroid was present in 16 % patients. 10 % of women in study group were hyperthyroid (2 % were subclinical hyperthyroid and 8 % were overt hyperthyroid), while it was 4 % in control group. The difference was statistically significant (p value = 0.036 i.e., <0.05) (Table 2).

Thyroid autoimmunity in the form of thyroid anti-TPO antibody was more prevalent in the study group (30 %) compared to control group (8 %). The difference is statistically significant with a p value of 0.005 (<0.05) (Table 3).

Among the patients with hypo/oligomenorrhea, one case (10 %) had subclinical hypothyroidism, one case (10 %) had overt hypothyroidism, one case (10 %) had subclinical hyperthyroidism, and three cases (30 %) had overt hyperthyroidism.

Among the patients with metrorrhagia, one case (16.67 %) had subclinical hypothyroidism.

Among the patients with menorrhagia, six cases (24 %) had subclinical hypothyroidism and four cases (16 %) had overt hypothyroidism.

Among the patients with polymenorrhea, two cases (25 %) had subclinical hypothyroidism and 2 (25 %) had overt hypothyroidism.

This difference was statistically significant (p value = 0.027, i.e., <0.05) (Table 4).

Among the patients with high TSH level, 42.85 % had proliferative endometrium, 28.57 % had secretory endometrium, 21.42 % had hyperplastic endometrium, and 7.14 % had atrophic endometrium.

Among the patients with low TSH level, 20 % had proliferative and secretory endometrium each, and 60 % had atrophic endometrium.

So, we can see that atrophic endometrium (60 %) is the commonest histopathological finding in women with hyperthyroidism and proliferative endometrium (42.85 %) with hypothyroidism.

This difference was statistically significant (p value = 0.018, i.e., < 0.05) (Table 5).

Discussion

Thyroid disorders in general and hypothyroidism in particular are the common causes of menstrual disorders in women. Menarche, pubertal growth and development, menstrual cycles, fertility and fetal development, postpartum period, reproductive years, and postmenopausal years are profoundly influenced by the thyroid status of women. It is recognized universally that menstrual disturbances may accompany and even may precede thyroid dysfunction.

Menorrhagia was the most common complaint among the patients with menstrual disorders, and most of the patients in other groups presented with white discharge in our study. Similar were observations of Pahwa [13] (50 %) and Padmaleela [14] (50 %), where menorrhagia was the most common complaint.

In our study, the prevalence of *hypothyroidism and hyperthyroidism* in patients with menstrual disorders is almost *two times* higher than in the control population. In the study by Kaur [12], out of 100 patients studied, 14 had hypothyroidism. In the study by Sharma [7], prevalence of hypothyroidism was detected in 22 % patients of DUB and hyperthyroidism in 14 %. In the study by Pahwa [13], 22 % cases of hypothyroidism and 76 % of euthyroidism were reported, whereas Padmaleela [14] observed thyroid disorders in 26.5 % patients of DUB. The prevalence of hyperthyroidism was 8.4 % among the DUB patients as assessed by the findings of their thyroid function tests. Gowri [15] found 17.6 % women with hypothyroidism, 2.7 % with subclinical hypothyroidism, and 4.7 % with hyperthyroidism, which is similar to our study.

In our study, the prevalence of *anti-thyroid peroxidase antibodies* in patients with menstrual disorders is almost *four times* higher than in the control population. This emphasizes the significance of estimation of thyroid antibodies in patients with menstrual disorder. Different

Table 2 Distribution of study and control group with respect to thyroid status

Thyroid status	Study group		Control group	
	Number	Percentage (%)	Number	Percentage (%)
Euthyroid	28	56	40	80
Hypothyroid				
Subclinical hypothyroid	10	20	5	10
Overt hypothyroid	7	14	3	6
Hyperthyroid				
Subclinical hyperthyroid	1	2	0	0
Overt hyperthyroid	4	8	2	4
Total	50	100	50	100

Table 3 Distribution of study and control group with respect to anti-TPO antibodies

Anti-TPO Antibodies	Study group		Control group		p value
	Number	Percentage (%)	Number	Percentage (%)	
Present	15	30	4	8	0.005
Absent	35	70	46	92	
Total	50	100	50	100	

Table 4 Correlation of thyroid dysfunction with menstrual disorders

Menstrual disorders	Euthyroid (%)	Hypothyroid		Hyperthyroid	
		Subclinical (%)	Overt (%)	Subclinical (%)	Overt (%)
Amenorrhea (N = 1)	0 (0)	0 (0)	0 (0)	0 (0)	1 (100)
Hypo/Oligomenorrhea ($N = 10$)	4 (40)	1 (10)	1 (10)	1 (10)	3 (30)
Metrorrhagia ($N = 6$)	5 (83.33)	1 (16.67)	0 (0)	0	0
Menorrhagia ($N = 25$)	15 (60)	6 (24)	4 (16)	0	0
Polymenorrhea ($N = 8$)	4 (50)	2 (25)	2 (25)	0	0
Total	28	10	7	1	4
$N = 50$					

Table 5 Correlation of histopathological findings with TSH level

TSH Level	Histopathological findings			
	Proliferative (%)	Secretory (%)	Hyperplastic (%)	Atrophic (%)
Normal TSH ($N = 25$) (euthyroid)	16 (64)	5 (20)	3 (12)	1 (4)
High TSH ($N = 14$) (hypothyroid)	6 (42.85)	4 (28.57)	3 (21.42)	1 (7.14)
Low TSH ($N = 5$) (hyperthyroid)	1 (20)	1 (20)	0 (0)	3 (60)
Total ($N = 44$)	23	10	6	5

authors have used different methods for Anti-TPO antibody assay, and their results may vary with kits from different manufacturers. Our samples were evaluated for Anti-TPO Antibody using ELISA microwell kit (Xema Co., Ltd, Germany), with cutoff value 75 IU/ml.

In our study, of total 17 hypothyroid patients, most of the patients had menorrhagia followed by polymenorrhea, hypo/oligomenorrhea, and metrorrhagia. Kaur [12] observed that among 14 hypothyroid patients, 9 (64.3 %) had menorrhagia, 3 (21.4 %) had oligomenorrhea, and 2

(14.28 %) had metrorrhagia. Pahwa [13] found a total of 22 hypothyroid patients, in which 16 (78.94 %) had menorrhagia and 4 (10.5 %) had polymenorrhea. In the study by Padmaleela [14], the commonest menstrual complaint was menorrhagia (53.3 %) followed by polymenorrhea (13.3 %), and 20 % had hypo/oligomenorrhea in hypothyroid patients, which goes with our study. Among five hyperthyroid patients, the commonest complaint was hypo/oligomenorrhea followed by amenorrhea. In the study by Kaur [12], the patient with hyperthyroidism was found to have hypomenorrhea. Pahwa [13] found that of two hyperthyroid patients, both had menorrhagia. In the study by Padmaleela [14], among the hyperthyroid patients, 42.8 % had menorrhagia, 28.6 % had polymenorrhea, and 14.3 % had hypo/oligomenorrhea.

In the study group, we found proliferative endometrium in most of the patients on endometrial sampling followed by secretory endometrium in hypothyroid patients. In hyperthyroid patients, maximum number of patients had atrophic endometrium. In the study by Kaur [12], 9 (64.3 %) hypothyroid patients had proliferative endometrium, 3 (21.4 %) had endometrial hyperplasia, and the rest 2 (14.3 %) had secretory endometrium. Sharma [7] found 36.36 % proliferative, 36.36 % secretory and 27.27 % atrophic endometrium in hypothyroid patients. In hyperthyroid patients, they found 42.84 % proliferative, 28.56 % secretory, and 14.28 % hyperplastic endometrium on histopathology examination. In the study by Padmaleela [14], the most common finding in endometrial biopsy was proliferative endometrium (59.1 %) both in hypothyroid (60 %) and hyperthyroid cases (57.1 %). Cystic Glandular Hyperplasia was found only in 13.3 % and secretory endometrium in 26.7 % of the hypothyroid patients.

Conclusions

From our study, it may be concluded that there is a strong correlation of thyroid dysfunction with menstrual disorders. In the patients with menstrual dysfunction, if thyroid disorders are timely diagnosed and treated, the menstrual irregularities settle, and unnecessary intervention like hormonal treatment and surgery can be avoided. The menstrual abnormalities most commonly seen are menorrhagia followed by hypo/oligomenorrhea and polymenorrhea. Since thyroid dysfunction is an important treatable cause of menstrual disorder, estimation of thyroid status should be a part of the battery of investigations being done in the patients of menstrual disorders. The prevalence of subclinical hypothyroidism in patients with menstrual disorders emphasizes the need to detect the hypothyroidism at this stage, so that treatment can be initiated and progression to overt disease be slowed down as a part of management of menstrual disorders.

The estimation of anti-TPO antibody is an expensive test. We recommend its testing as a routine test in the evaluation of patients with menstrual disorders. However, prospective studies are required to analyze the cost effectiveness of anti-TPO antibody testing and its possible benefits with regard to treatment.

Compliance with ethical requirements and Conflict of interest This study was approved by the institutional ethical committee and there is no conflict of interest.

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