

Pattern of Thyroid Dysfunction in Women with Menstrual Disorders

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How to cite this article:

Khatiwada S, Gautam S, KC R, Singh S, Shrestha S, Jha P, Baral N, Lamsal M. Pattern of Thyroid Dysfunction in Women with Menstrual Disorders. *Ann. Clin. Chem. Lab. Med.* 2016;2(1):3-6

DOI: <http://dx.doi.org/10.3126/acclm.v2i1.14195>

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Abstract

BACKGROUND

Thyroid disorders are among the commonest endocrine disorders worldwide. Thyroid dysfunction can interfere in multiple metabolic and physiological processes including menstrual cycle. This study was conducted to find pattern of thyroid dysfunction among women with menstrual disorders.

METHODS

Two hundred thirty three females with menstrual disorders were screened for thyroid dysfunction. Thyroid function was assessed by measuring serum free triiodothyronine (T₃), free thyroxine (T₄) and thyroid stimulating hormone (TSH) levels.

RESULTS

The mean age of study patients was 25.7±6.8 years. The most common menstrual disorder observed was irregular cycle (72.5%, n=169) followed by amenorrhea (21.9%, n=51) and menorrhagia (5.6%, n=13). Most of the patients were in the age group 15-24 years (51.1%, n=119), followed by 25-34 years (36.1%, n=84) and 35-45 years (12.9%, n=30). Mean level of free T₃ and T₄ was 2.91±1.05 pg/ml, 1.42±0.57 ng/dl respectively. Median TSH was 2.0 mIU/L (IQR, 1.0-4.0). Thyroid dysfunction was seen in 25.8% (n=60) women. Most common thyroid dysfunction was subclinical hypothyroidism (14.2%, n=33) followed by subclinical hyperthyroidism (6.9%, n=16), overt hyperthyroidism (3%, n=7) and overt hypothyroidism (1.7%, n=4).

CONCLUSIONS

The study finds thyroid dysfunction especially subclinical hypothyroidism to be common among women with menstrual disorders. Thus, it may be beneficial to screen menstrual disorder patients for thyroid function especially to rule out thyroid disorder as potential etiological agent for menstrual disturbance.

KEYWORDS: Menstrual disorder, Thyroid dysfunction

Introduction

Menstrual problems account for much of the morbidity, affecting one in every five women during their life span [1]. Prevalence of menstrual morbidity in developing countries is comparable to that observed in developed countries and menstrual dysfunction represents a problem for women in developing countries. In developing countries, abnormal uterine bleeding appears to affect about 5-15% of women of reproductive age and probably a higher percent of women in older age groups. Other menstrual disorders include amenorrhea, dysmenorrhea etc. [2].

Thyroid disorders are among the commonest endocrine disorders worldwide with females having higher dysfunction rate than males [3, 4]. Thyroid dysfunctions interfere with numerous aspects of reproduction and pregnancy and an association of hyperthyroidism or hypothyroidism with menstrual disturbance, anovulatory cycles, decreased fecundity and increased morbidity during pregnancy has been observed [5]. Thyroid dysfunction may have profound effects on the female reproductive system and thus women with thyroid dysfunction often have menstrual irregularities, infertility and increased morbidity during pregnancy [6].

Studies have reported thyroid dysfunction to be common among patients with diabetes mellitus, metabolic syndrome and kidney diseases in Nepal [4, 7]. There is however little information about thyroid function status among females with menstrual disorders, and thus the importance of thyroid function test in such patients is unknown. In the light of inadequate information about thyroid function status in Nepalese women with menstrual disorders, we sought to find the pattern of thyroid dysfunction in Nepalese women with menstrual disorders by analyzing the retrospective data of women with menstrual disorders attending thyroid laboratory of B P Koirala Institute of Health Sciences, Dharan, Nepal. The study would be helpful in determining the burden of thyroid dysfunction in women with menstrual disorders and may help for clinical management of such women.

Methods

A retrospective one year (2012-2013) data of Nepalese women with menstrual disorders aged 15-45 years was analyzed for finding the pattern of thyroid dysfunction in such patients. All the

patients in the reproductive age group (15-45 years) presenting with menstrual problems were searched for their thyroid status by considering serum free triiodothyronine (T3), free thyroxine (T4) and thyroid stimulating hormone (TSH) level. Exclusion criteria were women taking anti-thyroid drugs and women with known thyroid disorders. After screening, 233 women were identified to be suitable for the study. Ethical clearance was taken from institutional ethical committee.

Each patient age, type of menstrual disorders and thyroid hormones level were noted. Thyroid hormones were estimated by ELISA technique using kits from HUMAN diagnostics. The fT3 and fT4 estimation were based on the principle of competitive ELISA. TSH estimation was based on the principle of sandwich ELISA. Patients were divided into three groups on the basis of menstrual disorders present; first group with irregular cycle and included oligomenorrhea and polymenorrhea, second group with amenorrhea and third group with menorrhagia. The normal range for thyroid hormones; fT3, fT4 and TSH were 1.4-4.2 pg/ml, 0.8-2.2 ng/dl and 0.39-6.16 mIU/L respectively. Patients with all thyroid hormones in normal range were considered as euthyroid. Patients with TSH level >6.16 mIU/L and free T3 and free T4 in normal range were considered subclinical hypothyroid. Overt hypothyroidism was defined as TSH level >6.16 mIU/L and free T3 and T4 lower than normal range. Subclinical hyperthyroidism was defined as TSH<0.39 mIU/L and normal free T3 and T4 level. Overt hyperthyroidism was defined as TSH<0.39 mIU/L and free T3 and T4 higher than normal range. The data was analyzed using SPSS version 20.

Continuous variables were expressed as mean±SD values and categorical variables as number (percentage). One way ANOVA test and Kruskal-wallis test was applied for continuous variables and chi-square test for categorical variables at 95% confidence interval. A p value < 0.05 was considered statistically significant.

Results

The mean age of study patients was 25.7±6.8 years. Among the study patients, the most common menstrual disorder observed was irregular cycle (72.5%, n=169) followed by amenorrhea (21.9%, n=51) and menorrhagia (5.6%, n=13). Most of the patients were in the age group 15-24 years (51.1%, n=119), followed

by 25-34 years (36.1%, n=84) and 35-45 years (12.9%, n=30). Mean level of free T3 and T4 was 2.91 ± 1.05 pg/ml, 1.42 ± 0.57 ng/dl respectively. Median TSH was 2.0 mIU/L (1.0-4.0). Level of thyroid hormones according to type of menstrual disorder is shown in table 1. Significant difference in free T3 ($p=0.026$) and TSH level ($p=0.012$) was observed among various menstrual disorders.

Among the study patients, 74.2% (n=173) were euthyroid and 25.8% (n=60) presented some kind of thyroid dysfunction. Most common thyroid dysfunction was subclinical hypothyroidism (14.2%, n=33) followed by subclinical hyperthyroidism (6.9%, n=16), overt hyperthyroidism (3%, n=7) and overt hypothyroidism (1.7%, n=4). Thyroid dysfunction according to type of menstrual disorder and age range is shown in table 2. No significant difference in thyroid dysfunction was observed among different types of menstrual disorders, and among age subgroups.

Discussion

In the present study we observed that irregular cycle was the commonest menstrual disorders in women attending the thyroid laboratory, and much of the patients were of age group 15-24 years. However, in another study among dysfunctional uterine bleeding patients, most of the patients were in age group of 35-45 years (54%), followed by 25-34 years (28%) [8]. In a study by Pahwa et al. among 100 dysfunctional

uterine bleeding patients, the commonest menstrual complaint was menorrhagia constituting 50% followed by polymenorrhoea (19%), menometrorrhagia (18%), metropathia haemorrhagica (7%) and 6% had irregular bleeding with uncertain pattern [9]. In a study among Nepalese adolescent girls menstrual disorders were found to be the second most common (23.80%) gynecological problem [10].

In the present study, thyroid dysfunction was seen in 25.8% women with menstrual disorders, and women with menorrhagia have higher TSH level and lower free T3 level than women with other menstrual disorders. Higher level of TSH and lower free T3 observed in menorrhagia than in other menstrual disorders may be due to smaller number of women with menorrhagia in the present study that had poor thyroid function. The major thyroid dysfunction was subclinical hypothyroidism followed by subclinical hyperthyroidism, overt hyperthyroidism and overt hypothyroidism. Previous studies among women with menstrual disorders have reported thyroid dysfunction in varying rate among different population [8, 9]. In a study among dysfunctional uterine bleeding patients, Sharma et al. reported hypothyroidism and hyperthyroidism in 22% and 14% patients respectively [8]. In study among 100 dysfunctional uterine bleeding patients by Pahwa et al. 22 were found to be hypothyroid, 2 hyperthyroid and the rest of the patients were euthyroid [9]. Previous studies among Nepalese population have also found thyroid dysfunction in large part of study population [4, 7].

Table 1. Thyroid hormones level according to menstrual disorders

Hormones	Total, n=233	Irregular cycle, n=169	Amenorrhea, n=51	Menorrhagia, n=13	P value
Free T3 (pg/ml)	2.91 ± 1.05	2.88 ± 0.89	3.16 ± 1.45	2.31 ± 0.86	0.026
Free T4 (ng/dl)	1.42 ± 0.57	1.41 ± 0.54	1.55 ± 0.67	1.15 ± 0.38	0.062
TSH (mIU/L)	2.0 (1.0-4.0)	2.0 (1.0-3.0)	2.0 (1.0-4.0)	5.0 (2.5-6.0)	0.012

Thyroid hormone levels are expressed as mean \pm SD except for TSH which is expressed as median (IQR). P value was calculated using one way ANOVA and Kruskal wallis test at 95% confidence interval.

Table 2. Thyroid function status according to menstrual disorders and age range

Thyroid status	Total, n=233	Irregular cycle, n=169	Amenorrhea, n=51	Menorrhagia, n=13	P value	15-24 years, n=119	25-34 years, n=84	35-45 years, n=30	P value
Euthyroid	173 (74.2%)	127 (54.5%)	38 (16.3%)	8 (3.4%)	0.557	92 (39.5%)	61 (26.2%)	20 (8.6%)	0.449
Subclinical hypothyroidism	33 (14.2%)	20 (8.6%)	9 (3.9%)	4 (1.7%)	0.122	11 (4.7%)	16 (6.9%)	6 (2.6%)	0.088
Overt hypothyroidism	4 (1.7%)	3 (1.3%)	-	1 (0.43%)	0.162	1 (0.43%)	1 (0.43%)	2 (0.86%)	0.081
Subclinical hyperthyroidism	16 (6.9%)	15 (6.4%)	1 (0.43%)	-	0.139	10 (4.3%)	4 (1.7%)	2 (0.86%)	0.6
Overt hyperthyroidism	7 (3%)	4 (1.7%)	3 (1.3%)	-	0.352	5 (2.1%)	2 (0.86%)	-	0.443

The data is expressed as number (percentage). P value was calculated using chi-square test at 95% confidence interval.

Thyroid dysfunction has been found to be associated with menstrual disturbances, however there are findings showing both high and low frequency of menstrual disorders in thyroid dysfunction [11]. Thyroid hormones affect menstrual cycle and both hyperthyroidism and hypothyroidism may result in menstrual disturbances [12]. Thyroid hormones play an important role in normal reproductive function both through direct effects on the ovaries and indirectly by interacting with sex hormone binding proteins. Thyroid dysfunction can lead to (reversible) menstrual irregularities and infertility. Treating thyroid dysfunction can reverse menstrual abnormalities and thus improve fertility [6].

Conclusion

The present study finds high rate of thyroid dysfunction especially subclinical hypothyroidism

among Nepalese women with menstrual disorders. Thus it may be beneficial to screen menstrual disorder patients for thyroid dysfunction especially to rule out thyroid disorder as a potential etiological agent for menstrual disturbance. The study has however several limitations. First the sample size was small, so the finding may need to be verified in larger population. Since the study was cross-sectional no cause and effect relationship between menstrual disorders and thyroid dysfunction could be drawn. A number of other potential factors like thyroid autoimmunity and iodine deficiency or excess condition in study population may also be responsible for the thyroid disorder in the study patients since such components were not studied.

Conflict of Interest

None declared

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