Original Article

Is it important to test thyroid function tests in migraineurs?

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Abstract

Background : Migraine is one of the most common causes of primary headaches. In our study, we aimed to investigate the relation of migraine with thyroid dysfunction by determining the blood levels of free T3, free T4 and TSH in the patients with migraine.
Methods: This study was performed to 234 out-patients diagnosed as migraine. Age, gender, family history, history of thyroid disease, nausea, vomiting, motion sickness, photophobia, phonophobia; type, duration, frequency and intensity of the migraine and relation of these parameters with thyroid function tests were assessed; and compared with the control group. Forty eight healthy people who applied to Family Medicine policlinic with similar age and gender were included to the control group.
Results: In study group there were 17 migraineurs with aura (7.3%), four basilar-type migraine (1.7%) and one retinal migraine (0.4%). The mean migraine duration in study group was 9.8±8.2 years. Also the frequency of the migraine was 43.2±2.6 day/year, the mean duration of an attack was 32.8±18.5 hours. There was no statistically significant difference between two groups when thyroid function test results were compared, regarding the parameters above.
Conclusion: With this study results, we concluded that thyroid dysfunction is not more prevalent among the migraineurs and it is not necessary to test TFT of those patients suffered from migraine.

Key Words: Migraine, thyroid function tests, thyroid dysfunction.

Toprak D, Demirkıran K, Ellidokuz H.. Is it important to test thyroid function tests in migraineurs? TJFMPC, 2007;4:47-51.

INTRODUCTION

Migraine is one of the most common causes of primary headaches. It progresses with episodes and it is characterized with different combinations of neurological, gastrointestinal and autonomic changes (1). Generally, physical examination is normal and the diagnosis is retrospective which is based on co-existing symptoms profile and features of the headache.

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Submitted date: 07.10.2007
Accepted date: 19.11.2007

Clinically, it is progressed with periodic, unilateral location, throbbing headache and moderate or severe intensity of headache attacks. While the attacks nausea, vomiting, phonophobia and photophobia can accompany (1). The last formal diagnostic criterions, for migraine, were published by International Headache Society (IHS) in 2004 (2). The IHS System recognizes six major types of migraine:
1- Migraine without aura (formerly "common" migraine),
2- Migraine with aura (formerly "classic" migraine),
3- Chilhood periodic syndromes that are commonly precursors of migraine
4- Retinal migraine,
5- Complications of migraine,
6- Probable migraine
Also there are subtypes of migraine in this system (2, 3, 4). The diagnose criterions of migraine with or without aura are shown in Table 1 and 2.

Migraine is a frequent disorder that affects 2%-3% of the general population (5). The migraine incidence rate was found as 3.69 (95% confidence interval 3.66, 3.73) cases per 1000 person-years in UK (6). It is reported 17% in women and 6% in men (7, 8). In a sudy it was around 2.5 times higher in women (6) Although there are different hypothesis in migraine physiopathology, there is no common argued idea on this subject.

The prevalence of thyroid dysfunction in general population is 4.8-9% (9, 10, 11). There are many studies in which the relation between migraine and hormones, like oral contraceptives and prolactin, were evaluated (12, 13). In our study, we aimed to investigate the relation of migraine with thyroid dysfunction by determining the blood levels of free triiodothyronine (fT3), free thyroxine (fT4) and thyroid stimulating hormone (TSH).

METHOD

A total of 234 migraine patients who applied to Neurology policlinics of Afyon Kocatepe University Faculty of Medicine were included the study. On the other hand 48 healthy subjects with no history of primary headache and thyroid disease with similar age and gender distribution with the study group, applied to Family Medicine policlinics of our hospital, were selected for the control group. Patients whose thyroid function tests were not in normal ranges and who had headache complaints and thyroid dysfunction history were excluded from control group. Also history of previously diagnosed thyroid disease, patients who were performed thyroid operation, patients with chronic renal failure (hemodialysis), subjects taking medicines for thyroid disease like L-thyroxin and propycil, also medicines like dopamine, dopamine agonists or antagonists, corticosteroids and heparin were excluded from study and control groups.

Age, gender, family history of migraine, history of thyroid disease, nausea, vomiting, motion sickness, photophobia, phonophobia; type, duration and intensity of the migraine and relation of these parameters with thyroid function tests were assessed. Migraine was diagnosed and classified according to the International Headache Society (IHS) criterions following a careful clinical evaluation. IHS criterions which we used for diagnose of migraine are showed in Table 1 and 2.

In all patients, to evaluate the thyroid functions, free triiodothyronine, free thyroxine and thyrotropin levels were measured by radioimmunoassay. According to our laboratory, the normal values of fT3 was 2.3-4.2 pg/mL, fT4 0.89-1.80 ng/dl and TSH 0.27-4.2 uIU/mL. Thyroid function tests were also evaluated in control group (n=48) and compared with the study group. Demographic and clinical features of the migraine patients were reported. Frequency (day/year), duration (hour) and severity of the cephalalgia was reported for all the migraine patients. Severity scores were between 0-3 points by which zero represented no pain and 3 points were most severe pain. All the migraineurs were wanted to score, their last two months headaches according to these 4 degrees of pain.

SPSS 10.0 program was used for the analysis of the datas. T test, chi-square and Mann Whitney U tests are used as statistical methods to compare the groups and $p<0.05$ is accepted as significant.

RESULTS

In a period of 16 months, a total of 234 migraine patients were included in this study, with 203 female (86.8%), 31 male (13.2%) and a ratio of F/M=6.6. The mean age of the participants were 35.7±10.2 years (16-69). Case and control groups were similar according to age and the gender ($p>0.05$). Control group included 6 men (12.5%) and 42 women (87.5%).

In study group there were 105 migraineurs without aura (90.6%), 17 with aura (7.3%), four basilar-type migraine (1.7%) and one retinal migraine (0.4%). The mean migraine duration in study group was 9.8±8.2 year (1-40 years). Also the frequency of the migraine was 43.2±2.6 day/year (2.4-240 day/year). The mean duration of an attack was 32.8±18.5 hours (4-96 hours) for the migraineurs. The most prevalent complaint related with migraine was nausea (94.9%, n=222). The others were sonophobia (86.8%), photophobia (85.9%) and vomiting (45.3%). A family history of migraine was observed in 89 (38%) patients out of 234.

We separated our study group into two groups according to their ages in which group one included ages under 35 years old and group two represented 36 and older ages. Both groups included same number of patients (n=117) and we couldn't find a significant correlation between age and thyroid function tests ($p>0.05$).

Moderate or severe pain which is represented by 2 and 3 points, for last two months, were 55.1% and 44.9% respectively.

The clinical features of our patients according to the gender were shown in Table 3.

The ratio of thyroid disease history, in our study group, was 2.6% (0.9% hyperthyroidism, 0.4% hypothyroidism, 1.3% subclinical hyperthyroidism). The mean value of free T3 was 3.1±0.5 pg/mL (1.00-5.65 pg/mL), free T4 was 1.2±0.3 ng/dl (0.33-2.42 ng/dl) and TSH was 1.8±1.2 uIU/mL (0.00-8.43 uIU/mL). When we compared these results according to the gender, with the control group, there was a difference related with the high estimation of the mean free T3 values, in men (3.3±0.3 pg/mL) (p: 0.002). Mean values of free T3

in men was 3.3±0.3 pg/mL and 3.0±0.5 pg/mL in women.

There were no statistically significant difference between two groups when thyroid function test results were compared, regarding family history of migraine, motion sickness, nausea, vomiting, photophobia, phonophobia, duration, frequency and type of the migraine (p>0.05) (Table 4 and 5).

DISCUSSION

Among women, the overall prevalence of migraine was 10.1-22.9% with a maximum of 11.5-38.1% in the 40-49 age group. The prevalence rate among men was 2.5-14.8% and the female/male gender ratio was 2.0-4.0 (14, 15). Comparing our results, similarly, migraine is more prevalent among women, but our F/M ratio is six. This can be explained with; our study group which was carried out in Neurology and Family Medicine clinics of the hospital and participants' not being selected randomly. Also like many studies performed with outpatients, women's more request of help for headache problem can be a reason for this excess number (16, 17, 18).

Women with migraine had an average of 39.8-52.5 headache occasions during a year and men with migraine 23.3-61 headache occasions per year (14, 15). In our study group, migraine attacks were 43.2±2.6 day/year (2.4-240), which were 36.6±2.12 day/year for women and 43.8±2.7 day/year for men. These results are similar with other studies.

In migraine endocrinological causes like menstrual cycle is well known (12, 19). Thyroid function studies are performed to role out thyroid disease, such as thyrotoxicosis, a condition that may exacerbate headache. But another hypothesis is the relation of hypothyroidism. Hypothyroidism is claimed to be one of the causes of headache (12, 19, 20). In the study by Th. Moreau et al. a relation with hypothyroidism and headache was observed. In their study 39.8% of the patients had a history of migraine and thirty-one patients with hypothyroidism of 102 (30%) presented with headache 1 to 2 months after the first symptoms of hypothyroidism (19). But in another study, thyroid function tests were performed in 30 patients with chronic headache. Six were found to have hyperthyroidism and none had hypothyroidism (21). Although these both studies; we couldn't find a significant relation with TFT and the migraine, in our study. In a study by Hagen K et al. lower TSH values among headache sufferers, especially migraineurs, than the subjects without headache complaints were measured (22). Also they found the prevalence of headache low, amongst women (not amongst men) with high TSH values (22). The measured mean serum TSH levels in our study group, were not low or high compared with the control group (17.5±1.19, 1.62±1.00 respectively) and also in women. In our opinion, both hyperthyroidism and hypothyroidism can cause headache but in reverse way, headache or migraine are not the risk factors for thyroid dysfunction with regard to our study.

The frequency of all types of thyroid function test disorders were reported as 6.8%, of which 1-0.015% were as hypothyroidism, 0.2-0.038% were hyperthyroidism, 0.3-5.6% as subclinical hypothyroidism and 4.6%±2.1% as subclinical hyperthyroidism. Like migraine overt thyroid dysfunction was more evident in women. Thyroid dysfunction was 2-2.66 fold frequent in women than in men (9, 10, 11, 23-25). While our subclinical hyperthyroidism prevalence was low, the others were similar with other studies. With a comprehensive and a larger study group the number of subclinical hyperthyroidism can increase.

With these results, we didn't find the increased prevalence of thyroid dysfunctions among migraineurs. It must not be confused that; these results don't represent that TFT are useless in all kinds of headaches, as they are one of the criterions in differential diagnosis of chronic headaches.

CONCLUSION

With this study results, we concluded that thyroid dysfunction is not more prevalent among the migraineurs and it is not necessary to test freeT3, freeT4 and TSH of those patients suffered from migraine.

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Table 1: Adapted IHS Criteria for Migraine with Typical Aura (IHS 2004) (2)

A. At least 2 attacks fulfilling criteria B-D
B. Aura consisting of at least one of the following, but no motor weakness:
- Fully reversible visual symptoms including positive features (e.g., flickering lights, spots, or lines) and/or negative features (i.e., loss of vision)
- Fully reversible sensory symptoms including positive features (i.e., pins and needles) and/or negative features (i.e., numbness)
- Fully reversible dysphasic speech disturbance

C. At least two of the following:
- Homonymous visual symptoms and/or unilateral sensory symptoms
- At least one aura symptom develops gradually 5 minutes or more and/or different aura symptoms occur in succession over 5 or more minutes
- Continuing of these symptoms in 5-60 minutes

D. Headache fulfilling criteria for migraine without aura beginning during the aura or follows the aura within 60 minutes
E. No other systemic or neurologic diseases that cause headache

Table 2: IHS Criteria for Migraine without Aura (HIS 2004)

Headache Descriptions (Any 2)
A. At least 5 attacks fulfilling criteria B and D
B. The headaches last 4–72 hours/no treatment or unsuccessfull treatment
C. At least two of the following with the headache:
- Unilateral
- Pulsatile quality
- Moderate to severe pain intensity
- Aggravation by or causing avoidance of routine physical activity

D. Associated Symptoms (Any 1)
- Nausea and/or vomiting
- Photophobia and phonophobia

E. No signs of a secondary headache disorder.

Table 3: The clinical features of our patients with migraine according to the gender.

	With aura	nausea	Vomiting	Motion sickness	Sono phobia	Photo Phobia	Intensity (2 points)	Intensity (3 points)	(+) family history
F	15	192	93	64	178	178	110	93	74
M	2	30	13	8	25	23	19	12	15
Total n (%)	17 (7.3)	222 (95.7)	106 (45.7)	72 (31.0)	203 (87.5)	201 (86.6)	129 (55.6)	105 (45.3)	89 (38.4)

Table 4: Mean values of free T3, free T4, TSH according to sex, type of migraine, symptoms, family history, intensity and duration of the migraine in study group (n=234).

	Free T3	Free T4	TSH
Male	3.30±0.35	1.29±0.18	1.41±0.65
Female	3.01±0.48	1.23±0.26	1.81±1.25
Basilar-type migraine (n:4)	3.0±0.2	1.2±0.3	1.7±0.5
Retinal migraine (n:1)	3.0	1.0	2.1
With Aura	3.0±0.3	1.3±0.3	1.8±0.9
Without Aura	3.0±0.5	1.2±0.2	1.8±1.7
Nausea	3.0±0.4	1.2±0.2	1.7±1.1
Vomiting	3.0±0.5	1.2±0.3	1.6±0.9
Motion sickness	3.0±0.5	1.2±0.3	1.7±1.2
Phonophobia (sonophobia)	3.0±0.4	1.2±1.2	1.7±1.1
Photophobia	3.0±0.5	1.2±0.3	1.7±1.2
Positive Family History	2.9±0.5	1.2±0.3	1.7±1.2
No Family History	3.1±0.5	1.2±0.2	1.8±1.2
(Intensity) 2 points	3.0±0.3	1.2±0.2	1.7±1.1
(Intensity) 3 points	3.0±0.5	1.2±0.3	1.8±1.3
(duration) 1-20 year	3.0±0.4	1.3±1.2	1.9±1.0
(duration) 21-40 year	3.0±0.5	1.2±0.3	1.7±1.2

Table 5: Mean values of Thyroid function tests of study group (n=234) and control group (n=48)

Group	Mean ± standard deviation
Free T3	
Case	3.1±0.5
Control	3.1±0.3
Free T4	
Case	1.2±0.3
Control	1.2±0.2
TSH	
Case	1.8±1.2
Control	1.6±1.0

* t test