

Comorbidity between hypothyroidism and headache disorders in a Mexican population

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Introduction. Headache and hypothyroidism are common comorbidities. This is a cross-sectional study of the prevalence of hypothyroidism in headache patients in the largest Mexican headache registry.

Patients and methods. PREMECEF is an e-database for patients with headaches. Data was recollected from July 2017-April 2019 in three centers of Monterrey, Mexico.

Results. Of 869 patients, 35 (4%) had hypothyroidism. Four had two different headache diagnoses; of the 39 individual diagnoses, 23 were primary, 1 secondary, 13 cranial neuralgias, and 2 unspecified headaches. Hypothyroidism prevalence: 8.3% in unspecified, 6.5% in cranial neuralgias, 3.4% in primary, and 1.9% in secondary headaches; in tension-type headache (TTH) was 3.9%, in migraines 3.2%, in trigeminal neuralgia 6.1%, and in occipital neuralgia 6.3%.

Conclusion. This is the first report on the prevalence of hypothyroidism in occipital and trigeminal neuralgia. The prevalence of hypothyroidism in migraine and TTH is higher than the general population.

Key words. Headache disorders. Hypothyroidism. Hypothyroidism-type headache. Migraine. Neuralgia. Tension-type headache.

Introduction

Hypothyroidism is characterized by thyroid hormone deficiency and occurs more frequently in women and older adults [1]. The prevalence of clinical hypothyroidism in the general population varies between 0.2% and 5.3% in Europe, 0.3% and 3.7% in the United States of America, and 1.2% in Mexico [2,3]. The prevalence of subclinical hypothyroidism is much higher, even figures of up to 18% have been reported [4]. Hypothyroidism usually presents a wide variety of symptoms involving different systems, including neurological symptoms [1].

Headache is one of the most common symptoms of hypothyroidism, occurring in approximately one-third of the patients [5]. The International Classification of Headache Disorders, third edition (ICHD-3) includes, in 10.4, headache attributed to hypothyroidism as a discrete entity, whose criteria state that the headache develops in temporal relationship with the onset of this or led to its diagnosis and resolves or worsens depending on its control [6]. This headache is not commonly diagnosed in daily clinical practice as a single entity. However, it is more common to diagnose other headaches as comorbidities in hypothyroid patients, such as migraine and tension-type headache [5].

The relationship between headache disorders and hypothyroidism has not been described in Mexico. This study aims to report the prevalence of hypothyroidism in patients with headaches in the largest headache registry in Mexico.

Patients and methods

First Mexican Headache Registry (PREMECEF, for its acronym in Spanish) is an electronic database for physicians, which works as an online file for patients whose reason for consultation is a headache. PREMECEF is available to any physician in Mexico interested in collecting data from their patients and cooperating with the national registry. Nevertheless, so far, we have the participation of three regional centers in the city of Monterrey, Nuevo Leon, Mexico: a specialized headache clinic within the neurology service of a public university hospital, a general neurology service of another public hospital, and a private headache clinic within a private hospital. The database was approved by the Research Ethics Committee of the Faculty of Medicine and University Hospital of the Autonomous University of Nuevo Leon.

PREMECEF began operating in July 2017 and for our study, we performed a cross-section of the

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Table. Prevalence of hypothyroidism in the different headache disorders registered in PREMECEF.

	Total n (%)	Hypothyroidism n (%)	Prevalence of hypothyroidism
Primary headaches	673 (70.8)	23 (58.9)	3.4%
Tension-type headache	358 (37.6)	14 (35.9)	3.9%
Chronic migraine	28 (2.9)	3 (7.7)	10.7%
Migraine without aura	161 (16.9)	3 (7.7)	1.9%
Migraine with aura	59 (6.2)	2 (5.1)	3.4%
Thunderclap headache	2 (0.2)	1 (2.6)	50%
Secondary headaches	52 (5.4)	1 (2.6)	1.9%
Cervicalgia	5 (0.5)	1 (2.6)	20%
Cranial neuralgias	201 (21.1)	13 (33.3)	6.5%
Occipital neuralgia	143 (15)	9 (23.1)	6.3%
Trigeminal neuralgia	49 (5.1)	3 (7.7)	6.1%
Painful optic neuritis	4 (0.4)	1 (2.6)	25%
Unspecified or not elsewhere classified headaches	24 (2.5)	2 (5.1)	8.3%
Myofascial pain syndrome	14 (1.4)	2 (5.1)	14.3%

patients registered until April 2019. All headache diagnoses were made based on the criteria of the ICHD-3 or, until January 2018, of the beta version. Regarding the information on hypothyroidism, the data were collected through the medical record and evolution notes as the patients attended their follow-up consultations.

Statistical analyses were performed using IBM SPSS software (version 22; SPSS Inc, Chicago, IL). Continuous variables were summarized as mean \pm standard deviation and categorical variables as percentages. The prevalence was calculated by the number of people in the sample with the characteristic of interest (hypothyroidism) divided by the total number of people in the sample (the entire sample and the number of patients with each diagnosis).

Results

Up to April 2019, a total of 869 patients with head-

ache had been registered. Of these, 35 (4%) had a confirmed diagnosis of hypothyroidism, 31 (91.4%) were women, and had an average of 45 ± 15.5 years old (range 18-84). Of all patients in the registry, 792 (91.1%) had one headache diagnosis, 73 (8.4%) had two different diagnoses, and only 4 (0.4%) had three diagnoses. Among the patients with hypothyroidism, 4 (11.4%) had two diagnoses and the rest only one; of the 39 individual diagnoses, 23 (58.9%) were primary headaches, 1 (2.5%) was a secondary headache, 13 (33.3%) cranial neuralgias, and 2 (5.1%) were unspecified or not classified headaches. Regarding the timeline of the diagnosis of hypothyroidism and their first headache consultation, 37 (94.9%) were diagnosed before the consultation and only 2 (5.1%) were diagnosed during the follow-up (Table).

The prevalence of hypothyroidism in each group of the ICHD-3 was: 8.3% in unspecified or not classified headaches, 6.5% in cranial neuralgias, 3.4% in primary headaches, and 1.9% in secondary headaches. The prevalence of hypothyroidism in tension-type headache was 3.9%, in migraines 3.2%, and in occipital neuralgia 6.3%. Individually, the headache diagnoses with the highest prevalence were the primary thunderclap headache with 50%, painful optic neuritis with 25%, cervicalgia with 20%, myofascial pain syndrome with 14.3%, and chronic migraine with 10.7% (Table).

Discussion

As far as we know, this is the first study that includes headaches from the four groups of the ICHD in relation to hypothyroidism. The relationship between headache disorders and hypothyroidism had been previously established in a study that included 8,412 participants. Authors found that patients with a preexisting headache disorder had a 21% increased risk of developing hypothyroidism [7]. Nevertheless, they only considered a self-report of frequent headaches and did not make a diagnosis according to the ICHD.

The most studied headache in relation to hypothyroidism has been migraine. The prevalence of hypothyroidism in migraineurs patients had been around 3% [8]. Similar to our results, where we found a prevalence of 3.2%. Nevertheless, it has been described that hypothyroidism is 8.4 times more prevalent in persons with chronic migraine compared to those with episodic migraine [7]. The same situation was found in our patients, while the patients with migraine without or with aura had a

prevalence between 1.9% and 3.4% respectively, and the chronic migraine reached a prevalence of 10.7%, suggesting that hypothyroidism is a risk factor for headache chronification.

The only other prevalence of hypothyroidism in a headache disorder described in the literature is tension-type headache with variations between 1.6% ($n = 852$) and 28.8% ($n = 118$) [8,9]. In our study, the prevalence was found between these figures with a 3.9%, which could indicate that the greater the number of participants in the study, the lower the prevalence found, which could be more representative of the real world.

The most important finding of our study was the prevalence of hypothyroidism in patients with cranial neuralgias, mainly occipital neuralgia with 6.3% and trigeminal neuralgia with 6.1%. The possible association between hypothyroidism and neuralgias has been described in animal studies. Hypothyroid hormone deficiency causes a decrease in neuronal volume and a decrease in the number of cells of the glia that could cause defects in myelination. Also, hypothyroidism causes an increase in the nociceptive threshold that is related to a failure of conduction due to the potentiation of the axonal lesions in the neuralgia [10].

Our study has several limitations, among them that it is a clinic-based sample study that may not be representative of the general population. Mainly, the problem would lie in headache disorders with low prevalence, as was the case of thunderclap headache, cervicgia, painful optic neuritis, and myofascial pain syndrome, where we had less than 15 patients of each. Another limitation is the lack of assessment of the thyroid function of the patients at the time of the start of the study, only based on the data obtained during the clinical history taking, and the study is cross-sectional, therefore, unable to assess the direction of the association between the headache disorders and the hypothyroidism.

Conclusion

To the best of our knowledge, this is the first report on the prevalence of hypothyroidism in patients with occipital and trigeminal neuralgia. Also, the prevalence of hypothyroidism in migraine and tension-type headache in our population is similar to those previously described, these being higher than the prevalence in the general population. The evidence suggests a bidirectional relationship between headaches disorders and hypothyroidism, which is why they should be evaluated together when either of these two is the reason for patients' consultation.

References

1. Almandoz JP, Gharib H. Hypothyroidism: etiology, diagnosis, and management. *Medical Clinics* 2012; 96: 203-21.
2. Chaker L, Bianco AC, Jonklaas J, Peeters RP. Hypothyroidism. *Lancet* 2017; 390: 1550-62.
3. Flores-Rebollar A, Moreno-Castañeda L, Vega-Servín NS, López-Carrasco G, Ruiz-Juvera A. Prevalence of autoimmune thyroiditis and thyroid dysfunction in healthy adult Mexicans with a slightly excessive iodine intake. *Nutr Hosp* 2015; 32: 918-24.
4. Al Eidan E, Ur Rahman S, Al Qahtani S, Al Farhan AI, Abdulmajeed I. Prevalence of subclinical hypothyroidism in adults visiting primary health-care setting in Riyadh. *J Community Hosp Inter Med Perspect* 2018; 8: 11-5.
5. Spanou I, Bougea A, Liakakis G, Rizonaki K, Anagnostou E, Duntas L, et al. Relationship of migraine and tension-type headache with hypothyroidism: a literature review. *Headache* 2019; 59: 1174-86.
6. Headache Classification Committee of the International Headache Society. The International Classification of Headache Disorders, 3rd edition. *Cephalalgia* 2018; 38: 1-211.
7. Martin AT, Pinney SM, Xie C, Herrick RL, Bai Y, Buckholz J, et al. Headache disorders may be a risk factor for the development of new onset hypothyroidism. *Headache* 2017; 57: 21-30.
8. Lisotto C, Mainardi F, Maggioni F, Zanchin G. The comorbidity between migraine and hypothyroidism. *Headache* 2013; 14 (Suppl 1): S138.
9. Abou Elmaaty AA, Flifel ME, Belal T, Zarad CA. Migraine and tension headache comorbidity with hypothyroidism in Egypt. *Egypt J Neurol Psychiatr Neurosurg* 2020; 56: 78.
10. Da Costa Sobrinho OP, Freitas da Silveria H, Alves Vieira LC, Oliveira de Sousa KK, Souza Dias DB, Viana Gondim D, et al. Trigeminal neuralgia in rats with hypothyroidism: a morphological study. *FASEB J* 2017; 31 (Suppl 1): S744.7.

Comorbilidad entre hipotiroidismo y cefalea en la población mexicana

Introducción. Cefalea e hipotiroidismo son comorbilidades comunes. Éste es un estudio transversal de la prevalencia del hipotiroidismo en pacientes con cefalea en el registro de cefalea más grande de México.

Pacientes y métodos. PREMECEF es una base de datos electrónica para pacientes con cefalea. La información se recolectó de julio de 2017 a abril de 2019 en tres centros médicos de Monterrey, México.

Resultados. De 869 pacientes, 35 (4%) tenían hipotiroidismo y cuatro tenían diagnósticos de dos diferentes cefaleas. De los 39 diagnósticos individuales, 23 fueron primarias; una, secundaria; 13, neuralgias craneales; y dos, cefaleas no especificadas. La prevalencia de hipotiroidismo fue del 8,3% en las no especificadas, del 6,5% en las neuralgias craneales, del

3,4% en las cefaleas primarias y del 1,9% en las secundarias. En la cefalea de tipo tensional fueron del 3,9%; en las migrañas, del 3,2%; en la neuralgia trigeminal, del 6,1%; y en la neuralgia occipital, del 6,3%.

Conclusión. Éste es el primer informe de la prevalencia de hipotiroidismo en la neuralgia occipital y la trigeminal. La prevalencia de hipotiroidismo en la migraña y la cefalea de tipo tensional es mayor que en la población general.

Palabras clave. Cefalea. Cefalea atribuida al hipotiroidismo. Cefalea de tipo tensional. Hipotiroidismo. Migraña. Neuralgia.