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The association between Hypothyroidism and Migraine in Patients of Al-Muthanna province, Iraq

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Abstract

Background: Hypothyroidism as a cause of headache is known for over six decades. It was reported migraine in 25% of hypothyroid patients, and it was observed improvement in headache in 30% of hypothyroidism patients after initiation of thyroid hormone replacement. Similarly, a strong correlation has been found between hypothyroidism and migraine.

Aim: To determine the relationship between hypothyroidism and migraine

Patients and methods: Thyroid function test has been studied in 100 patients with migraine attending neurology consultant clinics/ Al-Hussain teaching hospital in Al-Muthanna province\Iraq.

Results: The study show migraine was more in female patients (84%) and in the age range (31-50) years about (64%). Hypothyroidism was found in (61%) of the patient with migraines who had high TSH levels and normal or low T4.

Conclusion: It was concluded that there is an association between migraine and hypothyroidism and considered hypothyroidism as a predisposition to the development of migraine.

Keywords: Hypothyroidism; Migraine, Headache and trigger factor

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Introduction

Migraine, the second most common cause of headache, and the most common headache-related, and indeed neurologic, cause of disability in the world, afflicts approximately 15% of women and 6% of men over a 1-year period [1]. It frequently starts in childhood, particularly around puberty, and affects women more than men (3:1 female-to-male ratio) [2], Migraine is a condition marked by recurring moderate to severe headache with throbbing pain that usually lasts from four hours to three days, typically begins on one side of the head but may spread to both sides, is often accompanied by nausea, vomiting, and sensitivity to light or sound, and is sometimes preceded by an aura and is often followed by fatigue [3]. Migraine was thought to result primarily from vascular dysregulation. As part of this hypothesis, aura preceding headache was thought to result from hypoxemia related to transient vasoconstriction and migraine pain from rebound vasodilation, which caused primary nociceptive neurons within the walls of engorged intracranial vessels to undergo mechanical depolarization. This vascular hypothesis agreed with the observed effects of vasodilating drugs, such as nitroglycerin, which caused headaches, and vasoconstricting drugs, such as ergotamines, which resolved headache [4]. Cortical spreading depression: A self-propagating wave of cellular depolarization that slowly spreads across the cerebral cortex and is associated with depressed neuronal bioelectrical activity and altered brain function, has been linked to migraine aura and headache [5]. Cortical spreading depression is thought to activate neurons in the trigeminal nucleus caudalis, leading to inflammatory changes in pain-sensitive meningeal vascular structures, which produces headaches via central and peripheral reflex mechanisms. Cortical spreading depression is also thought to alter the permeability of the blood-brain barrier by activating and upregulating brain matrix metalloproteinase [6]. Hypothyroidism can affect any individual at any age but there are some risk factors that increase the likelihood of this condition developing.

Patients and Methods

Patients:

A cross-sectional study was conducted in neurology consultant clinics/Al-Hussain teaching hospital and private clinics in Al-Muthanna province. A total number of 100 migraine patients were randomly selected and examined from both sexes, aged from 22-55 years old, all were previously diagnosed as migraine, were examined for a thyroid function test. History was obtained about their ages, onset of

migraine (at which age began) and hypothyroidism and any symptom of hypothyroidism. The period of data collection was 5 months started from August 2018 to January 2019.

Methods: Blood samples were taken from all patients at Laboratory Department of a private hospital and analyzed for TSH, T3, and T4 by AIA-360 fluorometric enzymatic immunoassay; kit method, and the normal values for both sexes of TSH is 0.4-4.2 ml U/L, T3 is 1.2-3.8 nmol/L, T4 is 58-150 nmol/L.

Patients considered to be hypothyroidism when have high level TSH with normal (subclinical) or low (primary) T4 level [7]. T3 testing is rarely helpful in the hypothyroid patient, since it is the last test to become abnormal [8].

Statistical analysis

Descriptive statistics were used to describe the mean and SD of the thyroid function parameters (TSH, T3, T4) in patients. The data was analyzed using SPSS version 19, Student t-test was used to assess the difference of the mean of thyroid parameters between male and female and between different age groups in patients with migraine. P-value <o.o5 significant.

Results

A cross-sectional hospital-based study conducted on 100 migraine patients and measured thyroid function test for each one. percent of females was 84% while the male was 16% with age rage (10-30) and (31-50) with a percentage of (36%) and (64%) respectively. (61%) of migraine patients associated with hypothyroidism while 39% with normal thyroid function and this result are statistically highly significant.

Discussion

According to the International Headache Society, around 30 percent of people with an underactive thyroid gland (hypothyroidism) have a history of headaches. Moreover, half have had a history of migraine prior to their diagnosis [9], and many past studies have reported

Table 1: Correlation between migraine patients age and thyroid disease.

		Thyroid disease		Total	p-value
		Normal	Hypothyroidism		
AGE	10 - 30	19	17	36	0.034
	31-50	20	44	64	
Total		39	61	100	

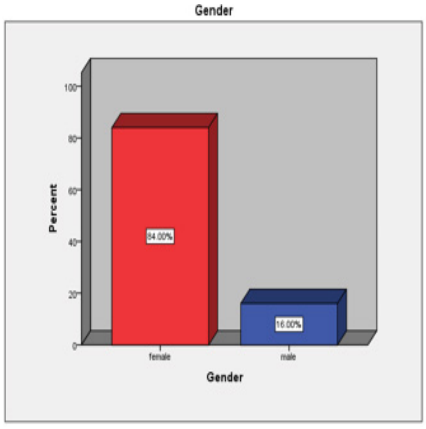

Figure 1: Percentage of male: female migraine patients.

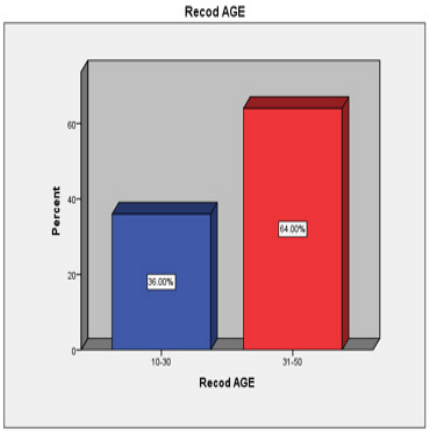

Figure 2: Percentage of age of migraine patients.

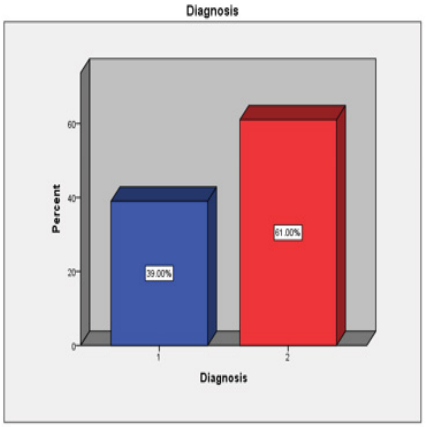

Figure 3: percentage of hypothyroidism in migraine patients. *1. Normal thyroid, *2. Hypothyroidism.

Table 2: Chi-Square Tests between Migraine patients age and hypothyroidism.

	Value	Df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.488a	1	0.034*		
Continuity Correction[b]	3.629	1	0.057		
Likelihood Ratio	4.455	1	0.035		
Fisher's Exact Test				0.054	0.029
N of Valid Cases	100				
P-value less than 0.05 is significant.					

associations between headache disorders and hypothyroidism, but the directionality of the association is unknown. In this study, the relation of hypothyroidism with migraine was examined. We have found in our study of 25 migraine patients, that there was a high proportion with hypothyroidism (61%) and this was in conformity with the results from another study [10]. The frequency of hypothyroidism in our patients with migraine was also higher than that reported in the general population the prevalence of subclinical hypothyroidism in the general population ranges from 4-10% (23), and that of overt hypothyroidism is 1-2% in women and 0.1% in men (24). The study result showed that migraine is more predominance in female (84%) than male (16%), Although hypothyroidism was more common in females than males with migraines, it was statistically significant, and this agrees with another study [10,11]. The female preponderance in

our study was consistent with the higher prevalence of both subclinical and overt hypothyroidism in the general population. We found that the proportion of hypothyroidism in migraine patient is highly associated with the age group of (31-50) as TSH concentration are high in older age groups compared to younger age group and this agrees with another study [12]. An early-onset migraine that was diagnosed in the second decade of life associated with the highest proportion of hypothyroidism now so we can say the more chronic migraine the higher incidence of hypothyroidism; this agrees with other studies [10]. Several studies have shown decreased sympathetic nervous system activity during periods of migraine, catecholamine promotes the conversion T4 to T3 Thus, chronic migraines may be at a greater risk for hypothyroidism [14]. Finally, it must be mentioned that several studies say; in most people with migraines and subclinical hypothyroidism will see an improvement in headache symptoms after being treated with levothyroxine [15]. This is believed to be a result of the reduction in cerebral excitability associated with the correction of hypothyroidism and the role of hormone imbalance in the development of chronic migraines especially in patients with chronic migraines [16].

Conclusions

- Hypothyroidism is one of the trigger factors for migraine.
- Incidence of hypothyroidism in migraine patients is highly associated with age of patients.

Recommendations

- It seems prudent for primary care physicians to perform thyroid profile in cases with chronic migraine especially in those not showing satisfactory response to conventional treatment for headache.
- Further studies are required to clarify the link between hypothyroidism and migraine.

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