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Original Research

Evaluation of the Etiology, Clinical Presentation, Findings and Prophylaxis of Children with Headache

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Abstract

Objectives: A headache is prevalent in childhood and constitutes a significant part of outpatient applications. This study aimed to evaluate the results of etiology, clinical features, examination results, prophylactic treatment and follow-up in patients with a headache.

Methods: Between January 2017 and December 2018, the files of the patients with the complaint of headache were reviewed retrospectively in this study. A headache was classified according to the International Headache Society (IHS) criteria.

Results: In this study, 350 patients aged between 3-17 years old and the mean age of 11.2±2.7 with a headache were included; 212 (60.6%) of them was female and 138 (39.4%) of them was male. The rate of a primary headache was higher in females than in males (p=0.004). The headache causes were a migraine in 51.1%, tension-type headache in 32.3%, secondary in 13.4%, and not classified in 3.1%. The mean age of the patients with a primary headache was significantly higher than patients with a secondary headache (p<0.001). The most common trigger factor was insomnia (52.7%). Abnormal physical/neurological signs and symptoms were detected in 17 (9.49%) patients. Cranial magnetic resonance imaging (MRI) examination was performed in 121 (34.5%) patients. Abnormal findings were found in 35 (28.9%) of these. In this study, 33 patients underwent electroencephalography (EEG); none of the had an epileptiform abnormality. Flunarizine (23.2%) and cyproheptadine (7.5%) were the most administered prophylactic treatments. It was observed that all patients who had prophylaxis and who had come to control had a significant decrease in headaches.

Conclusion: The cause of childhood headaches is mostly migraine and tension-type headache. As long as there is no abnormality in the history and neurological examination, neuroimaging studies are not required in the routine evaluation of patients with a headache. Prophylactic treatment increases the quality of life in selected cases.

Keywords: Childhood; headache; prophylaxis.

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Headache is a common problem in children and adolescents. While the incidence of recurrent and severe headaches is 37-51% at the age of seven, it increases with age and increases to 57-81% at the age of 15.[1] Headaches may reduce children's participation in social activities. It is also a major cause of school absenteeism and health-related costs.[2]

Childhood and adolescence headaches are primary (migraine, tension-type) and secondary (upper respiratory tract infections, central nervous system infections or

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space-occupying lesions) according to the International Classification of Headache Disorders (ICHD-3 beta) regulated by the International Headache Society (IHS).[3]

Although headaches in children are in the primary group, such as migraine and tension headache and are benign, they often cause concerns in parents and doctors that there is a severe underlying disease. Many patients and their relatives request neuroimaging from their physician due to a suspicion of a brain tumor. The benefit of neuroimaging for underlying pathologies in the presence of headache is not superior to neurological examination.[4, 5] In addition, headache is rare in the presence of intracerebral tumor without additional findings.[6]

In this study, we aimed to examine the etiology, clinical findings, tests and treatments of our pediatric patients with headache.

Methods

In this study, the files of all pediatric patients who applied to our hospital's Pediatric Neurology outpatient clinic with headaches between January 2017 and December 2018 were retrospectively analyzed. Age, gender of the patients, history of headache taken from the patient and their families (location, age of headache onset, frequency of attacks, pain severity, location, type of headache, triggering and accompanying factors, family history), detailed physical and neurological examination, ophthalmological examination and blood pressure measurements were noted. Physical and neurological examinations of all patients were performed by the same pediatric neurologist. Laboratory tests, brain magnetic resonance imaging (MRI) and electroencephalogram (EEG) results were evaluated. Headache classification of the patients was made according to IHS criteria.[3] Institutional approval was obtained for this retrospectively designed study (20.07.18/73301522).

Statistical Analysis

SPSS 15.0 for Windows program was used for statistical analysis. For descriptive statistics, number and percentage were used for categorical variables, and mean, standard deviation, minimum, maximum were used for numerical variables. Since numerical variables did not meet the normal distribution condition, comparisons of two independent groups were made using the Mann-Whitney U test, and in more than two groups, Kruskal Wallis test was used. Subgroup analyzes were performed with the Mann-Whitney U test and interpreted with Bonferroni correction. The ratios in the groups were compared by Chi-Square Analysis. Statistical significance was accepted as $p<0.05$.

Results

In this study, 350 patients with headache (212 female (60.6%), 138 male (39.4%)), aged between 3-17 years (mean age: 11.2±2.7), were included. The mean age of the patients with primary headache was statistically significantly higher than the patients with secondary headache ($p<0.001$). The mean age of migraine patients was 11.5±2.7 (3-17) years in female patients and 10.7±2.6 (3-17) years in male patients. The mean age of the female patients was statistically significantly higher than that of male patients ($p=0.012$).

According to IHS diagnostic criteria, the causes of headache were as follows: migraine in 51.1%, tension headache in 32.3%, secondary in 13.4% and unclassified in 3.1%. Only one patient was diagnosed with trigeminal neuralgia. Aura was present in 15 (8.4%) of the patients diagnosed with migraine. While 10 of the auras were visual, it was in the form of paresthesia in five patients. There was no significant difference between the presence of aura and age ($p=0.78$) and gender ($p=0.49$).

In patients with secondary headaches, viral upper respiratory tract infections were present in 17 patients, sinusitis in 10 patients, benign intracranial hypertension in eight patients, cerebral vein thrombosis in one patient, hypertension in two patients, pneumonia in three patients, otitis in three patients, dental abscess in two patients, and brain tumor was present in two patients.

The age of onset of headache was 9.9±2.2 (3-16), and the age of onset of those with primary headache was statistically significantly higher than those with secondary headache ($p<0.001$). No statistically significant difference was found between the gender groups concerning mean age at onset ($p=0.135$).

The mean age of migraine patients was 12.5±2.07, the mean age for tension headache was 10.7±2.03, and the mean age of those with secondary headache was 8.04±2.26, and the mean age in migraine was significantly higher than the other groups ($p<0.001$). Primary headache rate was higher in female gender than male gender ($p=0.004$). Of the patients diagnosed with migraine, 119 (66.5%) were female, and 68 (60.2%) of those with tension headache were female.

The mean time to diagnosis of patients with primary headache was statistically significantly longer than those with secondary headache ($p<0.001$). The mean time until diagnosis was 22.5±8 months in patients with migraine and 13.4±6.6 months in the tension-type headache. There was a significant difference between headache types concerning mean time until diagnosis ($p<0.001$).

It was stated that there were factors present triggering headache in all patients with primary headache. The num-

ber of factors triggering headache in migraine patients was less than three in 46.9%, more than three in 53.1%; and these rates were 57.5%-47.5% in those with tension-type headache, and no statistically significant difference was found (p=0.078). The most common triggering factors were insomnia (52.7%), stress (45.9%), temperature (41.9%), noise (35.5%) and excitement (29.1%). One hundred eighteen patients (65.9%) stated that their pain increased with movement and 105 patients (58.6%) stated that headache interfered with their daily activities.

Headache severity was significantly higher in migraine patients (7.5±1.0) than those with tension-type headache (5.2±0.6) (p<0.001). Headache characteristics of patients with migraine and tension-type headache are shown in Table 1.

Table 1. Headache characteristics of patients with migraine and tension-type headache

	Migraine		Tensiyon Type		
	n	%	n	%	p
Qualification					
Throbbing	150	83.8	19	16.8	**<0.001**
Stinging	25	14.0	56	49.6	
Pressing	4	2.2	37	32.7	
Uncertain	0	0.0	1	0.9	
Photophobia					
Absent	29	16.2	57	50.4	**<0.001**
Present	150	83.8	56	49.6	
Phonophobia					
Absent	40	22.3	57	50.4	**<0.001**
Present	139	77.7	56	49.6	
Photophobia and Phonophobia					
Absent	69	38.5	113	100	**<0.001**
Present	110	61.5	0	0.0	
Nausea and Vomiting					
Absent	75	41.9	103	91.2	**<0.001**
Present	104	58.1	10	8.8	
Localization side					
Bilateral	90	50.3	103	91.2	**<0.001**
Unilateral	89	49.7	10	8.8	
Migraine in the family					
Absent	49	27.4	74	65.5	**<0.001**
Present	130	72.6	39	34.5	
Passes with sleep					
Absent	72	40.2	76	67.3	**<0.001**
Present	107	59.8	37	32.7	
Increases with activity					
Absent	61	34.1	81	71.7	**<0.001**
Present	118	65.9	32	28.3	

Abnormal physical/neurological findings were found in 17 (4.85%) patients (Table 2). Cranial MRI was performed in 121 (34.5%) patients. Abnormal findings were detected in 35 (28.9%) of them. Severe pathology associated with headache was found in only one of these patients (cerebellar tumor) (Table 2). EEG was performed in 33 patients in total. Nonspecific diffuse slowing was observed in only two patients, and none of them had epileptiform abnormalities.

Drug treatment was administered as antibiotherapy and analgesic to the required patients in secondary headaches due to infection. Carbamazepine was initiated in the patient with trigeminal neuralgia, due to severe pain, which considerably reduced the quality of life. Sleep hygiene, diet modification, exercise, relaxation techniques and avoidance of trigger factors were recommended in patients with primary headache. In addition, 30 (10.2%) patients received flunarizine, 13 (4.4%) cyproheptadine, five (1.71%) propranolol, two (0.68%) amitriptyline, and two (0.68%) received SSRI (selective serotonin reuptake inhibitor) treatment. It was observed that there was a significant reduction in headaches in all patients who were initiated with preventive medicine (Table 3).

Discussion

Primary headaches constitute the majority of headaches in children and adolescents.[7] It has been reported that the most common cause of acute recurrent childhood headaches is migraine.[8] In this study, the most common type was migraine type headache.

Table 2. Examination and MRI findings of patients with headache

Abnormal Physical/Neurological Examination Findings	n	%
Papilledema	8	2.28
Diplopia	3	0.85
Paresthesia	2	0.57
Ataxia	2	0.57
Hypertension	2	0.57
Abnormal Cranial MRI Findings	**n**	**%**
Nonspecific gliotic focus	9	2.57
Arachnoid cyst	8	2.28
Sinusitis	5	1.42
Thickening and opacity in the sinus mucosa	4	1.14
Adenoid vegetation	3	0.85
Venous Angioma	2	0.57
Mega cisterna magna	2	0.57
Chiari type 1	1	0.28
Cerebellar tumor	1	0.28

Table 3. Prophylactic drugs used in migraine and tension-type headache patients and their follow-up status

	Medication (n)	Pain response	
		Pain Reduction (n)	No pain
Migraine	Flunarizin (30)	20	10
	Siproheptadin (13)	6	7
	Propranolol (5)	2	3
	Amitriptilin (2)	1	1
Tension-type headache	SSRI (2)	-	2

When we look at the relationship of migraine with age, it was more frequent in males than females between the ages of 3-5 and 5-7, at the same rate in males and females between the ages of 7-11, and more in females after the age of 11. On the other hand, tension-type headache was observed to be at the same rate in females and males up to the age of 11 and more frequent in females after the age of 11.[9] It has been shown that migraine pains start at the age of 7.2 in male patients and 10.9 years in female patients.[10] In this study, the mean age in migraine patients was 11.5±2.7 years for females and 10.7±2.6 years for males. The mean age of female gender was statistically significantly higher than that of males (p=0.012).

Colombo et al.[11] reported that children with recurrent headache were diagnosed in an average of 20 months according to the IHS criteria. In this study, the time until diagnosis was 22.5±8 months in patients with migraine and as 13.4±6.6 months in the tension type. There was a significant difference between headache types in the mean time to diagnosis (p<0.001).

Solotareff et al.[12] reported the presence of an average of three triggering factors, being at least one in all 101 patients with a diagnosis of migraine. In another study, no significant difference was found between those with migraine and tension-type headache in terms of triggering factors.[13] In our study, all patients with primary headache had a history of a triggering factor. There was no significant difference in the number of triggering factors between migraine and tension-type headache. It was stated that the most common triggering factors were insomnia and stress.

It has been reported that 70% of patients with primary headache had a family history.[14] Especially in migraine patients, first-degree relatives were at 1.9 times higher risk than the general population,[15, 16] and the presence of migraine with aura has been reported as 34% in monozygotic twins and as 12% in dizygotic twins,[17] which suggests that genetic factors play an important role in the development of migraine. In our patients, a family history of headache was found in 72.6% of those with migraines. This ratio was significantly higher than those with tension-type headache (34.5%) (p<0.001).

Acute headaches constitute 2-6% of emergency room admissions of children, most of which are infectious diseases, such as viral respiratory tract infections, otitis, and sinusitis.[18] Secondary headache was present in 13.4% of our patients and 57.4% of them were due to upper respiratory tract infections and sinusitis.

According to current guidelines, cranial MRI is not routinely recommended for recurrent headaches with a normal neurological examination.[19-21] However, in daily clinical practice, neuroimaging studies are often preferred due to parents' anxiety and doctors' fear of overlooking a severe underlying disease, such as a brain tumor. In previous studies, it was reported that neuroimaging was performed with a rate of 35%-81% in patients with headache.[4, 5, 14, 22] These studies reported MRI abnormalities (such as sinus abnormality, nonspecific white matter abnormality, arachnoid cyst, venous angioma, Chiari malformation) at a frequency of 9-22%. Despite the relatively high number, the number of headache-related abnormalities was few.[4, 23] Yılmaz et al.,[23] reported 21% of 449 patients had abnormal cranial MRI findings, but only two (0.6%) of them were associated with headaches. In another study, the cerebral abnormality was found in 20% of pediatric patients with headaches; but only 1.2% of them reported a significant change.[14] In our study, cranial MRI was performed in 34.5% of patients both in emergency and outpatient clinic conditions. Significant pathology associated with headache was detected in only one of these patients.

There are various EEG disorders in migraine patients, but EEG has no use in determining headache etiology or distinguishing migraine from other types of headache.[24] It is emphasized that EEG would be useful for the differential diagnosis of seizures in patients with migraine with aura.[25] In one study, EEG abnormalities were detected in six (0.7%) of 831 patients with headache with aura.[26] Gürkaş et al.[27] found EEG abnormality in only 15 (5.3%) of 284 children with primary headache. While this rate was 1.9% in patients with tension type headache, it was 5.5% in the migraine group. Nonspecific diffuse or focal slowing was reported in 12 patients, and epileptic discharge was reported in three patients. In our study, 33 patients underwent EEG, two patients had widespread slowing, and none had epileptic abnormalities.

Despite palliative treatment, prophylactic treatment is recommended for patients whose quality of life and daily ac-

tivities are affected in primary headaches, such as migraine and tension-type headache. The use of flunarizine, topiramate, valproic acid, amitriptyline, propranolol, and cyproheptadine has been reported in the literature, especially in pediatric patients.[12, 28] In our patients, mostly flunarizine, cyproheptadine, beta-blocker, amitriptyline, and SSRI (selective serotonin reuptake inhibitor) were preferred. With prophylaxis, a significant reduction in headache was detected in all of our patients.

In conclusion, headaches are a common problem in childhood and constitute an important outpatient clinic admissions. Patients can be diagnosed with a detailed history, comprehensive general and neurological examination. More comprehensive clinical studies are needed to guide physicians on how to monitor children with headaches.

Disclosures

Ethics Committee Approval: Institutional approval was obtained for this retrospectively designed study (20.07.18/73301522).

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Conflict of Interest: None declared.

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