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THE EVALUATION OF THE CAUSES OF HEADACHE IN A PEDIATRIC POPULATION

PEDİYATRİK BİR HASTA GRUBUNDA BAŞAĞRISINA NEDEN OLAN ETİYOLOJİK FAKTÖRLERİN DEĞERLENDİRİLMESİ

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Key Words : childhood, adolescence, headache, migraine, diagnosis

SUMMARY

Headache is a common reason for consultation in pediatric neurology clinics. Right classification of the headache type is important for choosing the most appropriate treatment. In this study, we aim to determine the etiological factors related to headache types in pediatric age groups in a pediatric population with the complaint of headache.

The clinical and laboratory findings of 147 patients with headache were reviewed retrospectively. Revised International Headache Society criteria were used for the classification of the patients. The patients were divided into 2 groups according to their ages: group 1 patients between 3–10 years of age; group 2 patients between 11–18 years of age. The findings of systemic and neurological examinations and the results of the laboratory tests were noted.

There were 53(36.1%) males and 94(63.9%) females in the study. The mean age of the patients was 12.6±3.3 years (range 3–18). Headache was found more frequent in group 2. Of the 147 patients 71(48.3%) had migraine, 41(27.9%) had tension-type headache, 25(17%) had sinusitis, 5(3.4%) had posttraumatic headache, 3(2%) had intracranial mass, 1(0.7%) had trigeminal neuralgia and 1(0.7%) had venous sinus thrombosis. Migraine and tension-type headaches were more frequently seen in females.

We conclude that the frequency of headache increases with age and migraine is the most frequent cause of recurrent headache in children. Girls are usually more often affected.

ÖZET

Başağrısı pediyatrik nöroloji polikliniklerinden en sık konsültasyon istenme nedenlerinin başında gelmektedir. Başağrısının doğru sınıflandırılması ve doğru tanının konması uygun tedavinin seçilmesi bakımından çok önemlidir. Bu çalışmada başağrısı yakınması ile gelen bir grup hasta değerlendirilerek çocukluk yaş grubunda başağrılarının etiyolojik nedenlerinin araştırılması amaçlanmıştır.

Başağrısı olan 147 hastanın klinik ve laboratuvar bulguları retrospektif olarak değerlendirilmiştir. Başağrıları "Revised International Headache Society" kriterlerine göre sınıflandırılmıştır. Hastalar yaşlarına göre grup 1 3-10 yaş ve grup 2 11-18 yaş olacak şekilde iki gruba ayrılmıştır. Sistemik ve nörolojik muayene ve laboratuvar bulguları kaydedilmiştir. Çalışmaya alınan hastaların 53'ü (%36.1) erkek, 94'ü (%63.9) kız olup yaş ortalamaları 12.6±3.3 (3-18) yaş idi.

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Başağrısı grup 2'de daha fazla idi. Yüz kırk yedi hastadan 71'inde (48.3) migren, 41'inde (%27.9) gerilim tipi başağrısı, 25'inde (%17) sinüzit, 5'inde (%3.4) posttravmatik başağrısı, 3'ünde (%2) intrakraniyal kitle, 1'inde (%0.7) trigeminal nevralji ve 1'inde (%0.7) venöz sinüs trombozu saptandı. Migren ve gerilim tipi başağrısı kızlarda daha sık görülmekte idi.

Sonuç olarak, bu çalışma başağrısı sıklığının yaşla birlikte arttığını ve migrenin çocukluk çağı başağrılarının en sık nedeni olup kızlarda daha sık olarak görüldüğünü göstermiştir.

INTRODUCTION

Headache is a frequent symptom during childhood and adolescence. Its prevelance is 8% at age 3, 19% at age 5 and 59% at school age (1).

Headaches may be a primary disorder such as migraine, cluster or tension headache or it may be a secondary symptom of any systemic or central nervous system disorder. Detailed history, physical and neurological examinations and some laboratory tests are necessary for the diagnosis (2). Dental, ophtalmologic, otorhinologic and psychiatric examinations and specific diagnostic tests are sometimes needed.

The most frequent cause of headache in childhood is migraine, which has negative effect on daily activities and academic performance of the child. Migraine prevelance differs according to the age groups. It has been reported that, it was seen 1.2-3.2% between the ages 3 and 7, 4-11% between the ages 7 and 11 and 8-23% between the ages 11 and 15 (3,4).

In this study, we aimed to determine the etiological factors related to headache types in pediatric age groups.

PATIENTS AND METHODS

In this study, 147 cases with headache were evaluated who admitted to the Pediatric Neurology Department of Dokuz Eylül University School of Medicine between January 2002 and December 2004. The patients were divided into two groups according to their ages: 40 patients between 3–10 years of age constituted group 1 and 107 patients between 11–19 years of age constituted group 2. The data were taken from the files of the patients. The frequency, duration, age of onset, location, severity, associated symptoms and signs of the headache, the factors that make it better or worse and family history were recorded. The systemic and neurologic examinations and the results of the laboratory tests including cranial imaging findings were noted. The headaches of the patients were classified according to the revised International Headache Society (IHS) criteria (3).

RESULTS

Of the 147 patients with headache, 94 (63.9%) were girls and 53 (36.1%) were boys. The mean age of the patients was 12.6±3.3 years (range 3-19). Of them, 27.3% was between 3 and 10 years and 72.7% was over 10 years.

Migraine was the most frequent cause of headache in the study population (63/147; 42.8%). Tension type headache was the second most common cause which was seen in 30 (20.4%) patients.

Table I. Age groups and causes of the headaches

Causes of the headache	Total n (%)	Group 1 n (%)	Group 2 n (%)	p
Migraine headache	63 (42.8)	12 (19.1)	51 (80.9)	0.054
Tension-type headache	30 (20.4)	10 (33.3)	20 (66.6)	0.398
Headache due to acute sinusitis	23 (15.6)	11 (47.8)	12 (52.2)	0.154
Psychosomatic	5 (3.4)	0 (0)	5 (100)	0.164
Posttraumatic	5 (3.4)	2 (40)	3 (60)	0.513
Others	21 (14.2)	6 (28.5)	15 (71.1)	0.879
Total	**147 (100)**	**40 (27.2)**	**107 (72.8)**	

Other causes of the headache were sinusitis (15.6%), psycosomatic (%3.4) and posttravmatic headache (%3.4). In 14.2% of the cases, rare causes were cluster-type headache, postmeningitis headache and headache due to intracranial cyst, cerebral anomaly, sinus thrombosis, uremic encephalopathy, refraction disorder, trigeminal neuralgia, syncope, FMF and intracranial mass. In regard to the causes of the headaches no statistically significant difference was detected between the two groups (Table I).

It was found that the frequency of the headache was increasing with age. Migraine and tension-type headache were diagnosed in 80.9% and 66.6% in group 2 patients, where the frequency of migraine and tension-type headache were seeen in 19.1% and 33.3% of the patients respectively in group 1. The frequency of sinusitis was similar in both of the groups (47.8% in group 1 and 52% in group 2). The psychosomatic headaches were seen only in group 2 patients. The distribution of patients according to age groups, gender and causes of the headache was shown in table II. Migraine, tension-type and phycosomatic headaches were seen more frequently in females. However, there was no significant difference between the groups in regard to the gender. Acute type headaches were found in 99 of the 147 patients (67.3%). Acute localized headaches were seen in 24 patients (16.3%). Acute recurrent headaches were detected in 67 (45.5%) and acute generalized headaches were found in 8 (5.4%) patients. Chronic progressive and chronic nonprogressive headaches were seen in 5 (3.4%) and 43 (29.2%) patients respectively (Table III). It was determined that the most frequent cause was posttraumatic headache in acute generalized headaches, sinusitis in acute localized headaches, intracranial space occupying lesion in chronic progressive headaches and tension type headaches in chronic nonprogressive headaches.

Table II. Age and gender of the patients and the causes of the headaches

Causes of headache (n)	**Total (n=147)**	**Group 1 (n=40)**	**Group 2 (n=107)**	**p**
	F/M	**F/M**	**F/M**	
Migraine (63)	37/26	8/4	29/22	0.534
Tension-type headache(30)	25/5	7/3	18/2	0.165
Acut sinusitis headache (23)	18/5	7/4	11/1	0.103
Psychosomatic (5)	4/1	0	4/1	-
Trauma (5)	0/5	0/1	0/4	-
Other (21)	10/11	1/5	9/6	0.072
Total (147)	**94/53**	**23/17**	**71/36**	**0.319**

F = Female; M = Male

Table III. The causes and the characteristics of the headaches

Type	**Localization**	**n (%)**	**Cause**	**N**
			1. Trauma	**5**
	Generalized	**8**	2. Vascular disorders	**2**
		(5.4)	3. Metabolic disorders	**1**
Acute	Localized	**24 (16.3)**	4. Sinusitis	**23**
(67.3 %)			5. Reactive errors	**1**
			6. Migraine	**63**
	Recurrent	**67**	7. Syncope	**1**
		(45.5)	8. Cluster-type headache	**3**
	Progressive	**5**	9. Intracranial cyst	**2**
		(3.4)	10. ICM	**3**
Chronic			11. Tension-type headache	**30**
(32.7 %)			12. Psychosomatic	**5**
	Non-progressive	**43 (29.2)**	13. Meningitis	**4**
			14. Cerebral anomaly	**2**
			15. Cranial neuralgia	**1**
			16. FMF	**1**

ICM=Intracranial mass; FMF= Familial Mediteranean Fever

The family history was detected in 61 patients (41%). Family histories were positive in 40 (65.5%) of the patients in migraine, in 10 (16.4%) of the patients in tension-type headache, in 4 (6.6%) of the patients in sinusitis and in 2 (3.3%) of the patients in psychologic headache groups. The existence of the family history was found statistically significant only in the migraine group (p=0.006). Results of the electroencephalographic and neuroimaging studies were shown in table IV. Abnormal electroencephalographic findings were detected in 14 of 44 patients (31.8%). In migraine group, electroencephalography (EEG) was performed in 18 patients of whom 3 (% 16.6) had abnormal EEG results. Pathologic findings were found in 12 of 47 patients (25.5%) by cranial computerized tomography (CT), in 14 of 29 patients (48.3%) by cranial magnetic resonance imaging (MRI), in 1 of 2 patients (50%) by doppler USG and in 1 of 2 patients (50%) by magnetic resonance angiography (MRA) (Table V).

Table V. The results of the diagnostic tests

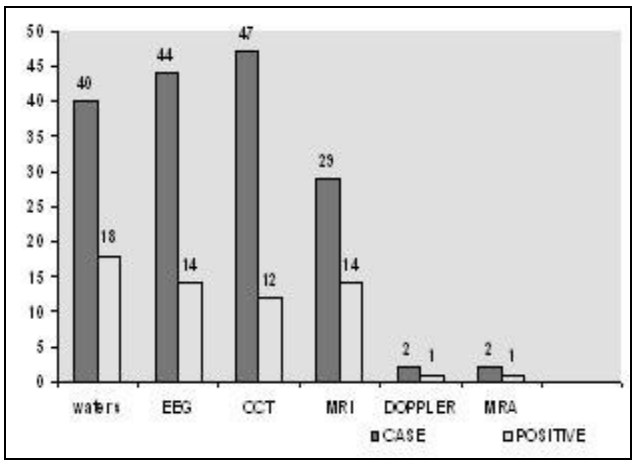

Table IV. EEG, cranial CT and MRI findings of the patients

Findings	Diagnosis (no of cases)
EEG	
Generalized abnormality	Psychosomatic(1), sinusitis(1), migraine(2), cluster(1), tension-type(1), refractive
Focal abnormality	Cerebral abnormality(1), cyst(1), tension-type(1), Syncope (1)
Paroxysmal activity	Sinusitis(1), migraine(1), tension-type(1)
Computed Tomography	
Hypodense lesion in the left peritrigonal area	Migraine
Hypodense lesion in the right thalamus area	Tension
Hyperdense lesion in the supracellar area	Psycosomatic
Left parietal chronic ancephalomalasic changes	Posttraumatic
Dilatation of the right lateral ventricule	Cerebral abnormality
Corpus callosum lipoma	Cerebral abnormality
Arachnoid cyst	İntracranial cyst
Hyperdense lesion on the right temporal area	Sinus thrombosis
Hyperdense lesion on the left temporal area	Sinus thrombosis
Magnetic resonance imaging	
Parietooccipital chronic infarct +pansinusitis	Sinusitis
Nodular heterotopic gray matter areas	Sinusitis
Hypertrophia of the posterior ethmoid cells	Sinusitis
Bilateral occipital, parietal and right frontal chronic ischemia	Uremic ancephalopathy
Polipoid mucosal hypertrophia of the left maxiller sinus	Postmeningitis
Hyperdense lesions around posterior horns of the ventricles	Postmeningitis
Epidermoid cyst	İntrcranial cyst
Colloid cyst of the 3. ventricles	ICM
Cerebral tumor	ICM
Cerebellar tumor	ICM
Sinus thrombosis	Vascular disorders
Sinus thrombosis	Vascular disorders
Venous angiom	Psycosomatic

ICM : intracranial mass.

DISCUSSION

Headache is a prevelant complaint during childhood and 4-8% of all admittances to pediatric neurology outpatient clinics are due to headache (5,6). Prevelance studies showed that 74-82% of the girls and 56-74% of the boys have headache at least once before 18 years of age (7-8). The most frequent cause of headache is migraine in childhood (9-11). The results of the studies in children with headache showed that headaches were due to sinusitis in 13-30.4%, migraine in 28–41.3 %, tension-type headache in 13.6-18.5% and psychosomatic disorders in 5.6% (6,12). They assessed 68% as acute, 32% as chronic, 35.2% as acute localized type, 31.2% as acute recurrent type, 30.4% as chronic nonprogressive and acute generalized type and 16% as chronic progressive type headache (6). Headache characteristics are also related to the gender. During prepubertal periode, it is more frequent in boys. After puberty, the incidence of the headache rises in girls.

Similarly, migraine is more prevelant in boys between 3 and 7 years old and percent of girls increases by years and exceeds boys after age of 11 (5). In accordance with the results of the reports published in the literature, we noticed that the most frequent etiological factor of the headache during prepubertal and pubertal periode was migraine and its frequency was increasing with age (7,13). We found that migraine was more prevalent in girls both during the prepubertal and postpubertal periode.

However, our results were not statistically significant. Because the number of the patients in each subgroup was small, we thought that, the results could not be statistically significant. Other frequent causes of headache were tension-type, sinusitis and psychosomatic headaches in our study. Tension-type and psychosomatic headaches were also more frequent in girls.

IHS developed diagnostic criteria for the classification of the types of headaches in adults and recommended revisions in these criteria for the classification of childhood headaches (3). The modifications include the decrease of the duration of the headache to 1 hour in patients under 15 years, the decrease of the number of the headache episodes to 3 instead of 5 and the withdrawn of the unilaterality of the headache localization from childhood migraine criteria (14,15). It has been reported that migraine headache lasted maximum 1 hour in 9-27% of the children with migraine and was unilateral in 41-44.3% of them (4,16,17). In Wöber's study only 36.7% of the children with migraine defined that their pain was pulsatile (4). This shows that detailed history and neurologic examination is necessary for the diagnosis of migraine headache in pediatric age groups. Headache is more prevalent in the families of the children with headache and it is more pronounced in migraine patients.

It was reported that mother's headache is a predictive factor for her child (18).

Migraine with aura (classical) or without aura (common migraine) are different entities but both have multifactorial heritage (19-21). In our study family history (from first degree relatives) was positive in 41.4% of the patients with headache and in 63.4% of the patients with migraine. The existence of the family history of migraine was statistically significant in migraine group. We thought that this result reflected the genetic base of the migraine.In patients with migraine associated abdominal pain can be worse than the headache (22,23). During Familial Mediterranean Fever (FMF) exacerbations, headache can be seen and some FMF patients have recurrent headache attacks when followed for long-term (18,24). We diagnosed one FMF patient with migraine. One of the rare causes of headache in children is cerebral sinovenous thrombosis (CSVT). It is more frequent in children than in adults and more frequent in newborns than in older children. Childhood CSVT carries significant long-term sequelae that include death or neurologic deficits in nearly 50% of the cases (25-27).

The diagnosis should be considered where findings suggest intracranial pathology especially seizures, headache, vomiting, reduced levels of consciousness and focal neurologic signs. The outcome of CSVT depends on rapid diagnosis and initiation of effective anticoagulation (28). Although cerebral angiography is the gold standard for the diagnosis of CSVT, 2 cases (1.4%) in our study population were detected using cranial MRI (29). It must not be out of consideration that a child with migraine headache may have also any space occupying lesion in his or her brain. Recurrent headaches may also be caused by intraventricular tumors (30). Although it is has been reported to be very rare, we detected a case with recurrent headache due to the colloid cyst of the third ventricule.There is no consensus about the need of the routine laboratory tests, EEG, cranial CT or cranial MR in recurrent headaches. EEG is not necessary to determine the etiology and to identify whether the headache is primary or secondary. However, generalized or focal EEG abnormalities or paroxysmal epileptiform activities were reported in some patients with headache (11). EEG abnormalities are not sufficient for the epilepsy diagnosis, but it must be remembered that headache can be the aura

of major motor seizures or the postictal symptom of the seizures which cannot be observed clinically (31).

Aicardi at al. reported that 31.7% of the patients with headache show EEG abnormalities (32). The electroencephalographic abnormality rate in our study (31.8%) was in accordance with the literature (6).Neuroimaging studies detect pathologic findings in 16% of the patients with headache and 3% of these pathologic findings can be treated medically or surgically (5,33). Medina at al. studied the clinical predictors of the space occupying lesions and found that headache with the onset in the last month, without family history, with abnormal neurologic findings, walking diffuculties and seizures are predictive for the space occupying lesions (34). In our study, pathologic findings were detected in %34 of the patients using cranial CT, MRI, MRA and Doppler USG which were treated in %2.7 of all patients with surgical intervention (2 patients with intracranial mass, 2 patients with venous sinus thrombosis).The results of this study suggested that the frequency of headache increases with age. Migraine headache is one of the the most frequent causes of recurrent headaches in children and girls are usually more often affected than boys. Detailed history, physical and neurological examination for any underlying intracranial pathology are necessary in patients with headache. Evaluation with neuroimaging methods and other tests should be used for the patients with abnormal neurological examination findings or abnormal pattern of symptoms.

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