375 Childhood Primary Headache: Clinical Features, the Agreement between Clinical Diagnosis and Diagnoses Using the International Classification of Headache Disorders in Thai Children

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Objective: *To study the clinical features of patients with headache and agreement between clinical diagnoses and ICHD II criteria diagnosis in primary headaches in Thai children.*

Material and Method: *Patients with headache who, over a 4-year period, consulted the neurological clinic, were interviewed by questionnaire, examined, diagnosed, treated, and followed up by pediatric neurologists. The result from the questionnaire was used to define the type of headache according to the ICHD II criteria. The clinical features were analyzed and clinical diagnosis was compared with diagnoses using the International Classification of Headache disorders.*

Results: *Three hundred and seventy-five primary headache patients were defined by ICHD II criteria. One hundred twenty eight (35.2%) were migraine, 47(12.5%) were tension-type, 123(33.3%) were probable migraine, 31(8.3%) were probable tension-type, and 40(10.7%) cannot be classified because the symptoms were not compatible with diagnosed criteria. Using clinical diagnosis as the standard, the sensitivity of the ICHD -based definition of migraine without aura and probable migraine was 89.96% whereas the specific was 65.09%. On the other hand, the sensitivity of the International Classification of Headache disorders-based definition of infrequent episodic tension-type and probable infrequent episodic tension-type was 56.34% whereas the specific was 87.50%.*

Conclusion: *The present study shows the increase of sensitivity but decrease of the specificity of ICHD II criteria in diagnosed pediatric migraine headache. However, the duration of attack and quality of headache are still the limitation of diagnosis for pediatric headache. Therefore, the diagnosis criteria in pediatric headache should be developed distinctly from adults.*

Keywords: *Primary headache, Migraine, International Classification of Headache Disorders Criteria*

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Headache is a common symptom that is generally found in both children and adults and motivates them to visit a doctor. The parents who take their children with headache to see the doctor are worried that the symptom is the result of a serious cause, especially brain tumor. Fortunately, the serious causes in these patients are rare, most cases are benign conditions such as migraine headache or tension-type headache while the causes of the children with chronic or recurrent headache are usually unrecognized etiology[1].

The criteria for diagnosis headache in children, was established by the International Headache Society in 1988 and was revised in 2004[2]. Based on these criteria, headache symptoms are classified to be primary and secondary headache. The primary headache disorders include migraine, tension-type, cluster and paroxysmal, and headache unassociated with a structural lesion. These were defined on the basis of

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symptoms profiles on the characteristic of attacks and the general and neuralgic examinations reveal normal. Contrary to secondary headache which were defined on the etiology such as head and/or neck trauma, cervical vascular disorder, infection, tumor mass, substance or its withdrawal, etc. These are mostly diagnosed by good history taking and physical examination and may need further laboratory investigation for some patients.

This classification was used for clinical practice and clinical research but many clinicians disagree with the criteria diagnosis of migraine and other primary headaches because these criteria had a low sensitivity and a high specificity[3]. The objectives of the present study were to study clinical features and study the agreement between clinical headache diagnoses by pediatric neurologists in Queen Sirikit National Institute of Child Health and ICHD II criteria in primary headaches in Thai children.

Material and Method

Children aged 16 years or under with a daily headache for more than 2 weeks or recurrent headache more than 4 times consulted the neurological clinic at Queen Sirikit National Institute of Child health between January and December 2001 and between January 2003 and December 2005. Parents and/or patients had to answer the questionnaire then were interviewed and examined by the pediatric neurological staff that made the decision to investigate, diagnose and to give treatment depending on the clinical features. They were followed up 2 weeks and 2 months later to confirm the diagnosis and the response of treatment. The checklist questions were age of onset, time, duration, location, frequency, severity, character of the headache, associated signs and symptoms, precipitating and relieving factors, and family history of headache and migraine.

Medical records and the answers from the interviewing were reviewed. The type of headaches was redefined according to the ICHD II criteria.

SPSS program was used as an analysis tool. The Chi-square test and independent student t-test were used to determine the association between two categorical variables.

Results

Four hundred and thirty nine cases were in the inclusion criteria. Three hundred seventy-five (85.4%) were primary headache, the others were secondary headache. Two hundred and twenty-eight (60.8%) cases were female, 147 (39.2%) were male. Mean age at first examination was 9.54 years (SD 2.51 years), range was 3.1-16 years, mean age at onset of headache was 8.09 years and 76.67% of cases were studying in primary school.

Of the 375 primary headache patients, 85.33% identified the site of headache at frontal or temporal regions. From the primary headache patients, 45.9% had unilateral pain, 24.1% could not specify the type of pain, 52.3% experienced nausea during the attack, 41.9%, 38.5% and 33.9% experienced vomiting, photophobia, and phonophobia respectively. About 60-70% of these had the attack less than 5 times. To specify the duration of attack was difficult to ascertain because of various duration of each attack and an analgesic drug usage. Most cases had attack-duration of less than 6 hours. There were 22.9% that had less than 1 hour duration of attacks and these patients had typical symptoms of migraine. One month before visiting the

Table 1. ICHD II Diagnostic criteria for migraine without aura[3]

Migraine without aura : Diagnostic criteria:
- A. At least five attacks fulfilling B to D
- B. Headache attacks lasting 1 to 72 hours (untreated or unsuccessfully treated)
- C. Headache has at least two of the following characteristics:
  1. Unilateral location
  2. Pulsating quality
  3. Moderate or severe intensity (inhibits or prohibits daily activities)
  4. Aggravation by walking stairs or similar routine physical activity
- D. During headache at least one of the following:
  1. Nausea and/or vomiting
  2. Photophobia and phonophobia
- E. Not attributed to another disorder.

Probable migraine without aura: Diagnostic criteria:
- A. Attack fulfilling all but one of criteria A-D for 1.1 migraine without aura
- B. Not attributed to another disorder

clinic, 49.1% of the children experienced a frequency of attack of more than 3 episodes/week. In these patients, 79.47% usually had an attack period in day time; however 32.5% experienced some attacks at night and awakened with headache. Most had no vomiting. The headache attacks affected the children's daily activities as 54.7% of them had to stop an ongoing activity because they needed to sleep. In addition, 22.4% missed school because the attacks occurred in the morning.

The associated symptoms with headache were sweating, had abdominal pain or discomfort, pallor, and eye pain or visual disturbance. These were reported in 5.3%, 10.4%, 12.3%, and 20% of cases, respectively.

The ICHD II criteria for migraine without aura, probable migraine without aura, infrequent tension-headache, and probable infrequent tension-headache were applied in these patients. The results were that 128 (35.2%) were migraine, 47 (12.5%) were tension-type, 123 (33.3%) were probable migraine, 31 (8.3%) were probable tension-type, and 40(10.7%) can't be classified because the symptoms were not compatible with diagnosed criteria, the duration-attack was less than the duration of attack of the ICHD II criteria, and the children couldn't describe the quality of headache.

Compared clinical features of children with migraine headache and tension-type headache

The authors accounted migraine headache with probable migraine headache to be migraine group and tension-type with probable tension-type to be tension-type group. Then these two groups were compared.

No statistically significant differences were found in gender, age at first visit, age at onset, awakened at night, relieving by sleep or acetaminophen, familial history of headache, and familial history of migraine.

The significant statistical differences were found in frequent attack-periods, premonitory symptom of mood disturbance, and abdominal pain or discomfort, associated symptoms of eye pain or visual

Table 2. ICHD II Diagnosis criteria for tension-type headache

2.1 Infrequent episodic tension-type headache: Diagnostic criteria:
- A. At least 10 episodes occurring on < 1 day per month on average (< 12 days per year) and fulfilling criteria B-D listed below
- B. Headache lasting from 30 minutes to 7 days
- C. Headache has at least two of the following pain characteristics:
  1. Bilateral location
  2. Pressing/tightening (non-pulsating) quality
  3. Mild or moderate intensity
  4. No aggravation by routine physical activity such as walking or climbing stairs
- D. Both of the following:
  1. No nausea or vomiting (anorexia may occur)
  2. Photophobia and phonophobia are absent, or one but not the other is present.
- E. Not attributed to another disorder

2.2 Frequent episodic tension-type headache: Diagnostic criteria:
- A. At least 10 episodes occurring on >/ 1 but <15 days per month for at least3 month (>/12 and < 180) and fulfilling criteria B-D
- B. Headache lasting from 30 minutes to 7 days
- C. Headache has at least two of the following pain characteristics:
  1. Bilateral location
  2. Pressing/tightening (non-pulsating) quality
  3. Mild or moderate intensity
  4. No aggravation by routine physical activity such as walking or climbing stairs
- D. Both of the following:
  1. No nausea or vomiting (anorexia may occur)
  2. Photophobia and phonophobia are absent, or one but not the other is present
- E. Not attributed to another disorder

2.3 Probable infrequent or frequent episodic tension-type headache: Diagnostic criteria:
- A. Episodes fulfilling all but one of criteria A-D for infrequent or frequent episodic tension-type headache
- B. Episodes do not fulfill criteria for migraine without aura
- C. Not attributed to another disorder

Table 3. 375 characteristics of headaches and associated symptoms

Characteristics (N)	%
Location 369	
Forehead	14.7
Bi-temporal	26.4
Uni-temporal, left or right	45
Vertex	6.2
Occipital	4.6
Diffused	2.4
Unilateral	45.9
Quality 370	
Throbbing	41.3
Stabbing	16.8
Tightness	14.7
Burning	1.9
Can't identify	24.1
Frequency of attack per week 375	
< 1	21
2-3	29.9
> 3	49.1
Duration of attack 375	
< 30 min	10.4
30 min-1 h	40
> 1-2 h	14.1
> 2- 6 h	18.9
> 6 h	16.5
Associated symptoms 375	
Nausea	52.3
Vomiting	41.9
Photophobia	38.5
Phonophobia	33.9
Severity 374	
Go to the bed	46.4
Stop activity	22.7
Continuous activity	27.7
Can't go to school	32.8
Aggravation by walking up stairs, sport or exercise 375	24.4
Frequent attack period 375	
Before go to school	24.8
Morning learning hours	12.0
Afternoon learning hour	23.5
Evening at home	19.2
Night, go to bed	9.1
Variable	30.1
Nocturnal awakening 368	35.2
Aura 375	
Mood disturbance	13.6
Abdominal discomfort	12
Visual disturbance	6.9
Associated symptoms 375	
Eye pain or visual disturbance	20
Abdominal pain or discomfort	10.4
Sweating	5.3
Looked pale face	12.3
Familial history headache 375	56
Familial history migraine 375	26.4
Precipitating factors 375	
Hot weather	6.4
Sleep deprivation	5.3
Learning stress	13.9
Familial stress	4.5
Relieving factors 375	
Sleep	64.8
Paracetamol	62.7

disturbance, abdominal pain or discomfort, pallor, precipitating by sleep deprivation, learning stress.

Frequent attack-period in classrooms in the afternoon and variable times were statistically and significantly different. Apart from the premonitory symptom of visual disturbance, there were significant differences in mood disturbance and abdominal pain/discomfort, associated symptoms of eye pain or visual disturbance, abdominal pain or discomfort, sweating, and pallor. Precipitating factors are significantly different in hot weather, sleep deprivation, and learning stress, except familial stress.

Agreement between clinical diagnosis and ICH II criteria

Using clinical diagnosis as the standard, the sensitivity of the International Classification of Headache disorders-based definition of migraine without aura and probable migraine was 89.96% where as the specific was 65.09%. On the other hand, the sensitivity of the International Classification of Headache disorders-based definition of infrequent episodic tension-type and probable infrequent episodic tension-type was 56.34% whereas the specific was 87.50%.

Discussion

Headache is a common problem in the out patient clinic but it was mostly under-diagnosed for etiology and resulted in under-treatment, especially in children. It affected patients' daily activities. The present study shows that 49.1% of children were interrupted from their on-going activities or sleeping during the attack and 24.4% had to miss class.

Most studies that used previous IHS criteria for diagnosis, described that the causes of recurrent or chronic headache were primary headache, especially

Table 4. Characteristics of headache classify with ICHD II criteria

Characteristics	Migraine (%) n = 128	Tension type (%) n = 47	Probable migraine (%) n = 123	Probable tension n = 31	Other primary headache n = 40
1. Location					
Forehead	8	8	21	9	11
Bi-temporal	25	22	35	6	11
Uni-temporal, left or right	92	11	44	5	14
Vertex	2	5	10	4	2
Occipital	1	0	8	6	2
Diffused	2	1	5	1	0
2. Quality					
Throbbing	81	8	52	0	14
Stabbing	7	10	23	12	11
Tightness	16	13	12	8	6
Burning	3	0	4	0	0
Can't identify	22	16	32	11	8
3. Associated symptoms					
Nausea and/or vomiting > 5 times	44	0	26	0	5
Photophobia and/or phonophobia > 5 times	117	0	70	0	13
4. Severity					
Go to the bed	88	11	51	7	17
Stop activity	33	6	29	9	8
Continuous activity	10	29	39	13	13
Can't go to school	68	5	42	2	6
5. Aggravation by walking up stairs, sport or exercise	59	0	20	1	4

in migraine or tension-type. Several studies showed that these criteria had some limitations because some patients were unclassified or overlapped[4,5]. By using the revised version, ICHD II criteria, 92% of these were classified to be migraine and probable migraine tension-type and probable tension-type. There was 8% that were un-classified, which could be other primary headaches such as primary stabbing headache, migraine, or tension-type headache. They could not be compatible with the criteria because of poor describing of the symptoms. The present study shows that ICHD II criteria can reduce the number of the un-classified between migraine group and tension-type group.

The present study showed 45% compatible with probable migraine or probable tension-type headache. The reasons for diagnosing probable migraine or probable tension-type headache were the short duration of the attacks and the poor described quality of headache or confusion between stabbing pain and throbbing pain,which were the same reasons as in previous studies.

Comparing between migraine and tension-type headache, the present study showed no significant statistical difference in epidemiology such as gender, age onset, familial history of headache, and migraine, but the significant statistic differences were in the clinical features especially in premonitory symptoms and associated symptom. These findings may be supportive of the hypothesis that migraine and tension-type were the same disorder, and can be distinguished by the severity.

The premonitory symptoms of mood disturbance, abdominal pain/discomfort, associated symptoms of eye pain or visual disturbance, abdominal pain or discomfort, sweating and pallor were reported to vary from 5-20% in the present study. However, these should significant difference between the migraine group and the tension-type group. These symptoms were obvious from other types of headache, so these factors should be considered included into the migraine criteria. In the present study, migraine without aura was not distinct from migraine with aura because most of the children could not describe the typical characteristic of visual symptoms and the duration of the attacks were less than the criteria requirement.

Agreement of diagnosis for migraine between

Table 5. Comparison of migraine group and tension-type group

Characteristics	Migraine and probable migraine (%) n = 257	Tension type and probable tension (%) n = 78	p-value	Other primary headache n = 40
Sex				
Male	99	33	0.55	15
Female	158	45		25
Age onset, mean (year)	9.68	9.44	0.47	8.89
Onset, mean (month)	17.93	13.72	0.11	13.05
Frequent attack period				
Before go to school	72	15	0.12	6
Morning learning hours	34	7	0.31	4
Afternoon learning hour	69	11	0.02*	8
Evening at home	55	11	0.16	6
Night, go to bed	23	6	0.73	5
Variable	67	32	0.01*	14
Nocturnal awakening	97	22	0.09	13
Premonitory symptoms				
Mood disturbance	45	4	0.01*	2
Abdominal discomfort	38	3	0.01*	4
Visual disturbance	21	3	0.20	2
Associated symptoms				
Eye pain or visual disturbance	63	6	0.001*	6
Abdominal pain or discomfort	36	0	0.000*	3
Sweating	19	1	0.046*	0
Pallor	40	3	0.01*	3
Familial history headache	144	40	0.44	26
Familial history migraine	69	18	0.51	12
Precipitating factors				
Hot weather	22	1	0.03*	1
Sleep deprivation	20	0	0.01*	0
Learning stress	46	3	0.002*	3
Familial stress	12	4	0.87	1
Relieving factors sleep	174	46	0.16	23
Acetaminophen	161	49	0.98	25

Table 6. Comparison of clinical diagnosis and ICHD II criteria

ICHD-II criteria	Migraine (%) n = 229	Tension type (%) n = 71	Unclassify (%) n = 75	Total
Migraine and probable migraine	206	19	32	257
Tension-type and probable tension-type	3	40	35	78
Other primary headache	20	12	8	40

Migraine: sensitivity 206/229 specificity 95/146
Tension-type sensitivity 40/71 specificity 266/304

clinical diagnosis and IHS diagnosis criteria 1988 were poor. Several studies showed the sensitivity of the IHS criteria in diagnosis migraine range from 47 to 66% and the specificity was 92.4%[3,6,7]. Thus, the IHS criteria was revised to be ICHD II and examined by several studies that revealed the improvement of diagnosis of

migraine[8,9]. The present study showed the sensitivity at 89.96% by using the International Classification of Headache disorders criteria for migraine, which supported the previous studies. Although sensitivity was increased but specificity decreased to 65.09% as in the study of Maytal[3]. However, the authors satisfied with this result, in spite of having limitation in gathering accurate data in pediatric headaches and change from migraine or migrainous-disorder to TTH or tension-type headaches, which did not fulfill the criteria, and vice, versa were reported, reaching up to 20-28.6%[8]. These findings support that the revision of International Classification of Headache Disorders is the right direction to improve the sensitivity of diagnosed migraine.

On interviewing with parents and children, the authors found that most patients could not accurately define the attack duration because nobody looked at the clock during the attack, and most of the children could not estimate the duration even the different between 30 minutes and 60 minutes. Fortunately, 27.5% of children in the present study estimated an hour duration, which meets the minimal requirement for diagnosed migraine. Of the patients, 22.9% had an attack duration of less than 1 hour; most of these patients had got analgesic drugs and/or sleep when the headache attacked. Although ICHD II criteria reduced the minimal duration requirement to 1 hour, this is still the limitation for diagnosing migraine. The authors propose that the attack duration criteria should be revised to be shorter, or in case the attack lasting and the patient had to take an analgesic drug or the patients had to go to bed should be considered. Furthermore, young children could not identify the quality of headache, 24.1% could not describe the quality of headache, and 16.8% described it as stabbing pain, which was difficult for some children to differentiate from throbbing pain.

As the authors know, the symptoms of migraine headaches in children are different from adults especially in severity, associated symptoms, and characteristics of the headache. This factor, including the non-maturation of verbal usage in children increases the difficulty and limitation in the diagnosis of pediatric headaches by using the criteria as used in adolescence. The authors believe the headache criteria for children under10 year should be revised by agespecific criteria.

Conclusion

Headache is a common problem that affects the daily activity during the attack. The ICHD II criteria-challenged in the present study shows increased sensitivity but decreased specificity on migraine headaches. However, the duration of attack and quality of headache are still the limitation of diagnosis for pediatric headache. Therefore, the diagnosis criteria in pediatric headache should be developed separately from adults.

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ลักษณะทางคลินิก เปรียบเทียบการวินิจฉัยผู้ป่วยโดยอาการทางคลินิกกับการวินิจฉัยโดยเกณฑ์ของ International Classification of Headache disorders (ICHD II) ของ primary headache ในเด็กไทย

สุรภี เรืองสุวรรณ, สมจิต ศรีอุดมขจร

วัตถุประสงค์: ศึกษาอาการทางคลินิกของเด็กไทยที่เป็น primary headache และ เปรียบเทียบการวินิจฉัยผู้ป่วยกลุ่มนี้โดยอาการทางคลินิกกับการวินิจฉัยโดยเกณฑ์ของ ICHD II

วัสดุและวิธีการ: ผู้ป่วยเด็กอายุน้อยกว่า 16 ปีที่มีอาการปวดศีรษะเป็นๆหายมากกว่า 4 ครั้งในระยะเวลา 4 ปีที่ส่งปรึกษา มาที่งานประสาทวิทยาได้ตอบแบบสอบถามเกี่ยวกับการปวดศีรษะ ซักประวัติ ตรวจร่างกาย วินิจฉัย ให้การรักษา และติดตามอาการ โดยกุมารแพทย์ ระบบประสาท ข้อมูลที่ได้จากแบบสอบถามถูกนำมาให้การวินิจฉัยชนิดของการปวดศีรษะโดยเกณฑ์ของ ICHD II และเปรียบเทียบการวินิจฉัยโดยอาการทางคลินิกกับ ICHD II

ผลการศึกษา: ผู้ป่วยที่เป็น primary headache 375 รายให้การวินิจฉัยโดย ICHD II 128 ราย (35.2%) เป็น migraine 47 ราย (12.5%) เป็น tension-type 123 ราย (33.3%) เป็น probable migraine 31 ราย (8.3%) เป็น probable tension-type และ 40 ราย (10.7%) ไม่สามารถแบ่งชนิดได้เนื่องจากไม่เข้ากับเกณฑ์ที่กำหนด เมื่อใช้การวินิจฉัยโดย อาการทางคลินิกเป็นเกณฑ์มาตรฐาน พบว่าการวินิจฉัย migraine without aura และ probable migraine โดย ICHD II มีความไวร้อยละ 89.96 มีความจำเพาะร้อยละ 65.09 การวินิจฉัย infrequent episodic tension-type และ probable infrequent episodic tension-type มีความไวร้อยละ 56.34 มีความจำเพาะร้อยละ 87.50

สรุป: การศึกษานี้พบว่าการใช้ ICHD II ในการวินิจฉัยmigraine headache ในเด็กมีความไวเพิ่มขึ้นแต่ความจำเพาะลดลง อย่างไรก็ตามการวินิจฉัยอาการปวดศีรษะในเด็กยังมีข้อจำกัดเนื่องจากไม่สามารถบอกลักษณะการปวดศีรษะและระยะเวลาที่ปวดแน่นอนซึ่งแตกต่างจากผู้ใหญ่ ดังนั้นเกณฑ์การวินิจฉัยการปวดศีรษะในเด็กจึงควรแยกจากเกณฑ์ที่ใช้ในผู้ใหญ่