

Redefining Migraine without Aura in Children A 7-Year Study Based on ICHD 2

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ABSTRACT

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Objective: To document short duration (less than one hour) activity affected headaches in children without migraine diagnostic-associated features of nausea, vomiting, phonophobia and photophobia and thus to redefine current (ICHD 2 and 3 BETA) paediatric migraine diagnostic criteria.

Background: Studies show that migraine in children are of shorter duration and when they present without associated features like nausea, vomiting, phonophobia or photophobia, diagnosis can be a real challenge as they miss two current migraine diagnostic criteria/group 14 is applied (headache unspecified / not elsewhere classified). This study is to document such short duration headaches in children without migraine diagnostic-associated features.

Methods: 7 year prospective cohort study conducted on 1432 children, 5 to 15 years old with the following inclusion criteria:

- 1) Recurrent short duration throbbing/non throbbing headaches (unilateral/bilateral / unilateral spreading bilaterally)
- 2) Activity affected (motionless/lie down/sleep off),
- 3) No nausea, vomiting, phonophobia or photophobia,
- 4) Common/well known/local migraine triggers in this region of India precipitating them.
- 5) One family member suffering from ICHD 2 1.1 (migraine without auras)/1.2 (migraine with auras)/ 1.6 (probable migraines).
- 6) No other significant headache-related history and normal physical, neurological and neuro ocular examinations.

Results: Duration of head pain: 5 minutes to 45 minutes. Common regional /well known migraine triggers: sun exposure, bus travel, missing meals, strenuous physical exercises and sleep disturbances. Family history: 83% (1188) mothers, 11% fathers (158) and 6% (86) siblings suffering from ICHD2, 1.1 (migraine without auras)/1.2 (migraine with auras)/1.6 (probable migraines).

Conclusion: A new definition of paediatric migraine based on above findings will be extremely helpful for any clinician in a busy practice. Recurrent activity-affected headaches precipitated by known or regional migraine triggers and one family member suffering from migraine origin pain (1.1, 1.2, 1.6) in the absence of another disorder, should lead one to consider the diagnosis of migraine without aura in children.

Keywords: Paediatric migraine

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The first landmark publication of I H S Headache classification system was in 1988¹ (Headache classification committee of The International Headache Society), and prior to that several classifications were used for headache diagnosis in children. These dealt mainly with migraine and included the criteria established by Vahlquist², Deubner³ and Prensky and Sommer.⁴ During the last 15 years, several studies^{5,6,7,8,9,10} have proposed revisions to the I H S criteria for children and adolescents with migraine. The major suggestions were to shorten the duration of the migraine attack to one hour and to remove hemicrania as a criterion since many children have headaches that are bilateral (temporal/frontal or unilateral spreading bilateral).

However, when I H S criteria and the various modifications are applied, a sizable proportion of headache children with migrainous features fail to fully meet ICHD2 of migraine without aura criteria and thus they receive an atypical migraine diagnosis (probable migraine according to ICHD2 and ICHD3 Beta).^{11,12} Many children report short duration episodes of activity-affected head pain which resemble migraine but these migraine episodes of less than one hour duration are not well documented. Moreover, there are overlapping statements in the diagnostic criteria of migraine and tension type headaches- number of episodes, duration of pain, bilaterality, may be non- throbbing, moderate intensity and either phonophobia or photophobia and

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mild nausea in chronic tension type headaches. No study has addressed children presenting with recurrent short duration activity affected headaches (aggravated by or causing avoidance of routine physical activities - predominantly a migraine diagnostic pain feature) with no associated diagnostic features of nausea, vomiting, phonophobia and photophobia. In this region of India (coastal region, Southern India) nearly 10 to 15 % of our child patients report such headaches with no other ICHD migraine diagnostic history, symptoms or signs for which no other diagnoses other than migraine can be thought of. This study was undertaken to diagnose such headaches and to propose a new definition for migraine without aura in children.

METHODS

This 7 year prospective cohort study was done at two coastal clinics of Southern India (Teresa Eye & Migraine Centre and St Sebastian's Visitation Hospital, Alleppey District of Kerala state). Children attending the monthly charity headache camps were also included.

Inclusion criteria

1. Recurrent (minimum 5 episodes) short duration, usually lasting less than one class hour (45 minutes), throbbing/non throbbing headaches (unilateral / bilateral / unilateral spreading bilateral)
2. Activity affected during the pain (motionless / sit quiet/lie down/sleep off).
3. No nausea, vomiting, phonophobia or photophobia.
4. Common migraine triggers in this region of India precipitating them.
5. One family member suffering from ICHD2 1.1 (migraine without aura)/1.2 (migraine with aura)/1.6 (probable migraine without aura).
6. No other significant history and normal physical, neurological and neuroocular examinations. The inclusion criteria was designed from the author's 15 years' experience^{10,16,17} in managing nearly 30,000 children and adolescents with recurrent headaches, prior to this study. 14,824 children were seen with recurrent short duration headaches lasting no more than 2 hours during this period of seven years and 1,432 satisfied the inclusion criteria. Information regarding the duration, severity, quality and location of head pain and behaviour during head pain episodes was also recorded. Children with visual manifestations, typical ICHD2 tension type headaches (activity not affected headaches precipitated by tension - anxiety situations) and other headaches of

eye, ENT and dental origin were excluded so also fever and other systemic and organic illnesses. The hospital ethical committee (St Sebastian's Visitation hospital, Arthunkal, Cherthala, Alleppey) clearance was taken and all patients/parents signed a written, informed consent.

RESULTS

1,432 children and adolescents fulfilled the inclusion criteria to diagnose brief migraine episodes of less than one hour duration (5 minutes to 45 minutes). There were 872 girls and 560 boys. The headache characteristics, common migraine triggers and family history of 1,432 children are given below.

Headache characteristics

Duration - 5 to 15 minutes 114(8%), 15 to 30 minutes 215(15%), 30 to 45 minutes 1103(77%).

Location - always unilateral 458(32%), bilateral 802 (56%), unilateral spreading bilaterally 172(12%).

Quality - pulsating 529(37%), non-pulsating 630 (44%), just ache (unable to explain) 273(19%). Behaviour during attack- sit quiet 602 (42%), lie down (with or without pressing temples) 458(32%), apply balm and sleep off 372 (26%).

Common Migraine Triggers

Exposure to sunlight 1317(92%), travelling by bus 659(46%), strenuous physical exercises like dancing and cycling 601(42%), sleep disturbances 329 (23%), missing meal at the right time 301(21%). 1031 (72%) reported more than one trigger.

Tension anxiety situations like examinations and funerals were another significant common migraine triggers but omitted in this study, not to confuse with tension type headaches.

Family history of migraine

Mother 1,188 (83%)

Father 158 (11%)

Siblings 86 (6%)

Diagnostic criteria of migraine without aura (ICHD2)

10 episodes.

Duration "30 minutes to 7 days.

2 of 4 pain characteristics Bilateral location, Non pulsating quality, Mild or moderate intensity, Not

aggravated by routine physical activities.

Autonomic symptoms or associated features.

Both of the following No nausea or vomiting, No more than one of phonophobia or photophobia.

DISCUSSION/COMMENTS

Many Studies have documented that in children and adolescents, migraine attacks tends to be of shorter duration. The duration of head pain was reported to be less than two hours in 11–81 % and less than one hour in 8 to 25%.^{13,14} In 1994, Metsahonkala⁶ reported that when duration was omitted as a criterion the prevalence of migraine increased by 25.9%. Gherpelli and colleagues¹⁵ found that entirely excluding duration criterion increased the sensitivity without decreasing the specificity of paediatric migraine diagnosis. This study supports the suggestion of decreasing the criterion on the minimal duration of head pain to less than one hour for migraine without aura in children.

In this study, 1,432 children reported recurrent, activity-affected head pain lasting 5 to 45 minutes without associated diagnostic migraine features of nausea/vomiting/phonophobia /and or photophobia. It is extremely difficult to get the symptoms of phonophobia and photophobia from some of these children with recurrent headaches and interviewing the parents, grandparents, other family members, classmates and teachers (as some of them get headaches only during school hours) are necessary to rule them out. This is usually not possible and practical in countries like India, where huge volumes of patients (up to 250 per day in government sector) have to be examined by a single doctor on a daily basis. Moreover there is no assurance that they may come for follow up visit with a headache diary, hence it is very important to make a definite diagnosis at the first contact for initiating an effective treatment regimen and to rule out red flags. The behaviour during head pain episodes like switching off TV and radio, closing the door and putting off lights, covering the heads with blanket or cloth when lying down with head pain, getting angry or shouting at family members or classmates when they try to talk etc. were indirect evidences suggestive of one or both. Reliable information regarding phonophobia and photophobia can be obtained only from mothers and grandmothers as they are the ones who are likely to be with the children most of the time. When fathers bring children for consultation, most of them have no idea regarding both these symptoms as they are not at home / have not witnessed one during the headache episodes.

All of them were getting the head pain attacks when exposed to one or more of the common migraine triggers^{16,10,17,18} in this region of India. Exposure to sunlight and traveling by bus were the most common triggers. Mortimer et al.¹⁴ reported that a migraine trigger could be identified in 44.4 % of the children aged 8–11 years. In children more than 8 years tiredness, exercise, noise, glaring light, missing a meal were all reported as migraine precipitants by different studies. Rossi et al.¹⁹ documented psychological stress followed by physical stress as the most common precipitating factors in childhood migraines. This is the first study to document common migraine triggers in a region to aid in the migraine without aura diagnostic work up. Majority of the children and their parents reported same common triggers with exposure to sunlight precipitating migraine in nearly 90% of them. Trigger factors are less common or less obvious in patients with episodic tension type headaches. It is documented that emotional stress, lack of sleep²⁰ and menstruation can trigger or aggravate both TTH and migraine but activity getting affected, other common migraine triggers precipitating pain and family history will favor a diagnosis of migraine in such a clinically confusing scenario.^{17,21,22,23} This study didn't consider stress and menstruation as triggers and lack of sleep is found to be one of the most common triggers for ICHD2 migraine without aura in this region of India. Other regional triggers documented were tapioca (starch extracted from manioc), jaggery (traditional uncentrifuged sugar), banana, flatulence-inducing dietary items like cabbage, beans, potato etc. Other unusual triggers were change in the usual bath time and bath oil, not having a bath for two days due to fever etc (any change in their daily routines), excess hair growth and oil bath with immediate exposure to sunlight. As there is a time gap (upto 24 hours in the majority of migraineurs here) between the exposure/ingestion and the onset of head pain, it is not always easy to get a direct correlation between these triggers and migraine pain.

Family history revealed mother (83%), father or sibling suffering from ICHD2 migraine with or without aura. Migraine is a familial disorder, although disagreement exists regarding the mode of inheritance. If one looks at the families of children with migraine, 50 to 90% of relatives also have migraine. Parents must be interviewed in detail to find out migraine symptoms. Most of them considered their headaches to be different from that of their children. The diagnosis as told to them by their medical practitioners (the first contact practitioner in their life) or the elders in the family like grandparents are; sinusitis, low (especially if dizzy spells are associated

with headaches) or high blood pressure, tension, spectacle-related (past history of a family member getting significant relief after wearing spectacles or pain manifesting in the orbito-periorbital area), ear balance dysfunction especially when dizziness or vertigo associated with recurrent headaches, localised edema/fluid collection (a local synonym for sinus related symptoms), anaemia, vitamin deficiency or functional. Some very interesting migraine mimics were PCO pain (polycystic ovary pain for menstrual migraine), period pain (head pain with migraine features during menstrual periods), gas related pain (abdominal gas formation as the initial symptom), normal ordinary pain etc. One must also be familiar with local/regional terminologies and slangs for migraine which are commonly used by traditional practitioners and elders. Therefore leading questions like whether they get headache when exposed to sunlight, bus travel or other known or common migraine triggers and other mimics and local synonyms of migraines must be specifically asked to unravel family migraine symptomatology. It was indeed surprising to find out that some parents considered head throbbing, severe head discomfort, paresthesia, burning sensation and head pain as different entities. Many mothers thought that sun exposure headaches are normal ordinary headaches and there is no need to mention about it to the doctor. When details of these headaches were asked typical migraine features were revealed. When asked a direct question like whether you get headaches, the answer from some of them are no headaches but get occasional migraines. Another surprising history was no headache but occasional blurring of vision which was nothing but typical aura features. Some of them after repeated questioning said they have also suffered from recurrent activity-affected headaches with nausea/vomiting precipitated by the same triggers as their children.

This documentation also unravels the pitfalls in many headache questionnaires that are currently used all over the world. A direct question like 'do you get headaches or did you get headaches during the past one year' will not expose nearly 25% of migraines in this region of India. Many mothers consider their headaches as different from their children's head pain and what they are getting is not headaches, but sinusitis, throbbing, head discomfort, low blood pressure, high blood pressure etc. Some family members consider migraine to be headache with vomiting and if vomiting is not present, it is considered as normal ordinary headache which everyone gets in the community. CAM (alternative and complimentary practitioners) usually diagnose migraine only if it is occurring in the early

morning hours (local terminology-sun migraine as it starts along with sunrise) or by late evening (moon migraine as it starts with sun set).

This study shows that reducing the time duration to less than one hour would considerably increase the number of children diagnosed with migraine. One can argue that this time reduction might increase the overlap between the diagnostic criteria of migraine and tension type headaches but it can be easily overcome by adding one common/known migraine trigger and one family member suffering from ICHD 2/3 beta migraine, present or past, to the current ICHD diagnostic features. One cannot consider any other diagnoses in these children when everything else is normal with history and examinations. Other short duration activity-affected headaches like cluster headaches and paroxysmal hemicranias with oculonasal autonomic symptoms, though reported in children, are very rare and no case was diagnosed in this age group during the study period. Short duration mild to moderate non throbbing headaches attributed to uncorrected refractive errors, phorias and tropias were diagnosed when prolonged and tiring near or far focusing precipitated periorbital pain. Other brief headaches (group 4-most of them are self-explanatory) attributed to cough, valsalva, cold, exercise, external compression, traction etc. were easy to diagnose clinically and were easily differentiated from brief migraine without aura episodes. Brief headaches attributed to pheochromocytoma were never diagnosed during the study period of 7 years or anytime in the past. Short duration headaches attributed to other disorders of homeostasis like sleep apnea were a diagnostic consideration when early morning non-throbbing, mild to moderate headaches were associated with nocturnal symptoms of snoring, abnormal sleep position, getting up in the night, chronic nasal allergic symptoms etc. Airplane travel headache was diagnosed in one. Children and adolescents complaining of aura like manifestations were not included in this study and benign occipital epilepsies with brief colored auras with automatisms occurring in the night were not a diagnostic consideration in these patients. Craniopharyngiomas,³ astrocytomas,² Arnold-chiari malformation,² medulloblastoma, ependymoma and supratentorial PNET one each were diagnosed during this period but all of them had one or more red flag symptoms/signs at presentation.

A critical analysis of the ICHD2 diagnostic criteria for migraine and tension, exposes more than one overlapping statement. In this study, majority of the children presented with bilateral (68%) non- throbbing

(63%) headaches (this fulfills two diagnostic pain features for tension type headaches) and with the duration of more than 30 minutes and no diagnostic associated features, one tends to diagnose episodic tension type headaches in these children (missing two criteria to diagnose ICHD 2 migraine without aura). At the same time atypical/ most probably migraine (missing duration and associated feature criteria) too can be diagnosed because of activity affected moderate to severe intensity head pain (predominantly a migraine feature) precipitated by regional and well known migraine triggers. In these clinically confusing situations, this study shows that the following three features undoubtedly favor a diagnosis of migraine without aura and clearly differentiate migraine from tension type headaches.

1. Activity affected head pain (motionless- aggravated by or causing avoidance of routine physical activities)
2. One common/regional /well known migraine trigger precipitating pain
3. One family member suffering from ICHD 2/3 beta migraine (definite or probable). The problem in diagnosing probable/atypical migraine is that, most of the parents are concerned about an underlying brain tumor or other serious disease and one can confidently explain to them that what their children are getting is nothing but brief migraine attacks. Also a negative general, physical, neurological and neuro-ocular exam will be very reassuring and scientifically more convincing to both children and family. In regions like rural India there is no assurance that most of them will ever come for a follow up examination. So it is always better to diagnose migraine without aura at first consultation and advice regarding all probable regional trigger avoidance. This includes avoiding both crowded long distance school bus journeys and physical training sessions and informing the teachers regarding sun exposure during school assembly and allowing the kids to wear a hat with a brim and sunglasses outside the class, plenty of clean drinking water and lunch at the right time etc. These measures will surely go a long way in alleviating this malady.

Thus this study shows that brief migraine attacks can manifest without associated features like nausea, vomiting, phonophobia and photophobia and both migraine and tension can be distinguished easily from a thorough clinical history. Therefore it is proposed that brief migraine without aura attacks be diagnosed in children and adolescents with less than one hour duration and without associated features and must be

differentiated from episodic tension type headaches. ICHD2/3 beta to be modified as - if duration of recurrent activity affected head pain is less than one hour and if no diagnostic associated/ autonomic symptoms are present, two additional features to be added to diagnose migraine without aura in children.

1. One common/known/ regional migraine trigger precipitating the attacks
2. One of the parents or siblings suffering from ICHD2/3 beta migraine with or without aura (definite or probable) - A new definition of paediatric migraine based on above findings will be extremely helpful for any clinician in a busy primary/ secondary care practice in developing countries like India where huge volumes of patients have to be seen daily. Recurrent (5 episodes or more) activity affected (fulfilling 2 diagnostic pain characteristics) headaches precipitated by known /common or regional migraine triggers and one family member suffering from migraine origin pain (1.1,1.2,1.6) in the absence of another disorder (not to miss red flags), should lead one to consider the diagnosis of migraine without aura in children.

END NOTE

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