MIGRAINE IN CHILDREN

N. Thilothammal
Margaret Chellaraj
K. Banu
Ratnam

ABSTRACT

A descriptive study was carried out to find out the clinical profile, and electro-encephalographic (EEG) changes in children with migraine. Screening for urinary excretion of 5-hydroxy indole acetic acid (5-HIAA) was carried out. Fifty children suffering from migraine as per Prensky's criteria were recruited over a period of 1 year. Forty six children were suffering from common migraine and 4 had classic migraine. The most common precipitating factors were physical strain and psychological stress like examination fear, fear of teacher and fights with friends. Abnormal EEG recordings were seen in 35 out of 50 patients. Urine samples taken during the headache free period were negative for 5 HIAA. Among the samples taken during the episode of headache, only 1 was positive for 5-HIAA.

It is concluded that common migraine is more prevalent than classic migraine. Clinical criteria is the only way of diagnosing migraine. Since EEG changes are non-specific, this cannot be used as a diagnostic test. Biochemical analysis is expensive and less sensitive.

Key words: *Migraine, EEG changes.*

From the Clinical Epidemiology Unit, Institute of Child Health and Hospital for Children, Madras.

Reprint requests: Dr. N. Thilothammal, No: 16, First Main Road, C.I.T. Colony, Mylapore, Madras 600 004.

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Parents are often surprised when their child complains of headache. In fact, migrainous headache is prevalent in 4% of children in the age group 7 to 15 years(l,2). Early studies have shown that in 20% of adults suffering from migraine, the onset was prior to the age of 10 years(3,4). Migraine, though not incapacitating is still a great handicap for the child at school as it interferes with the school performance and the school attendance.

According to Prensky's criteria, for diagnosis of migraine, the headache must be recurrent and separated by symptom free intervals and be accompanied by atleast 3 of the following 6 symptoms: abdominal pain, nausea or vomiting; localized unilateral headaches or hemicrania; throbbing quality to the pain; complete relief after a brief period of sleep; an aura which may be visual, sensory, motor; and a family history of migraine(5).

.Migraine headache in childhood has not been investigated in detail in our part of the world. The current study was, therefore, designed to determine the clinical profile of childhood migraine, to assess EEG changes in children suffering from migraine and to estimate qualitatively the excretion of 5-hydroxy indole acetic acid (5-HIAA) during and between attacks of migraine.

Subjects and Methods

A cross-sectional study was carried out at the Institute of Child Health and Hospital for Children, Egmore, Madras for a period of 1 year from April 92 to April 93. All children in the age group of 3 to 12 years attending the Neurology Out-Patient Department or getting admitted to the wards for recurrent headache were considered for selection. The lower limit of 3 years was selected because it was expected that children below

this age might not be able to express their symptoms clearly.

Three hundred children with headache were screened for evidence of sinusitis, refractive errors, hypertension, chronic renal illness, neurological disorders and neoplasma. Any child who had a definite underlying cause for headache or who was suffering from a chronic medical illness was not included in the study. Of 300 children screened, 50 children satisfying Prensky's criteria for migraine and who were living in Madras and were willing to participate in the study were enrolled.

Once a suitable case was enrolled, a detailed history was taken. Demographic data regarding type of house and mother's education were recorded. These were used as proxy measures to assess the socio-economic status of the child. Type of house was defined as kutcha or pucca. A pucca house was one that had brick walls, cement flooring and roof other than thatched. When any one of the above was absent the house was said to be kutcha. The mother's education was graded as follows-never attended school, attended elementary school, attended high school or college. If the child was living in a pucca house and if the child's mother's education was elementary school or above, then the child was considered to belong to a better socio-economic status. On the other hand, the child who was living in a kutcha house and whose mother never attended school was considered to be from a poor socio-economic group.

Details about the headache, such as the duration of illness, the frequency of headache, the. duration of each episode and the site of headache were noted down. Symptoms that were associated with the headache such as visual disturbances, vomiting, abdominal pain, sweating, vertigo and cold and clammy skin were enquired about. The nature of the precipitating factor like psychological stress (examination fear, fear of teacher, fights with friends, *etc.)* and physical strain (activity which was unusual for the child like strenuous exercise, excessive participation in outdoor games, travelling long distances, *etc.)* were assessed by questioning the parents. The school performance of the child was classified as above average, average and poor depending on their grades in class exams.

Children with headache that was sharply defined and associated with transient visual or other sensory or motor prodromes were diagnosed as having classic migraine. On the other hand children with headache without striking prodromes were diagnosed as having common migraine(5). After obtaining a detailed clinical history, a thorough physical examination was carried out and a neurological examination was done in detail. EEG was done for all cases during the symptom free interval.

The parents of the children were advised to bring two samples of urine for qualitative estimation of 5 HIAA-one during the headache free period and the other during a paroxysm.

Results

Children in this study were in the age group of 3 to 12 years. The mean age was 9 years. Forty five out of 50 children (90%) were above 6 years. The male to female ratio was 1.2:1 (27 males and 23 females). All the children were born at full term. History of birth asphyxia was present in two children and both had delayed milestones. All children were going to school except one 3 year. Performance in school was above average in 52%. Only 6% had a poor school performance. With respect to mother's

educational status, 37 (74%) had elementary education,.9 (18%) were illiterate and 2 (4%) were graduates. Only 16 (32%) children were from lower socio economic group.

History of febrile fits was present in 5 (10%) children and afebrile generalized tonic-clonic convulsions in 2 (4%). Family history of convulsions was present in 2 (4%) and family history of migraine was present in 44 (88%) of the children.

The minimum duration of illness was 1 month and the maximum duration was 48 months. The average duration was 18 months. Thirty two per cent of children had headache every week while 36% had once in 2 weeks. The minimum duration of the attack was 15 min and the maximum duration was 24 h. The mean duration was 3 . hours (SD ± 5 hours). Thirty four (68%) children had bilateral fronto temporal headache. Unilateral headache was present in 14 (28%) and the remaining 2 (4%) had occipital headache. Visual disturbance, nausea and vomiting and vertigo were present in 4%, 14% and 14%, respectively of the study population. However, these symptoms were present in combination in a majority (68%) of migrainous children *(Table I).*

All the children in our sample had atleast one precipitating factor, 64% had 2 while 16% had 3. The commonest factors in this study, either alone or in combination, were psychological stress (68%), physical strain (56%) and watching TV (26%) *(Table II).* Head injury was not a precipitating factor in any of the children. Majority of the patients had relief by taking rest or going to sleep. Only 16% were using analgesics to get relief.

Abnormal EEG recordings were present in 35 out of 50 patients. These included paroxysmal discharges and background slowing.

TABLE I—*Symptoms Associated with Migraine*

Symptoms	Number*	Percentage
Visual disturbances		
Alone	02	04
In combination	17	34
Nausea & Vomiting		
Alone	07	14
In combination	28	56
Vertigo		
Alone	07	14
In combination	21	42
More than 1 of the above	34	68

* The total number (n) will not be equal to 50 since a large proportion of children had more than 1 assocaited symptom.

Paroxysmal discharges were seen totally in 27 but of the 50 records. Among these, in 24 records, paroxysmal discharges were seen along with disturbances in background activity. In 3 records, paroxysmal discharges alone were seen. The type of paroxysmal discharges we came across were: *(i)* Sharp waves, *(ii)* Sharp wave and slow wave complexes, and *(iii)* Spike and slow wave complexes.

Paroxysmal discharges were both symmetrical and asymmetrical. Sharp wave discharge was the commonest type seen *(Figs. 1 & 2).* In 12 records more than one type of discharge was seen *(Table III, Fig. 3).*

Slowing of background activity was seen in 32 out of the 50 records. Out of these 32 records, 24 showed associated paroxysmal discharges and 8 showed background abnormality alone. The slowing was in the theta and delta range *(Fig. 4)* predominantly over the occipital region with or

TABLE II–*Precipitating Factors in Migraine*

Precipitating Factors	Number*	Percentage
Psychological Stress		
Alone	10	20
In combination	24	48
Physical Strain		
Alone	02	04
In combination	26	52
Watching TV		
Alone	03	06
In combination	10	20
Sunlight		
Alone	01	02
In combination	11	22
Hunger		
Alone	01	02
In combination	01	02
More than 1 of the above	33	66

* The total number (n) will not be equal to 50 since a large proportion of children had more than 1 precipitating factor.

without temporal slowing. Isolated temporal slowing was not seen. Background slowing was also seen symmetrically over both hemispheres as well as asymmetrically *(Table III).*

Urine was examined for all 50 children both during the headache free period and during an episode of headache. The samples taken during the headache free period were negative for 5-HIAA. Among the samples taken during the episode of headache, only one was positive for 5-HIAA.

Discussion

In our sample of 50 children, only 4 (8%) had classic migraine and 46 (92%) had common migraine. In a recent study conducted by Shinnard the proportion of classic migraine in children was 7%(6). Like other authors we also found that the majority of children (90%) with migraine were above 6 years of age(l,7).

The idea has long prevailed that migraine is predominantly a disease of the intellectuals. Many famous people like Caesar, Bismarck, Beethoven and Wagner had suffered from migraine. In our population the number of children who performed well in school were almost equal to the number who were average performers. This was also the finding in the study of Bille *et al.(1).*

Waters found that there was no correlation between social class and migraine(8,9). However, in out study, the majority (68%) of children belonged to the middle and higher income group. This could be explained by the fact, that this group of people consulted a doctor more frequently.

In our study the immediate relatives of 4% of the children were suffering from epilepsy. Billi suggests that seizures occur in 2-3% of close relatives of migrainous patients compared with an incidence of 0.5-1% in the general population(l).

Family history of migraine was present in 88% of our study population. The reported figure in other studies is also similar(l). The average duration of headache in our sample was 3 hours. The relative brevity of the duration of headache in children compared to adults has been reported by others(7). Unilateral headache was present in only 28% of the children in our study population, which is similar to the reports of Prensky *et al.* However, earlier re ports show a higher incidence of 58-60%(10). The incidence of visual disturbance in our study population was 38% which is endorsed by others(ll). Nausea

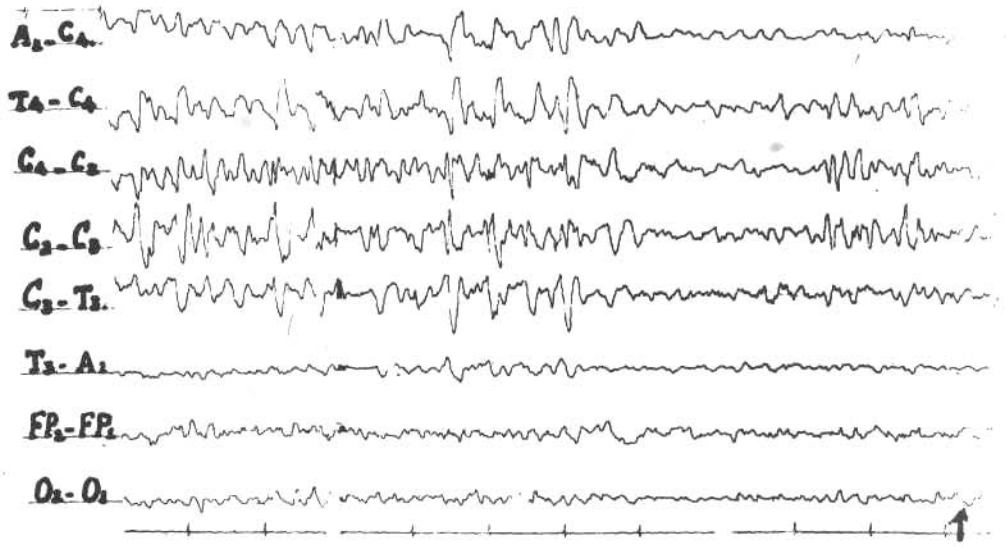

Fig. 1. Abnormal discharges in migraine. EEG of a 3 year old female child with Migraine, of 1 year duration. The record taken during the symptom free interval shows paroxysmal discharges of sharp waves over left temporal, central and right temporal and central areas.

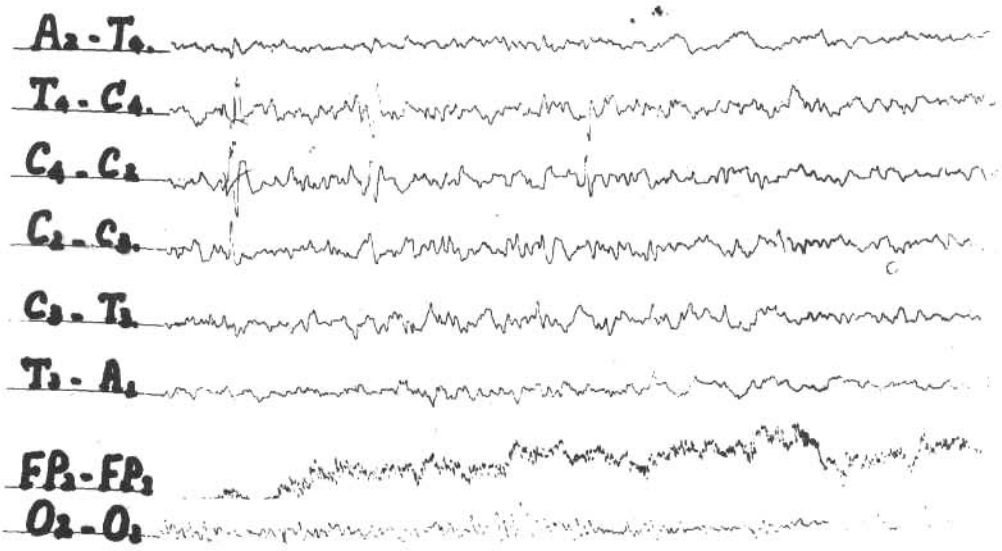

Fig. 2. Abnormal discharges in migraine. EEG of a 10 year old female child with migraine, of 1 year duration. The record taken during the symptom free interval shows spike discharges with phase reversal at C3 and C4.

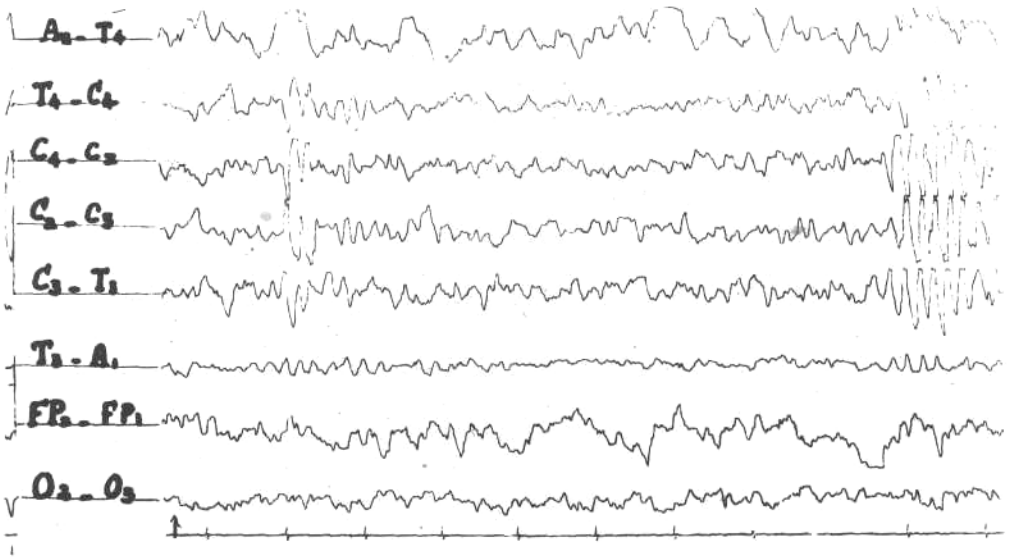

Fig. 3. Abnormal discharges in migraine. EEG of a 6-year old male child with migraine, of 1 year 6 months duration. The record taken during the symptom free interval shows paroxysmal discharges of spike and slow waves and sharp waves over left temporal and right temporal central areas.

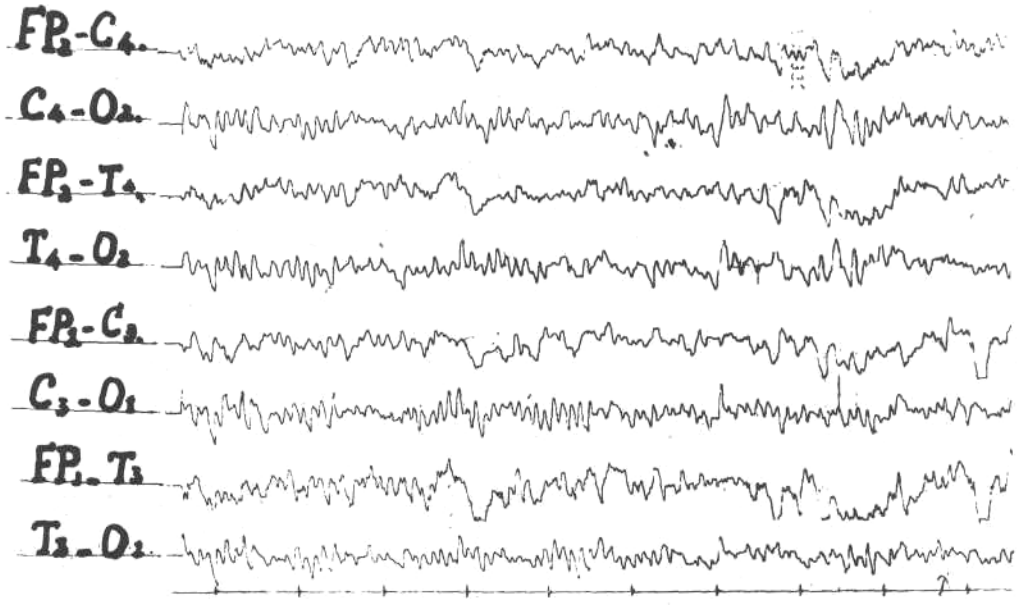

Fig. 4. Background activity disturbance in migraine. EEG of a 12 year old male child with migraine, of 1 year 3 months duration, taken during the symptom free interval, showing asymmetrical temporal and occipital slowing more pronounced on the right side.

TABLE III—*EEG Abnormalities Seen*

Paroxysmal Discharges Type of Discharge	Numbers (n=27)	Changes in Background Activity–Slowing Type of Changes	Numbers (n=32)
Asymmetrical sharp wave discharges alone	8	Asymmetrical occipital and temporal slowing	21
Symmetrical sharp wave discharges alone	5	Symmetrical occipital and temporal slowing	8
Asymmetrical discharge of spike & slow wave complexes and/or sharp wave and slow wave complexes	12	Asymmetrical occipital slowing	2
Symmetrical discharge of spike & slow wave complexes and/or sharp wave and slow wave complexes	2	Symmetrical occipital slowing	1

and vomiting occurred in 70% of our children and it was the most common phenomena associated with migraine. Other studies show incidences ranging from 65% to 78%(1,11). Vertigo and light headedness occurred in 56% of our patients during an attack of migraine and it was the second commonest symptom associated with migraine. This is comparable to the incidence of 47-54% in others reports(l).

The commonest precipitating factor in our sample was psychological stress followed by physical stress. This finding is similar to that of others(l,7,12).

EEG changes were present in 70% of our study population which is comparable with the reports of Hockaday and Whitty who found 60% abnormal records in migrainics(13). A lower figure of 30% has been reported by Selby and Lance(4).

Paroxysmal discharges were found in 54% of our sample, while other reports range from 17-30%(l 1,14,15). Prensky and Sommer found that children with paroxysmal discharges had seizures or a family history of epilepsy, but in our study it was found that children with paroxysmal discharges did not have either epilepsy or family history of epilepsy. Whether these children could be benefited by long term anticonvuftants is to be investigated further in future studies. Changes in the background activity in the form of slowing in the temporal and occipital regions with or without paroxysmal discharges was seen in 32 out of 50 patients. This is comparable to the Prensky and Sommer series where 37 out of 64 patients showed either diffuse slowing or slowing with sharp waves.

There is no specificity to the EEG in migraine and one must be wary of the interpretation of what is abnormal in juvenile records.

Qualitative analysis of the urine samples for 5-HIAA taken during the headache phase was positive in only one child out of the 50 children studied. Curzon et al. found that urine 5 HIAA was positive in two out of nine migrainous subjects studied(16).

This study has been done in the form of

a pilot study. Similar study in a larger cohort done in future may throw further light on childhood migraine. We conclude that common migraine is more prevalent than classic migraine in children. Clinical criteria is the only way of diagnosing migraine, though EEG may be used, keeping in mind the fact that EEG changes are non specific in migraine. Biochemical analysis is expensive and not highly sensitive.

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