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Original Article

Early Diagnosis of Migraine Necessary in Children: 10-Year Follow-Up

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ABSTRACT

BACKGROUND: The prevalence of migraine in individuals younger than 20 years old is 8%, with a mean age at onset of younger than 8 years. However, the long-term prognosis of migraine attacks has not been clearly established. **OBJECTIVE:** Our main objective was to evaluate disease course 10 years after migraine diagnosis in a cohort of children and adolescents. **METHODS:** Migraine was diagnosed in 1999 in a pediatric headache reference center using International Headache Society criteria. In 2009, all patients were interviewed by telephone on the persistence and characteristics of any headaches. The main end point was prevalence of persistent migraine attacks in 2009. Variables associated with persistent attacks were analyzed. **RESULTS:** Overall, 142 children were diagnosed with migraine in 1999. Of these, 84 were interviewed by telephone in 2009. In 1999, the mean age was 11.6 ± 3.1 years, 54% were male, and 50% had migraine without aura. Migraine attacks were common (1-3 attacks/week in 38%). Mean age at onset was 7 years and 4 months (±3 years). In 2009, migraine prevalence was 39/84 (46% [95% confidence interval 36-56]), 12 patients (14%) were headache-free, and 62 patients (74%) had tension-type headaches that were isolated headaches in 33 (39%) patients. The rate of patients with at least one migraine attack per week fell from 37% to 8% ($P = 0.001$) over the 10-year period. Age at the first visit to the center was significantly higher in 2009 migraine sufferers than nonsufferers (12.5 ± 3.0 versus 10.9 ± 3.1 years ($P = 0.02$)). In multivariate analysis, age ≥12 years at the time of first presentation was the only significant factor associated with long-term chronic migraine (odds ratio = 3.0 [1.1-8.0]). **CONCLUSIONS:** Ten years after first presentation, 46% of patients had migraine but the frequency of attacks had diminished. The only factor associated with chronic migraine was age ≥12 years at first presentation.

Keywords: migraine, pediatrics, evolution, risk factors

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Introduction

Migraine in children and adolescents is potentially incapacitating as it may impair quality of life and contribute to school absenteeism and lower participation in extracurricular activities including sports.[1-7] According to a recent systematic review, the prevalence of migraine is 7.7% in those younger than 20 years old.[2] It is significantly lower in those younger than 14 than those younger than 20 (7.0% versus 9.7% in females and 4.7 versus 6.0% in males) but is higher in females than males (7.0 versus 4.7%).[2] Mean age at onset is 7 years and 9 months; long-term prognosis is not well known.[8]

Prognosis varies according to age at diagnosis and length of follow-up. In the longest study (40 years), 23% of 73 children with migraine at entry were migraine-free by 25 years of age, but more than 50% still had migraine attacks

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around the age of 50.[9] The rate of headache resolution ranges from 5% to 38% according to cohort and duration of follow-up (3-40 years).[9-19] In 12%-30% of patients, headache intensity decreases.[9-18] Factors associated with a worse prognosis are female gender, time between attack onset, and its management, family history of migraine, onset before 6 years of age, and attack intensity.[9-11,13,18,20,21]

The objective of this study was to evaluate long-term prognosis 10 years after diagnosis in a population of children and adolescents with migraine.

Methods

This was a cohort follow-up study of all children and adolescents who had been diagnosed with migraine at a pediatric reference center for migraine in 1999 (unité fonctionnelle de lutte contre la douleur, Hôpital d'enfants Armand Trousseau, Paris). The diagnosis was made according to the 2004 International Headache Society criteria, updated from the 1988 criteria.[22] In 1999, practitioners at Armand Trousseau were already documenting the future 2004 International Headache Society criteria. Exclusion criteria were secondary headaches, tension-type headaches, and an unclear diagnosis. Data collated from the 1999 medical files were general patient characteristics, personal and family history, diagnosis, treatment, and attack frequency and outcome.

All patients were contacted 10 years after first presentation (October 2009-April 2010) for a telephone interview covering the following items: incidence of headaches, characteristics of headaches (International Headache Society criteria including frequency, triggers, long-term management, and current management), and lifestyle. The main endpoint was the prevalence of migraine attacks 10 years post diagnosis.

The study protocol was approved by the Ethics Committee (Comité de Protection des Personnes Ile-de-France V, Hôpital Saint-Antoine, Paris).

Statistical analyses

We used Epidata 3.0 software for data entry. Continuous variables are given as means with standard deviations (SD), medians, and interquartile ranges, and were compared by Student *t* test. Qualitative variables are expressed as percentages with 95% confidence intervals (95% confidence interval [CI]) and were compared by the chi-squared test. The association between chronic headaches and study variables was first analyzed in univariate analyses by logistic regression. Variables with a *P* value $\leq$0.2 (as well as gender) were entered into a multivariate analysis. Odds ratios (OR) and 95% CIs were calculated. We used SPSS 17.0 (SPSS Inc, Chicago, Illinois).

Results

Patients

Among the 299 patients presenting for the first time at the reference center in 1999, 142 were diagnosed with migraine. Of these, 86/142 (61%) were reachable in 2009 and 84 agreed to participate in a telephone interview. There was no significant difference in the characteristics (age, sex ratio, migraine type) of the 84 interview participants and the 56 patients lost to follow-up (one death and 55 changes of address).

Mean patient age at first presentation in 1999 was 11.6 $\pm$ 3.1 years; 77 (54%) were male; 50% of migraine attacks were without aura; 32/84 (38%) experienced one to three attacks per week; mean age at migraine onset was 7 years and 3 months ($\pm$3); and 59 (70%) were absent from school for periods lasting on average 5.9 $\pm$ 6.5 days.

Migraine rate 10 years after diagnosis

At the time of the telephone interview, 73/84 patients (87%) still remembered their first presentation to the center and 29 (34%) recalled the diagnosis. The baseline characteristics of the 84 patients are given in Table 1, and the characteristics of tension-type headaches and migraines are given in Tables 2 and 3, respectively.

A total of 39 patients still suffered from migraine attacks 10 years later (46% [95% CI 36-56], 26 without aura and 13 with aura); 12 (14%) had been migraine-free for at least 6 months; 62 (74%) suffered from tension-type headaches; and 33 (39%) had isolated headaches. Of the 72 patients still suffering from headache, 59 (82%) reported feeling better. From 1999 to 2009, the percentage of patients with at least one migraine attack per week fell highly significantly from 37% (31/84) to 8% (3/39) ($P = 0.001$).

Factors associated with long-term migraine

Age at first presentation and mean time between migraine onset and first visit were significantly higher in those still suffering from migraine in 2009 than in non-sufferers (age: 12.5 $\pm$ 3.0 versus 10.9 $\pm$ 3.1 years, $P = 0.02$; time: 5.0 $\pm$ 2.9 versus 3.9 $\pm$ 2.2 years, $P = 0.03$). However, there was no significant difference between the two groups in terms of patient age at migraine onset (7.7 $\pm$ 3.0 and 7.0 $\pm$ 2.9 years, respectively; $P = 0.3$). Two variables were significantly associated with migraine in 2009 in univariate analyses: age at onset $\geq$7 years and age at first presentation

TABLE 1.
Cohort Demographic Characteristics in 2009

Characteristics	Patients (N = 84)
Mean age, years (SD)	22.2 (3.1)
Extremes	15.0-29.0
Mean height, meters (SD)	1.73 (10)
Mean weight, kilograms (SD)	65 (12)
Mean body mass index, kg/m^{-2} (SD)	21.6 (3.0)
Siblings since 1999	5
Lifestyle, N	
Lives with parents/alone/with partner	54/10/17
Has children	1
Smoker	34
Mean pack-years (SD)	2.4 (2)
Alcohol	42
Several times per week/once a week/once a month	9/15/18
Drugs	10
Sports and leisure activities	
Regular sports/no sport for fear of migraine	41/12
Sedentary	29
Leisure activities	59
Profession, N	
Lower secondary school/higher secondary school/student	1/17/33
In employment	33
Employee	5
Paramedical profession	5
Middle level employee	13
Management employee/career in art	7
Other	3

Abbreviation:
SD = Standard deviation