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ORIGINAL ARTICLE

Clinical presentation of primary headaches in childhood and adolescence

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Abstract

Objective: To evaluate the clinical and epidemiological whooping cough/pertussis in a pediatric hospital. **Method:** Series of cases that were studied all patients with whooping cough hospitalized at the Institute of Pediatrics Martagão Gesteira of Universidade Federal do Rio de Janeiro (UFRJ) from May 2011 until August 2012. Were included patients with paroxysmal cough and signs of severity that required hospitalization and excluded patients whose records were incomplete. **Results:** Of the 38 cases of whooping cough analyzed, nine were suspected pertussis cases, and of these, six met the criteria for clinical confirmation of pertussis. The deaths occurred in young infants who were clinically confirmed cases of pertussis, according to the Ministry of Health-Brazil. **Conclusion:** A suspect case definition of pertussis followed confirmation early clinical favoring early institution of appropriate treatment and avoiding unfavorable outcomes.

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INTRODUCTION

Primary headaches are common in the pediatric age group, but more studies are necessary to better indicate differences at different ages in clinical presentation.

Headaches may present as symptoms of other diseases (denoted as secondary) or independently, without a known cause (primary headaches). They can also be unique and episodic, as well as recurrent and chronic.¹

Headaches present in various manners, and a uniform classification was needed to standardize their study and for adequate diagnosis and treatment. The Headache Classification Committee of the International Headache Society periodically publishes the International Headache Classification (ICHD-3b), which is now in its third beta edition.² In this classification, chronic primary headaches are didactically divided into four main categories: tension-type headache (TTH), migraine, trigeminal autonomic cephalgia (which is unusual in the pediatric age group), and other forms of primary headaches.²

Chronic headaches may be considered as a continuum encompassing TTHs and migraines, *status migranosus*, and cyclical childhood syndromes.³ They have a myriad of clinical presentations, which vary from individual to individual and over time in the same patient.^{4,5}

Migraines are chronic headaches associated with autonomic symptoms such as nausea and vomiting, photophobia, and phonophobia and may be accompanied by other reversible symptoms such as visual, sensory, motor, and speech disorders (which are called migraine with aura [MWA]). TTHs frequently do not present with nausea or vomiting.²

A cross-sectional study conducted in Curitiba, Brazil, using questionnaires answered by parents of school-age children showed that 90% and 45% of the children in question had at least one episode of headache over a 12-month period and over a 1-month period, respectively.¹ The same study showed that parents reported most of these episodes as secondary to other illnesses, such as upper respiratory infections. The incidence of chronic headaches varies according to the type under study, age group, and sex. In girls, MWA peaks between 12 and 13 years of age, and its incidence is estimated at 14.1:1,000 inhabitants, whereas migraine without aura (MoA) peaks between 14 and 17 years of age, with an incidence estimated at 18.9:1,000 inhabitants. In boys, MWA peaks at 5 years of age, estimated at 6.6:1,000, and MoA peaks between 10 and 11 years of age and is estimated at 10:1,000 inhabitants.⁶

The diagnosis is essentially clinical and based on the ICHD-3b criteria.² Laboratory and imaging tests (magnetic resonance or computed tomography) are only indicated to rule out underlying diseases that cause headache when related signs or symptoms are present.⁷⁻¹⁰

Quality of life is greatly affected in children and adolescents with chronic headaches, either because of the intrinsic aspect of the pain itself or because of the other commonly associated symptoms. The impact on everyday life can be seen

in the large number of missed days of school or work, which shows that headaches are very debilitating.¹¹

Treatment should include pain management during crises, and prophylaxis should be indicated when there is a major impact on quality of life, which is measured through screenings and a pain diary,¹² as well as by evaluating school absenteeism and poor academic performance, among other factors.¹³ The indication for prophylactic treatment and the best choice for pain management are not the focus of this work.

METHODS

We analyzed the medical records of 232 patients treated in the outpatient pediatric clinic for primary headaches at the Neuropediatrics Center of the Federal University of Paraná's Hospital das Clínicas (CHC-UFPR) between June 2009 and June 2014. All patients were evaluated by an experienced neurologist, who classified their symptoms according to the ICHD-3b standards and divided them into three groups (MWA, MoA, and TTH). The inclusion criteria for the study were meeting the ICHD-3b criteria for MWA, MoA, and TTH. Sixty patients with secondary headaches or suspected secondary headaches. At the first consultation, a standardized questionnaire including relevant clinical history data was administered and completed by the examiner. This study was registered and approved by the institutional review board (CHC-UFPR record 33507714.6.0000.0096). The data were tabulated in Microsoft Excel 2010, and statistical analysis was performed using Pearson's chi-square test for the qualitative variables and analysis of variance for the quantitative variables.

RESULTS

Among the 172 cases, 33 were classified as MWA, 96 as MoA, and 43 as TTH. Of the total cases, 45.3% were boys and 54.7% girls. In the MWA group, 60.61% were girls and 39.49% were boys; in the MoA group, 47.92% were girls and 52.08% boys, and in the TTH group, 65.12% were girls and 34.88% boys ($p = 0.12$), as shown in Table 1.

The mean age was 11.2 ± 2.7 years in the MWA group, 10.8 ± 2.8 in the MoA group, and 10.6 ± 2.4 in the TTH group ($p = 0.58$).

With respect to time from symptom onset to first evaluation at the specialized outpatient clinic, symptoms first appeared 1–3 years before first outpatient consultation in 42.42% of patients with MWA, 29.17% with MoA, and 34.88% of patients with TTH ($p = 0.36$); they appeared >3 years before the first outpatient consultation in 33.33% of patients with MWA, 39.58% with MoA, and 32.56% with TTH ($p = 0.66$), as shown in Table 1.

In terms of pain type, 72.73% and 76.84% of patients in the MWA and MoA groups, respectively, experienced throbbing headache compared with 32.56% of patients with TTH ($p < 0.00001$). Moreover, 6.06% and 16.67% of patients with

Table 1. Pain characteristics.

Characteristics of pain				
	MCA %	MSA %	CTT %	<i>p</i>
Male	39,39	52,08	34,88	
Female	60,61	47,92	65,12	1,266
Time of onset				
<1 year	21,21	30,21	33,23	0,314
1–3 years	42,42	29,17	34,88	0,362
>3 years	33,33	39,58	32,56	0,662
Characteristics of pain				
Throbbing	72,73	76,84	32,56	<0,00001*
Sharp	39,39	20,83	20,93	0,083
Oppressive	6,06	16,67	37,21	0,0017*
Continuous	3,03	0	2,33	0,267
Burning	3,03	1,04	2,33	0,711
Shock	0	1,04	2,33	0,635
Undefined	6,06	2,08	6,98	0,326
Intensity				
Strong	60,61	54,17	39,53	0,147
Moderate	36,36	41,67	46,51	0,672
Weak	3,03	4,17	13,95	0,063
Duration of pain episode				
1–5 min	0	2,08	2,33	0,692
5 min–4 hours	45,45	62,5	72,09	0,058
4–72 h	39,39	33,33	23,26	0,298
>72 h	6,06	0	2,33	0,068
Frequency				
Daily	9,09	5,21	9,3	0,592
2–5 per week	54,55	58,33	65,12	0,622
1–4 per month	30,3	32,29	26,19	0,773
Time of day				
Morning	12,12	14,58	20,93	0,522
Afternoon	48,48	51,58	62,79	0,374
Night	18,18	14,59	6,98	0,513
No defined time	30,3	23,96	20,93	0,633
Location				
Frontal	45,45	60,42	44,19	0,122
Temporal	36,36	25	11,63	0,039*
Vertex	6,06	12,5	13,95	0,523
Occipital	9,09	4,17	27,91	0,0018*
Holocranial	0	4,17	4,65	0,473
Triggering factors				
None	3,03	13,54	25,58	0,020*
Sound	42,42	33,33	27,91	0,411
Light intensity	63,64	42,71	30,23	0,013*

Fasting	36,36	14,58	9,3	0,004*
Visual Effort	33,33	21,88	13,95	0,13
Stress	30,3	21,88	30,23	0,456
Exercise	18,18	10,42	11,63	0,496
Excessive sleep	15,15	2,08	0	0,0013*
Odors	15,15	10,53	9,3	0,697
Mechanical factors	9,09	8,33	4,65	0,699
Menstruation	9,09	5,21	4,65	0,664
Foods triggering the crisis				
None	66,67	71,88	88,1	0,062
Chocolate	27,27	14,58	4,65	0,032*
Processed meats	12,12	9,38	2,33	0,241
Cookies	3,03	1,04	0	0,467
Cheese	21,21	8,33	4,65	0,042*

MWA and MoA, respectively, had oppressive headache against 37.21% of patients in the TTH group ($p = 0.0017$). Pain was described as strong by 60.61% of patients with MWA, 54.17% of patients with MoA, and 39.53% of patients with TTH, whereas it was described as moderate by 36.36% of patients with MWA, 41.67% of patients with MoA, and 46.51% of patients with TTH ($p = 0.672$) (Table 1).

The average duration of pain episodes was < 4 h in 45.45% of patients with MWA, 62.5% of patients with MoA, and 72.09% of patients with TTH and 4–72 h in 39.39%, 33.33%, and 23.26% ($p = 0.2$), respectively. Pain frequency was 2–5 episodes per week in 54.55% of patients with MWA, 58.33% with MoA, and 65.12% with TTH ($p = 0.62$). The most common period for the onset of pain crises was the afternoon for 48.48% of patients with MWA, 51.58% with MoA, and 62.79% with TTH ($p = 0.37$), and there was no defined period for 30.3%, 23.96%, and 20.93% of patients ($p = 0.63$), respectively (Table 1).

The location of the pain in patients with MWA, MoA, and TTH was, frontal in 45.45%, 60.42%, and 44.19% ($p = 0.12$); temporal in 36.36%, 25%, and 11.63% ($p = 0.039$); and occipital in 9.09%, 4.17%, and 27.91% ($p = 0.0018$), respectively (Table 1).

The following triggering factors were recorded in patients with MWA, MoA, and TTH, respectively: no factor in 3.03%, 13.54%, and 25.58% ($p = 0.02$); bright light in 63.64%, 42.71%, and 30.23% ($p = 0.013$); fasting in 36.36%, 14.58%, and 9.3% ($p = 0.004$); and excessive sleep in 15.15%, 2.08%, and 0%, respectively ($p = 0.0013$) (Table 1).

In the TTH group, 88.1% of patients noted hunger as a triggering factor for pain against 66.67% and 71.88% of patients with MWA and MoA, respectively ($p = 0.062$). However, 27.27% of patients with MWA noted pain after consumption of chocolate against 14.58% and 4.65% of patients with MoA and TTH, respectively ($p = 0.032$). Moreover, 21.21% of patients with MWA noted pain after consumption of cheese against 8.33% and 4.65% of patients with MoA and TTH, respectively ($p = 0.042$), as shown in Table 1.

In terms of prodrome symptoms, 15.15% of MWA patients reported photophobia against 2.08% and 0% of patients with MoA and TTH, respectively ($p = 0.0013$); sadness was described in 9.09% of patients with MWA, 0% of patients with MoA, and 4.6% of patients with TTH ($p = 0.02$), whereas blurred vision or vision loss was reported in 18.18% of patients with MWA, 0% of patients with MoA, and 0% of patients with TTH ($p < 0.000001$), as shown in Table 2.

In the MWA group, patients reported aura in the form of irritability (36.36%), dizziness (9.09%), visual scotomas (51.52%), vision loss or blurriness (21.21%), abdominal pain (9.09%), and paresthesia (6.06%). One patient reported auditory hallucinations while experiencing pain. These data can be seen in Table 3.

The absence of symptoms associated with pain was reported by 18.6% of patients with TTH against 0% in the other two groups ($p = 0.00003$). Photophobia was reported in 84.85% of patients with MWA, 76.84% of patients with MoA, and 23.26% of patients with TTH ($p < 0.00001$). Phonophobia was present in 84.84% of patients with MWA, 76.04% of patients with MoA, and 32.56% of patients with TTH ($p < 0.000001$). Vertigo was reported by 54.55% of patients with MWA, 35.42% of patients with MoA, and 13.95% of patients with TTH ($p < 0.0008$). Vomiting was reported by 54.55% of patients with MWA, 37.5% of patients with MoA, and by only 13.95% of patients with TTH ($p = 0.0003$). There was no statistical difference between the groups for the presence of pallor, vision loss, dark under-eye circles, runny nose, or watery eyes.

With regard to pain relief, 78.79%, 67.37%, and 37.21% of patients with MWA, MoA, and TTH, respectively, reported that rest relieved pain ($p = 0.0002$). Sleep brought relief to 72.73%, 55.21%, and 34.88% of patients with MWA, MoA, and TTH, respectively ($p = 0.004$), and staying in a dark environment brought relief to 60.61%, 56.25%, and 33.33% of patients with MWA, MoA, and TTH, respectively ($p = 0.023$). Playing was a relieving factor for 9.3% of patients with TTH ($p = 0.002$), against 0% in the other two groups, and watching TV relieved

Table 2. Characteristics associated with pain.

	MWA %	MoA %	TTH %	<i>p</i>
Prodrome symptoms				
Photophobia	15,15	2,08	0	0,0013*
Nausea	15,15	9,38	2,33	0,137
Sadness	9,09	0	4,65	0,020*
Irritability	18,18	6,25	9,3	0,125
Sleepiness	6,06	3,13	0	0,291
Difficulty concentrating	6,06	2,11	0	0,217
Fatigue	12,12	3,16	4,65	0,136
Blurry vision/vision loss	18,18	0	0	< 0,000001*
Associated symptoms				
None	0	0	18,6	0,00003*
Photophobia	84,85	76,84	23,26	< 0,000001*
Phonophobia	84,85	76,04	32,56	< 0,000001*
Nausea	69,7	65,63	37,21	0,002*
Vomiting	54,55	37,5	11,63	0,0003*
Vertigo	54,55	35,42	13,95	0,0008*
Pallor	45,45	37,5	23,26	0,11
Vision loss/blurry vision	9,09	8,33	0	0,139
Dark under-eye circles	3,03	0	2,33	0,267
Runny nose	3,03	0	2,33	0,267
Teary eyes	12,12	6,25	0	0,078
Scotoma	15,15	2,08	0	0,001*
Relieving factors				
None	0	10,42	16,28	0,06
Rest	78,79	67,37	37,21	0,0002*
Sleep	72,73	55,21	34,88	0,004*
Silence	33,33	25	20,93	0,461
Dark environment	60,61	56,25	33,33	0,023*
Play	0	0	9,3	0,021*
Watching TV	0	3,13	13,95	0,009*
Emotional aspects				
None	0	18,75	18,6	0,026*
Aggression	15,15	11,46	13,95	0,831
Irritability	42,42	36,46	30,23	0,54
Sadness	21,21	13,68	19,05	0,527
Anxious family	18,18	6,25	11,63	0,127
Anxiety	63,64	48,94	53,49	0,345
Parental separation	9,09	10,42	16,28	0,535
Caregiver not a parent	3,03	1,04	2,33	0,711
Problems in school	9,09	16,84	20,93	0,378
Associated disorders				
None	30,3	33,33	46,51	0,008*
Insomnia	12,12	7,29	6,98	0,647
Sleepwalking	21,21	7,29	6,98	0,052

Somniloquy	18,18	33,33	27,91	0,25
Night terrors	3,03	10,42	6,98	0,387
Kinetosis	24,24	21,05	16,28	0,678
Abdominal pain	15,15	17,71	4,65	0,118
Teeth grinding	21,21	26,04	11,63	0,16
Family history				
Headache	18,18	15,63	16,28	0,94
Migraine	54,55	35,11	27,91	0,049*
None	21,21	50,53	55,81	0,004*
Daily life				
At least 1 school absence in the past year	87,88	75,79	55,81	0,005*

Table 3. Types of auras presented by patients in the MWA group

Aura	
Nausea	6,06%
Dysarthria	3,03%
Irritability	36,36%
Dizziness	9,09%
Vision loss/blurry vision	21,21%
Visual scotoma	51,52%
Abdominal pain	9,09%
Paresthesia	6,06%
Weakness	6,06%

pain in 13.95% of patients with TTH against 0% of patients with MWA and 3.13% of patients with MoA ($p = 0.009$), as shown in Table 2.

Nearly all patients in all three groups (95%–100%) used some type of medication to stop the pain during the crisis, most commonly paracetamol (58%), followed by dipyrone (20%) and ibuprofen (15.6%).

With respect to associated psychological and emotional changes, all patients with MWA presented some type of alteration, against 81.25% of patients with MoA and 81.4% of patients with TTH ($p = 0.02$). The main changes were irritability [42.42% of MWA patients, 36.46% of MoA patients, and 30.23% of TTH patients ($p = 0.54$)] and anxiety [(63.64%, 48.94%, and 53.49%, respectively ($p = 0.34$)). Approximately 46.51% of patients with TTH did not present any associated disorder, against 33.33% of MWA patients and 30.3% of MoA patients ($p = 0.008$). The main disorders found were somniloquy (18.18% in MWA patients, 33.33% in MoA patients, and 27.91% in TTH patients; $p = 0.25$), teeth grinding (21.21% in MWA patients, 26.04% in MoA patients, and 11.63% in TTH patients; $p = 0.16$), and motion sickness (24.24% in MWA patients, 21.05% in MoA patients, and 16.28% in TTH patients; $p = 0.67$). Among patients with MWA, 54.55% had a positive family history of migraine, against 35.11% of patients with MoA and 27.91% of patients with TTH ($p = 0.049$) (Table 2).

The effects of the disease on daily life activities were measured by each individual's school absences. In the MWA group, 87.88% had at least one school absence due to pain during the previous year, compared with 75.79% of the MoA group and 55.81% of the TTH group ($p = 0.005$), as seen in Table 2.

DISCUSSION

The period between the onset of pain and first consultation in our sample was longer than that reported in the literature, which shows that majority of patients seek medical help within the first 12 months of symptom onset;¹⁴ this may be explained by the fact that the sample consisted of patients from a tertiary hospital who, for the most part, had already been referred by other professionals due to poor disease control. This factor can also explain the increased intensity and frequency of pain crises among our patients in all groups, differing from the literature, which shows lower pain intensity among patients with TTH.^{14,15}

Nevertheless, the pain was short-lasting in all groups, a fact corroborated by the literature, which shows that most crises last for < 4 h¹⁶ and occur more frequently in the afternoon.

The location of the pain is a criterion for classifying the type of headache, as are the concomitant presence of nausea, vomiting, photophobia, and phonophobia.² Therefore, the

migraine groups should differ from the TTH group. However, beyond these differences, the presence of vertigo was significantly higher in the migraine groups. Similarly, the incidences of photophobia and sadness as prodrome symptoms were higher in the MWA group.

Historically, visual auras are known to be the most prevalent type of auras. Our study showed that aura manifested as a visual change in 72% of patients, which is in contrast with other series that showed lower numbers (36.7%), although still accounting for the majority of auras.¹⁶

With regard to pain relief, the majority of our patients in the migraine groups benefited from halting activities, namely by resting, sleeping, or remaining in a dark environment.¹⁶ However, it should be noted that only the patients in the TTH group demonstrated relief through activities involving movement or concentration, such as watching TV and playing.

Psychological changes resulting from chronic pain are widely studied in adult patients, but little is known about the impacts of headaches on patients whose personality is still being formed. It is known, however, that patients with chronic headache have a higher prevalence of anxiety disorder than the general population, but this does not characterize a cause and effect association.¹⁷ In line with this, the majority of our patients complained of associated anxiety symptoms. In addition to psychological changes, the impact of the disease on the child's daily life can also result in changes in executive functions, particularly memory and attention.¹⁸⁻¹⁹

It is well known that a strong correlation exists between migraine and family history^{3,16,18}; this was especially notable in the MWA group. The lack of family history was a more specific finding for TTH.

The lack of differences between the groups with regard to many of the variables investigated also leads us to the hypothesis of the chronic headache spectrum, in which, over time, the affected individual presents typical characteristics that overlap between the classification groups.^{3,4,8,20} As a result, the clinical profiles of the different entities, even if they are didactically separated, depict significant overlap.²⁰ However, closer examination permits us to define small details in the patient history that are more characteristic of one or other types of headache.

Although headaches are very frequent in children and adolescents in particular, and despite the knowledge that they differ from headaches in adults, to understand how they present in this age range requires further studies and discussion. Furthermore, the impacts of this type of chronic disease on children and adolescents, whose neurological and psychological systems are still developing, require further studies to clarify some points which are not yet clearly understood.

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