



Idiopathic benign paroxysmal vertigo in children, a migraine precursor

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ABSTRACT

Vertigo and dizziness are common conditions in the adult population that can be rarely seen during childhood; only a few articles describing vertigo in children can be found in literature. Although many causes of vertigo in adulthood occur also in childhood, their frequency may be different. A typical example is benign paroxysmal positional vertigo, the most common peripheral vestibular disorder in adults, which occurs quite uncommonly in children. Furthermore, many common diseases causing vertigo in children may be unique for this population, such as benign paroxysmal vertigo (BPV) of childhood. At present, BPV is defined as a migraine's equivalent, a precursor of migraine or a periodic syndrome of childhood. The International Headache Society also studied this form of vertigo and included the Benign Paroxysmal Vertigo in section 1.3.3. of the International Classification of Headaches (ICHD-2).

The present review analyzes recent patho-physiological and clinical evidences regarding idiopathic BPV in children.

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1. Introduction

Vertigo and dizziness are common conditions in the adult population that can be rarely seen during childhood; only a few articles describing vertigo in children can be found in literature.

Vertigo in children and adults may have different characteristics. Firstly, vestibular disorders are often ignored in children, where vertiginous manifestations can be usually attributed to a lack of coordination or behavioural problems. Secondly, as children often lack the communication ability to accurately describe their symptoms, diagnosis is mostly based on clinical examination and laboratory investigations rather than symptom history. Finally, although many causes of vertigo in adulthood occur in childhood as well, their frequency may be different. A typical example is benign paroxysmal positional vertigo (BPPV), which is the most common peripheral vestibular disorder in adults that, on the contrary, occurs rarely in children. Furthermore, many common diseases causing vertigo in children may be unique for this population, such as benign paroxysmal vertigo (BPV) of childhood.

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2. Idiopathic benign paroxysmal vertigo

Idiopathic benign paroxysmal vertigo (BPV) is considered as a common cause of vertigo in children [1–3]. Basser [4] described this form of vertigo affecting exclusively children in 1964. Finkelhor and Harker [5] in 1987 studied 113 childhood patients with Benign Paroxysmal Vertigo. In 1967 Fenichel [6] suggested an association between childhood vertigo and migraine headache and coined the term "benign paroxysmal vertigo of childhood".

Parker [7] reported a 43% incidence of migraine family history among patients with BPV. He also calculated a 13% incidence of subsequent development of migraine along with other symptoms associated with migraine such as cyclic vomiting, recurrent abdominal pain, scotoma and photophobia. He referred to these symptoms as "migraine variants".

Headache provocation tests that made use of nitro-glycerine or histamine [8] resulted positive in causing headache or vertigo in patients affected by BPV.

At present, BPV is defined as a migraine's equivalent, a precursor of migraine or a periodic syndrome of childhood [9].

The International Headache Society also studied this form of vertigo and included the benign paroxysmal vertigo in section 1.3.3. of the International Classification of Headaches (ICHD-2) [10]. This is

Table 1

International Headache Classification (ICHD-2), Part 1, Migraine

1. MIGRAINE
1.1 Migraine without aura
1.2 Migraine with aura
1.3 Childhood periodic syndromes that are commonly precursors of migraine
1.4 Retinal migraine
1.5 Complication of migraine
1.6 Probable migraine

Table 2

Details of the International Headache Classification

1.3. Childhood periodic syndromes that are commonly precursors of migraine
1.3.1 Cyclical vomiting
1.3.2 Abdominal migraine
1.3.3 Benign paroxysmal vertigo of childhood

the most important document for the diagnosis and management of headache patients. All headache disorders are classified into major groups, each group is then subdivided one, two or three times into headache types, subtypes and subforms. For each disorder in the ICHD-2 explicit diagnostic criteria are present.

Benign paroxysmal vertigo of childhood is included in the chapter of migraine, among the “childhood periodic syndromes that are commonly precursors of migraine”; in this subgroup can also be found cyclical vomiting (characterized by recurrent episodic attacks of vomiting and intense nausea associated with pallor and lethargy) and abdominal migraine (characterized by episodic midline abdominal pain manifesting in attacks lasting 1–72 hours with normality between episodes; the pain is of moderate to severe intensity and associated with vasomotor symptoms, nausea and vomiting) (Tables 1 and 2).

The benign paroxysmal vertigo of childhood is defined as “a heterogeneous disorders that is characterized by recurrent brief episodic attacks of vertigo occurring without warning and resolving spontaneously in other wise healthy children”.

The *diagnostic criteria* for benign paroxysmal vertigo of childhood are reported in Table 3.

The age of onset of this vertiginous form is from 2 to 12 years, with an average age of 6 years.

The BPV affects especially females, as migraine [11]. Typically, vertigo has a sudden onset and lasts from a few seconds to several minutes. The attack isn't induced by movements of the head or specific positioning, resulting in a different form when compared to benign positional paroxysmal vertigo. Sometimes nausea and vomiting may be associated.

Usually, the child is frightened and seeks support for adjacent objects attempting not to fall.

Abnormal eye movements suggestive of nystagmus may be seen. There are no alterations of consciousness, neurological changes or signs of audiovestibular impairment during the entire attack.

Diagnosis is often rendered on the basis of family history and eye videotape to evaluate nystagmus and additional ocular modifications. No instrumental examination is needed, which could be expensive

Table 3

Diagnostic criteria for Benign Paroxysmal Vertigo of childhood reported in the Classification (ICHD-2)

Diagnostic criteria:
A. At least 5 attacks fulfilling criterion B
B. Multiple episodes of severe vertigo ¹ , occurring without warning and resolving spontaneously after minutes to hours
C. Normal neurological examination; audiometric and vestibular functions between attacks
D. Normal electroencephalogram

¹ Often associated with nystagmus or vomiting; unilateral throbbing headache may occur in some attacks.

and traumatic for the child and frequently negative. During the collection of the history it is imperative to search for the presence of familiar headache and precipitating factors similar to those of migraine including little or irregular sleep, hormonal changes, intake of certain foods and stress.

The *pathogenesis* of BPV is not yet known, dizziness seems anyway to follow vascular alterations that produce a transient hypoxia of the vestibular nuclei and the vestibular pathways [12].

The same phenomenon is involved in other brain districts throughout the classic migraine attack, according to the “vascular hypothesis”.

The *prognosis* is favourable; symptoms usually tend to disappear spontaneously before adolescence. Attacks may recur within a period of 6 months to 1 year and then disappear spontaneously without treatment. In some patients, vertiginous symptoms disappear when migraine appears.

Lindskog et al have observed that approximately 21% of patients with BPV develop migraine during a follow up of 13–20 years [13].

Treatment has primarily a prophylactic purpose and is designed to identify and possibly eliminate the factors that trigger the crisis [14].

In patients in which crises are frequent and disabling and non-pharmacological treatment is not sufficient, it may be useful to administer anti-migraine drugs.

3. Differential diagnosis

Vertigo in children can be a symptom of various clinical situations ranging from orthostatic hypotension to psychiatric or metabolic disorders. [15].

Differential diagnosis may involve:

1. Ear infection (*media otitis*) and its complications:

Otitis media is considered by some authors [16–18] the most frequent cause of vestibular disorders in children. An otitis media may induce serious balance deficits such as disorders in walking, lists and dizziness.

The mechanisms by which otitis media induces vertigo are unclear; a hypothesis is that the otitis induces a movement of the round window membrane and a consequent movement of perilymph. Symptoms tend to disappear after appropriate medical or surgical treatment.

2. Head trauma:

A head injury is a frequent cause of balance disorders and vertigo in children. Patients usually develop dizziness and imbalance immediately after the trauma, symptoms may persist for several days (they usually disappear during the first week) to several months.

3. Psychiatric pseudo vertigo:

This form mainly occurs in children aged between 8 and 10 years and can be easily diagnosed as the symptoms described or mimed by the child are exaggerated and distorted [3].

4. Vestibular neuritis:

The role of viral infections causing vertigo in children has been studied. In fact, dizziness or vertigo may appear during childhood pox such as mumps, rubella, chickenpox and measles [3]. Usually, vestibular neuritis affects children older than 10 years. The vertigo occurs suddenly and may be associated with nausea and vomiting. Imbalance may last for a few weeks.

5. Benign paroxysmal positional vertigo:

This form of vertigo is rare in children and often occurs after head injury.

This is a vertigo triggered by changes in the position of the head and is accompanied by the presence of positional nystagmus similar to that found in adults.

The treatment is the same as that of the adult form and is based on the execution of release manoeuvres.

In 90% of cases of dizziness and balance disorders in children a thorough medical history and a careful clinical examination can identify the correct cause and avoid excessive instrumental examinations [3].

Conflict of interest

None declared.

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