International Journal of Pediatric Otorhinolaryngology 79 (2015) 2438–2441

Contents lists available at ScienceDirect

International Journal of Pediatric Otorhinolaryngology

journal homepage: www.elsevier.com/locate/ijporl

Case report

# Vertigo with dysautonomia and serious allergy: An unusual case of juvenile Ménière's disease

Haiyan Wu, Zhiqiang Gao *

*Department of Otorhinolaryngology, Peking Union Medical College Hospital, Chinese Academy of Medical Sciences, No. 1, Shuai Fu Yuan, Dong Cheng District, 100730 Beijing, China*

ARTICLE INFO

*Article history:*
Received 30 July 2015
Received in revised form 18 September 2015
Accepted 21 September 2015
Available online 30 September 2015

*Keywords:*
Vertigo
Dysautonomia
Allergy
Ménière's disease
Children

ABSTRACT

A 13-year-old boy with frequent episodes of vertigo and otologic symptoms was diagnosed with Ménière's disease (MD) but failed to respond to conventional treatment. Allergy testing revealed serious reactions to many allergens, and autonomic tests showed he was dysautonomic. An allergen-restricted diet and treatment of dysautonomia were effective, the boy being free from vertigo within 2 months. This case provides evidence to promote the understanding of MD in children. The authors hypothesize that the autonomic nerves and the immune system can interact, and that such an interaction of dysautonomia and allergy can lead to a serious vertigo episode.



## 1. Introduction

The percentage of pediatric cases in patients with Ménière's disease (MD) reported in the literature ranges from 0.4% to 7% [1]. Allergy, metabolic disturbances, trauma, and inflammatory disorders are all possible contributory factors [2]. Allergy also plays a role in the production of the symptoms of MD in adult disorders [3–8]. Besides allergy, dysautonomia also contributes to the symptoms of MD in adult patients [9,10]. However, thus far there have been no reports on the correlation between MD and dysautonomia in adolescents.

Autonomic disorders are now being recognized in increasing numbers in children and adolescents. While dizziness and fainting remain the most common symptoms in patients with dysautonomia, vertigo and otologic symptoms are becoming more frequently reported [11], although the reason for this remains unknown. In some patients with dysautonomia, alongside episodic vertigo the otologic symptoms may include fluctuating sensorineural hearing loss, tinnitus, and aural pressure, just as occurs in classic MD.

The interaction between the autonomic nerves and the immune system has been demonstrated previously [12]. Studies have produced evidence that autonomic nerves regulate the immune system by changing the activity of immune cells [13]. Moreover, there is evidence to support the idea that in some patients allergen-induced autonomic modulation was upregulated, such that the same degree of nerve stimulus caused a greater effect [14]. In allergic diseases, autonomic dysfunction is associated with the clinical severity of the disease [15,16].

## 2. Case report

A 13-year-old boy presented with reported episodes of vertigo with otologic symptoms several times per day for almost 1 year.

The first vertigo episode occurred 30 min after a basketball training session 1 year previously. Nausea and lightheadedness were associated with the vertigo, and there were no otologic symptoms. After 20 min of bed rest, all symptoms disappeared. However, from then on the same symptoms continued to occur after strenuous exercise, including syncope, which occurred on two occasions, both after long-distance running. Again he recovered through bed rest. Subsequently, orthostatic intolerance occurred every time the patient remained standing for more than 15 min, after which he would experience vertigo, nausea, and lightheadedness.

On one occasion, after eating river crab the boy experienced a serious allergic reaction consisting of diarrhea and the appearance of wheals over the entire body. He had a history of allergic rhinitis, eczema at 6 years old, and an allergy to shrimp. After the allergic reaction to river crab he experienced vertigo several times every

* Corresponding author. Tel.: +86 13801241115.
*E-mail addresses:* wuhaiyanmd@yahoo.com (H. Wu), gaozhiqiangmd@yahoo.com (Z. Gao).

http://dx.doi.org/10.1016/j.ijporl.2015.09.026
0165-5876/

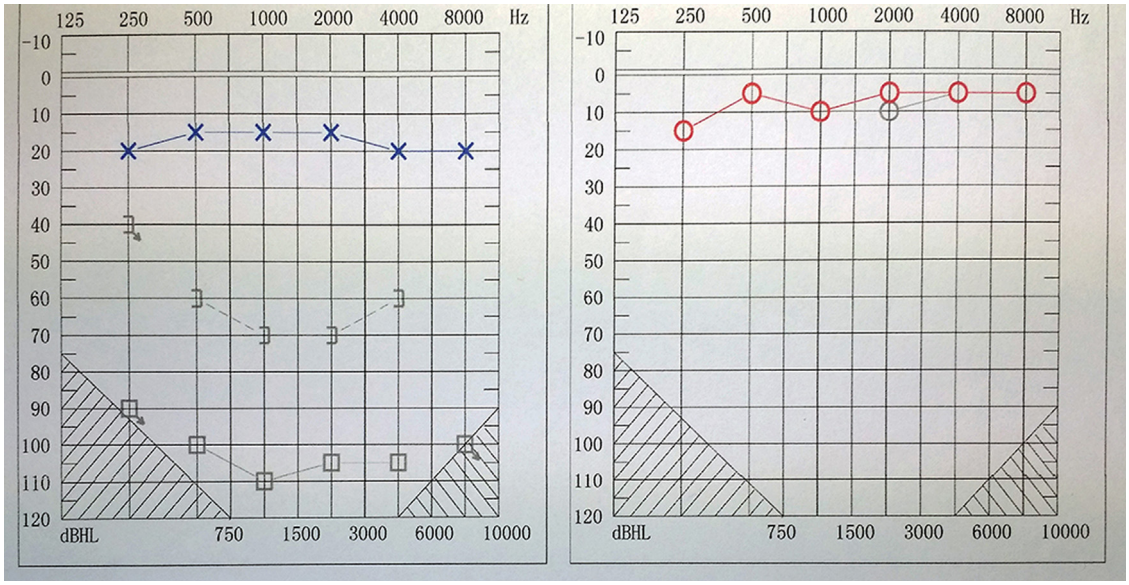


**Fig. 1.** JPEG. Pure tone audiograms. The gray curve was recorded at 8:09 AM, just after breakfast, during a vertigo episode. The black and red curves were recorded at 10:49 AM, 1 h after the vertigo episode on the same day (January 8, 2015). (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

day, including during or after meals, after defecation with exertion, after sports, and after postural changes such as from supine to standing. In addition, hearing loss, tinnitus, and aural pressure subsequently occurred. All symptoms would disappear after 30 min or 1 h of bed rest. The boy was diagnosed with MD and treated with a low-sodium diet, diuretics, and steroids, but none of the symptoms improved. Owing to the frequent vertigo attacks, the patient was forced to stop attending school. There were no migraine episodes, autoimmune dysfunction, febrile seizures, or physical or acoustic trauma in his history, and no history of MD or migraine in his family.

While the patient was experiencing vertigo, the pure tone hearing test showed that there was a moderate to severe hearing loss in all frequencies in the left ear (Fig. 1), and the caloric test showed weak function of the bilateral horizontal canal, which was weaker in the left ear (Fig. 2). The cervical vestibular evoked myogenic potential (cVEMP) test revealed a bilateral absence of pl3–n23. One hour after the vertigo episode, the result of the pure tone recovered to normal (Fig. 1). As the patient refused to undergo the caloric test again, no post-vertigo result was attainable. The cVEMP curve was still absent. A temporal bone computed tomography scan showed no positive findings.

As the vertigo episodes were obviously associated with meals, we tested for allergens. The serum total immunoglobulin E (IgE) was 2819 kU/L (Normal, 0–60 kU/L). The specific IgE and skin-prick results for inhalant and food allergens are listed in Table 1.

One week after the patient began to follow a restrictive allergen-free diet, the vertigo with otologic symptoms, such as tinnitus, hearing loss, and aural fullness, ceased to occur during or after meals. However, vertigo still occurred after exertion, such as after sports and defecation. Consequently, a battery of autonomic testing was performed (see Table 2).

In the head-up tilt test, 1 min after changing position from supine to tilt the patient experienced vertigo and sweating, and his heart rate rose by 41 beats/min. In the Valsalva test he felt vertigo at once, and in the rhythmic deep breathing test went into syncope. Consequently, postural orthostatic tachycardia syndrome and dysautonomia were diagnosed. During these examinations, horizontal right beat nystagmus was found when he experienced vertigo.

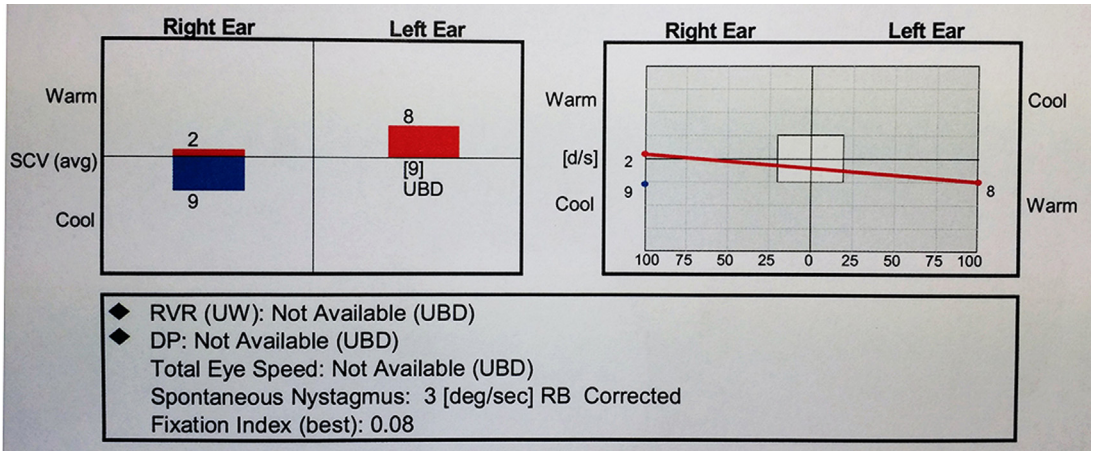


**Fig. 2.** JPEG. Caloric test conducted on the same day (January 8, 2015) at 8:30 AM during vertigo. Results showed bilateral weakness, more predominant in the left ear.