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In Brief

Balance and Vertigo in Children

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Author Disclosure

Drs Benun and Serwint have disclosed no financial relationships relevant to this In Brief. This commentary does not contain a discussion of an unapproved/investigative use of a commercial product/device.

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Balance is a motor function that enables a person to control coordinated movements. Any dysfunction of the neuroaxis that commands this control results in a disturbance of balance, leading to symptoms of dizziness. Vertigo is included under the subcategory of dizziness.

The definition of vertigo is a sensation of movement that may be rotational or moving forward and can include tilting. Vertigo may result from abnormalities of the labyrinth system or the central nervous system that spans from the vestibular nerve to the brainstem and cerebellum. As with any dysfunction, the key to correct diagnosis is performing a complete history, physical examination, and further testing based on clinical indications.

Obtaining an accurate history in young children may be difficult because they may not have the vocabulary to describe the sensation of vertigo. However, some authors suggest using playground terms such as “spinning, swinging, sliding, or being on the merry-go-round.” Symptoms associated with vertigo include nausea, vomiting, pallor, and perspiration but not loss of consciousness. Additional historical questions should address head trauma, fever, infections, and family history of vertigo or migraines.

The physical examination focuses on evaluation of the external and middle ear; ophthalmologic assessment for signs of nystagmus; and neurologic examination of the cranial nerves, cerebellar function, and gait. Additional testing to consider includes hearing testing and audiometry. Brain imaging, such as magnetic resonance imaging, is only needed if the history and physical findings suggest an intracranial process.

The most common cause of vertigo in children is middle ear disease, which may lead to balance disorders in walking. The external and middle ears should be examined for evidence of effusion, acute otitis media, or malformations such as cholesteatoma or perilymphatic fistula. Perilymphatic fistula may follow minor head trauma, resulting from a rupture of the round or oval window of the middle ear into the vestibule, creating a fistula. Symptoms from middle ear disease tend to improve after appropriate medical treatment. These diseases are very familiar to pediatricians and can easily be diagnosed by otoscopic examination.

It is more challenging to develop a differential diagnosis of vertigo in children who have normal tympanic membranes. Potential causes include:

- Benign paroxysmal vertigo (BPV)
- Migraine
- Vestibular neuritis due to viral infections
- Head trauma
- Ménière disease
- Cerebellar and brainstem tumors

After middle ear disease, BPV is the most common cause of vertigo in children. The age of onset ranges between 2 and 12 years, with an average age of onset of 6 years. The condition is more common in females and typically presents as a sudden onset of vertigo that lasts seconds to minutes, with complete resolution of symptoms between episodes. The attack is not induced by head movements or positional changes. Associated symptoms may include nausea and vomiting, and abnormal eye movements such as nystagmus may be present, but there are no neurologic changes or altered state of consciousness.

ness. The diagnosis is based on the brevity of the symptoms, presence of nystagmus during the episodes, symptom-free intervals, and frequently a family history of migraines. BPV is included among the periodic syndromes of childhood and may be considered a migraine equivalent. The prognosis is good and the symptoms disappear spontaneously before adolescence, although a subset of patients may develop migraines in the future. Migraines must also be considered as a potential cause of vertigo.

Vestibular neuritis is caused by viruses such as herpes simplex, varicella-zoster, and influenza. Symptoms of nausea and vomiting develop suddenly and may persist for weeks.

Head trauma with or without temporal bone fracture can cause labyrinthine concussion. Affected patients develop symptoms immediately after the trauma. The child is unsteady and tends to fall toward the affected side. The symptoms usually improve after 4 to 6 weeks.

Ménière disease is another consideration when evaluating vertigo. Although rare in children, the prevalence ranges from 1.5% to 4% among children in whom vertigo is diagnosed, and cases have been described as young as 4 years of age. The key symptoms are tinnitus, vertigo, and progressive hearing loss.

Cerebellar and brainstem tumors are rare causes of vertigo. Associated findings include headache, emesis, gait disturbance, and papilledema. Brain imaging is indicated.

Treatment of vertigo depends on the cause and duration of symptoms. For acute symptoms that resolve quickly, reassurance may be all that is needed. Medications to suppress symptoms include promethazine and diazepam. Persistent severe nausea or vomiting can be treated with antiemetics such as metoclopramide or prochlorperazine. If the vertigo becomes chronic or recurrent, clonazepam or carbamazepine may be indicated. Symptoms of anxiety,

panic attacks, and depression may present as a result of prolonged vertigo and should be treated accordingly.

Comment: Vertigo can be challenging to diagnose, especially in young children. Pediatricians need to be aware that the causes of vertigo in children differ from those in adults. Vertigo may be diagnosed infrequently in young children because symptoms may be incorrectly attributed to their developmental status and lack of coordination rather than to a balance dysfunction, and young children may have difficulty describing their symptoms. Pediatricians must be skilled in differentiating the common causes of vertigo, such as middle ear disease, which is easily treated, and BPV, which resolves, from rarer but more serious conditions that may be progressive and require more thorough testing and imaging.

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for detection of inducible clindamycin resistance in all staphylococcal isolates. The recommendation suggested that all laboratories report D-test-positive isolates as being resistant to clindamycin. CLSI also suggested that a comment be added: "This isolate is presumed to be resistant based on detection of inducible clindamycin resistance. Clindamycin may still be effective in some patients."

Despite the above guidelines, use of the D-test still is not universal. Physicians in primary care and specialty settings must be aware of whether a D-test has been performed to determine the presence of inducible clindamycin resistance in *S aureus* isolates. Varying use of the D-test may cause delay in initiating

appropriate antibiotic therapy and may contribute to avoidable failures of pharmacotherapy.

Suggested Reading

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Corrections

In the In Brief article entitled "Balance and Vertigo in Children" in the February issue (*Pediatr Rev*. 2011;32:84–85), the next-to-last sentence in the third column on page 84 should read, "The attack is induced by head movements or positional changes." This condition is very similar to benign paroxysmal positional vertigo in adults and may be the same condition. Current thinking is that the pediatric disorder is a migraine equivalent, whereas the adult condition is attributed to calcium crystals in the semicircular canals, although the cause of the pediatric disorder is not clear.

In the Visual Diagnosis case published in the June issue (*Pediatr Rev*. 2011;32:253–255), the correct designation for the third author is Kenneth Cochran, RN.