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*The author reported no
potential conflict of interest
relevant to this article.*

“I feel dizzy, Doctor”

Diagnosing the underlying cause of this common complaint can be challenging because many conditions present with dizziness. This review—and accompanying algorithm—can guide your evaluation.

PRACTICE RECOMMENDATIONS

➤ Refer a patient who reports that his dizziness is accompanied by hearing loss to an otolaryngologist for evaluation. **(C)**

➤ Use the HINTS (Head Impulse, Nystagmus, and Test of Skew) procedure to differentiate central from peripheral vertigo. **(A)**

➤ Use the Dix-Hallpike procedure to diagnose benign paroxysmal positional vertigo. **(B)**

Strength of recommendation (SOR)

- (A)** Good-quality patient-oriented evidence
- (B)** Inconsistent or limited-quality patient-oriented evidence
- (C)** Consensus, usual practice, opinion, disease-oriented evidence, case series

With an estimated lifetime prevalence of 17% to 30%,¹ dizziness is a relatively common clinical symptom, but the underlying cause can be difficult to diagnose. That’s because patients’ descriptions of dizziness are often imprecise, and this symptom is associated with a wide range of conditions. A careful history and physical examination are key to diagnosis, as is an understanding of the mechanisms of dizziness.

This article covers the range of diagnoses that should be considered when a patient presents with dizziness, and provides insight regarding features of the patient’s history that can better elucidate the specific etiology.

What do patients mean when they say, “I feel dizzy”?

“Dizziness” is a vague term, and patients who report dizziness should be asked to further describe the sensation. Patients may use the word dizziness in an attempt to describe many sensations, including faintness, giddiness, light-headedness, or unsteadiness.²

In 1972, Drachman and Hart proposed a classification system for dizziness that describes 4 categories—presyncope, vertigo, disequilibrium, and atypical (TABLE 1).³ These classifications are still commonly used today, and the discussion that follows describes potential causes of dizziness in each of these 4 categories. A stepwise approach for evaluating a patient who reports dizziness can be found in the ALGORITHM.³⁻⁶

Syncopal-related dizziness can have a cardiovascular cause

Presyncope is a feeling of impending loss of consciousness that’s sometimes accompanied by generalized muscle weakness and/or partial vision loss. Taking a careful history regarding the events surrounding the episode should distinguish this



A careful description of the circumstances surrounding the dizziness episode can help identify underlying conditions such as orthostasis, hypoglycemia, or hyperventilation.

type of dizziness, and doing so is essential because most of the underlying pathogenesis involves the cardiovascular system and requires specific interventions.

■ **Dysrhythmias** can cause syncope and may or may not be accompanied by a feeling of palpitations. Diagnosis is made by electrocardiogram (EKG) followed by the use of a Holter monitor.

■ **Vasovagal syncope** is caused by a sudden slowing of the pulse that's the result of stimulation of the vagal nerve. It can occur from direct stimulation of the nerve from palpation (or strangulation), or from an intense autonomic discharge, as when people are frightened or confronted with something upsetting (eg, the sight of blood.)

■ **Orthostatic hypotension** results from a change in body position in which either autonomic mechanisms cannot maintain venous tone, causing a sudden drop in blood pressure, or in which the heart cannot compensate by speeding up, as when a patient is taking a beta-adrenergic antagonist or has first-degree heart block. It can also result from hypovolemia.

Measuring the patient's blood pressure in the recumbent, seated, and standing po-

sitions can verify the diagnosis if an episode occurred soon before the examination. This kind of dizziness can be treated by instructing the patient to rise slowly, or by making appropriate medication adjustments. If conservative measures fail, medications such as midodrine or droxidopa can be tried.⁷

■ **Hypoglycemia, hypoxia, or hyperventilation** can also precipitate syncopal symptoms. Taking a careful history to assess for the presence of seizure-related features such as tonic/clonic movements or loss of bowel and bladder control can be helpful in distinguishing this form of dizziness.

Vertigo can have a central or peripheral cause

Vertigo is dizziness that is characterized by the sensation of spinning. The presence of vertigo implies disease of the inner ear or central nervous system. The "wiring diagram" of the vestibulo-ocular reflex is fairly straightforward, but sorting out the symptoms that arise from lesions within this system can be a diagnostic challenge. Vertigo has classically been divided into causes that are central (originating in the central ner-

➤
Dizziness related to presyncope often involves a cardiovascular pathology, such as a dysrhythmia or orthostatic hypotension.

TABLE 1
Types of dizziness and potential causes³

<p>Presyncope</p> <ul style="list-style-type: none"> • Dysrhythmia • Vasovagal syncope • Orthostatic hypotension • Hypoglycemia • Hypoxia • Hyperventilation
<p>Vertigo</p> <ul style="list-style-type: none"> • Benign paroxysmal positional vertigo • Labyrinthitis • Vestibular migraine • Meniere's disease • Genetic causes • Acoustic neuroma • Age-related vestibular loss • Cerebellar infarction • Tullio phenomenon • Obstructive sleep apnea • Systemic sclerosis • Diabetes
<p>Disequilibrium</p> <p>Atypical ("light-headedness")</p> <ul style="list-style-type: none"> • Panic attack • Early hyperventilation • Toxin exposure (eg, diphenylarsinic acid, pregabalin, paint thinner)

vous system) or peripheral (originating in the peripheral nervous system).

■ **The HINTS** (Head Impulse, Nystagmus, and Test of Skew) protocol is a group of 3 tests that can be used to differentiate central from peripheral vertigo (TABLE 2).^{8,9} To perform the head impulse test, the examiner asks the patient to focus his gaze on a target and then rapidly turns the patient's head to the side, watching the eyes for any corrective movements.¹⁰ When the eyes make a corrective saccade, the test is considered to be positive for a peripheral lesion.

Horizontal nystagmus is assessed by

having the patient look in the direction of the fast phase of the nystagmus. If the nystagmus increases in intensity, then the test is considered positive for a peripheral lesion.

Finally, the "test of skew" is performed by again having the patient fixate on the examiner's nose. Each eye is tested by being covered, and then uncovered. If the uncovered eye has to move to refocus on the examiner's nose, then the test is positive for a central lesion. A positive head impulse, positive horizontal nystagmus, and *negative* test of skew is 100% sensitive and 96% specific for a peripheral lesion.¹¹

Vertigo can have many possible causes
Benign paroxysmal positional vertigo

(BPPV) is vertigo that is triggered by movement of the head. It occurs when otoconia that are normally embedded in gel in the utricle become dislodged and migrate into the 3 fluid-filled semicircular canals, where they interfere with the normal fluid movement these canals use to sense head motion, causing the inner ear to send false signals to the brain.¹²

Diagnosis is confirmed by performing the Dix-Hallpike maneuver to elicit nystagmus. The patient is moved from a seated to a supine position with her head turned 45 degrees to the right and held for 30 seconds. For a demonstration of the Dix-Hallpike maneuver, see <https://youtu.be/8RYB2QIO1N4>. The Dix-Hallpike maneuver is also the first step of a treatment for BPPV known as the Epley maneuver. (See "The Epley maneuver: A procedure for treating BPPV" on page 719.^{13,14})

■ **Labyrinthitis**—inflammation of the inner ear that can cause vertigo—is suggested by an acute, non-recurrent episode of dizziness that is often preceded by an upper respiratory infection. If the external canal is extremely painful and/or develops a vesicular rash, the patient might have herpes zoster of the geniculate ganglion (Ramsay Hunt syndrome type 2).

■ **Vestibular migraine and Meniere's disease.** When a patient who has a history of migraines experiences symptoms of vertigo, vestibular migraine should be suspected, and treatment should focus on migraine therapy rather than vestibular therapy.¹⁵

CONTINUED

ALGORITHM

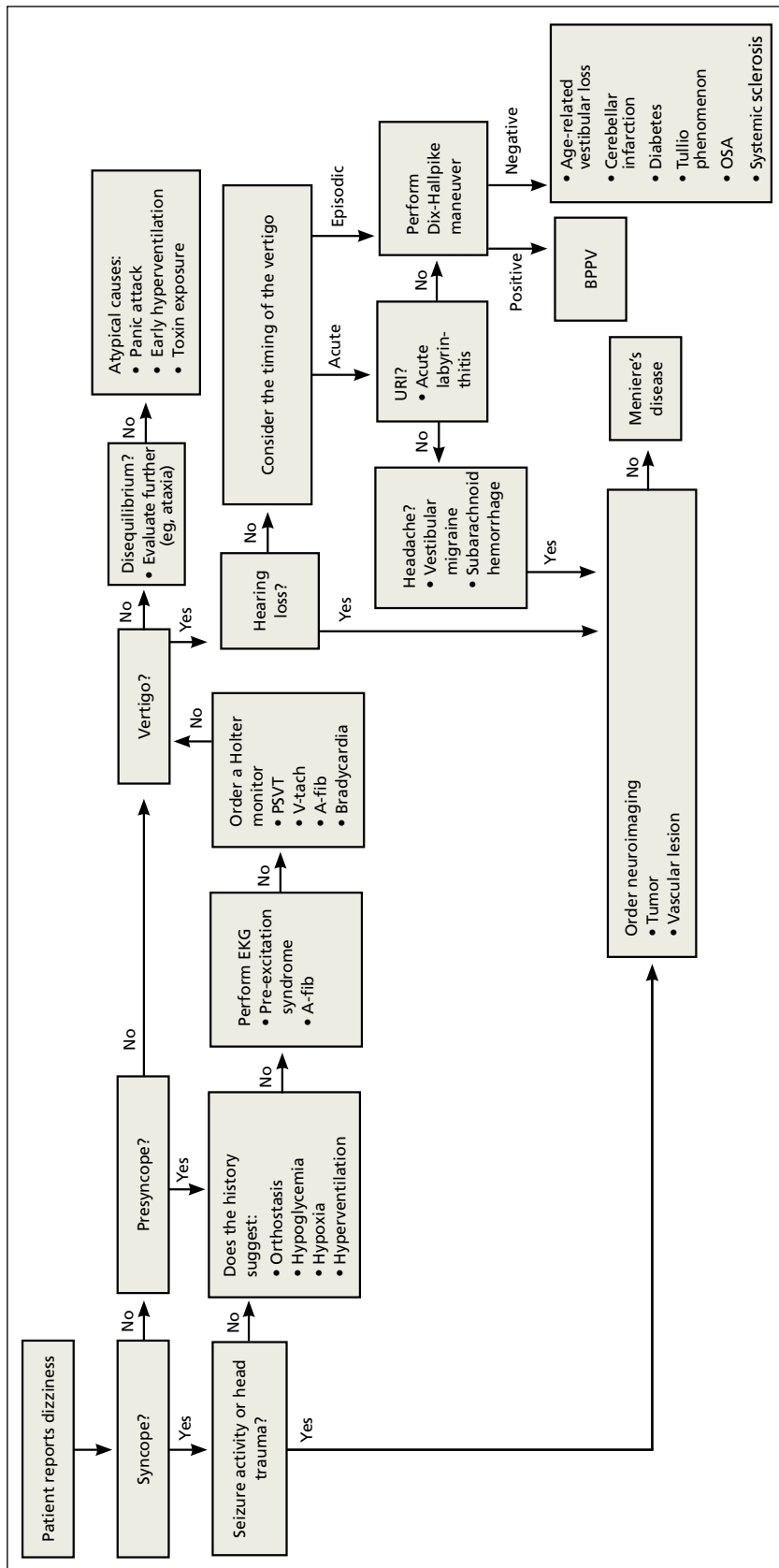
Evaluating dizziness: A stepwise approach³⁻⁶

In evaluating the vague symptom of "dizziness," it is essential to rule out life-threatening illnesses by asking whether the patient has experienced a loss of consciousness, seizure activity, or head trauma.

A careful description of the circumstances surrounding the dizziness episode is necessary. Frequently, the patient's history may suggest conditions that are easy to evaluate, such as orthostasis, hypoglycemia, hypoxia, or hyperventilation. In the absence of the spinning sensation of vertigo, it is important to consider the diagnosis of a dysrhythmia. The presence of hearing loss can be an ominous warning sign for acoustic neuroma, although it may also be caused by Meniere's disease. Similarly, a complaint of headache may also warrant neuroimaging, depending on the clinical setting. An acute attack of vestibular symptoms following an upper respiratory infection (URI) suggests acute labyrinthitis, although 50% of cases of acute labyrinthitis may lack a history of URI.

Benign paroxysmal positional vertigo can also present acutely, although it is somewhat more likely to be recurrent. The Dix-Hallpike maneuver should verify the diagnosis, and is the first step in the corrective Epley maneuver. A negative Dix-Hallpike test may indicate acute labyrinthitis if the condition is acute, or other conditions, such as age-related vestibular loss, diabetes, or sleep apnea.

Although patients with vertigo often report difficulty with balance, the absence of the sensation of "spinning" may focus the diagnosis more on other problems of balance, and prompt a search for pathologies that affect the cerebellum and other mechanisms involved with muscle coordination. Finally, having ruled out the most serious conditions, a vague sense of "light-headedness" may suggest intoxication or be indicative of an anxiety disorder. Ruling out the most life-threatening causes of dizziness should provide some reassurance for patients with anxiety.



A-fib, atrial fibrillation; BPPV, benign paroxysmal positional vertigo; EKG, electrocardiogram; OSA, obstructive sleep apnea; PSVT, paroxysmal supraventricular tachycardia; URI, upper respiratory infection; V-tach, ventricular tachycardia.

>
 A positive head impulse test is highly suggestive of a peripheral lesion.

TABLE 2

HINTS: Is the cause of the patient's vertigo central or peripheral?^{8,9}

Head Impulse

- Face the patient
- Ask the patient to focus on your nose
- Quickly turn the patient's head to one side and then the other
- If the patient cannot fixate forward during the test, the test is positive for a peripheral lesion

Nystagmus

- Horizontal nystagmus: If there is an increase in the intensity of the nystagmus when the patient looks in the direction of the fast phase of the nystagmus, then the test is positive for a peripheral lesion
- Vertical or rotary nystagmus is almost always associated with a central lesion

Test of Skew

- Face the patient
- Ask the patient to focus on your nose
- Cover one eye and then the other. If the uncovered eye has to move up or down to refocus on the examiner's nose, then the test is positive for a central lesion

Symptoms of Meniere's disease and vestibular migraine can overlap.¹⁶ The current definition of Meniere's disease requires ≥ 2 definitive episodes of vertigo with hearing loss plus tinnitus and/or aural symptoms.¹⁷ Thirty percent of vertigo episodes in patients with Meniere's disease can be attributed to BPPV.¹⁸

■ **Acoustic neuroma.** In addition to vertigo, acoustic neuroma is often associated with gradual hearing loss, tinnitus, and facial numbness (from compression of cranial nerve V preoperatively) or facial weakness (from compression of cranial nerve VII postoperatively). Unilateral hearing loss should prompt evaluation with magnetic resonance imaging.

"Acoustic neuroma" is a misnomer. The lesion arises from the vestibular (not the acoustic) portion of the 8th cranial nerve, and isn't a neuroma; it is a schwannoma.¹⁹ Although it actually arises peripherally within the vestibular canal, it typically expands centrally and compresses other nerves centrally, which can make the clinical diagnosis more challenging if one were using the classical schema of differentiating between peripheral and central causes of vertigo.

■ **Age-related vestibular loss** occurs when the aging process causes deterioration

of most of the components of the vestibulo-ocular reflex, resulting in dizziness and vertigo. Usually, the cerebral override mechanisms can compensate for the degeneration.

Other causes of vertigo include cerebellar infarction (3% of patients with vertigo),²⁰ sound-induced vertigo (Tullio phenomenon),²¹ obstructive sleep apnea,²² and systemic sclerosis.²³ Diabetes can cause a reduction in vestibular sensitivity that is evidenced by an increased reliance on visual stimuli to resolve vestibulo-visual conflict.²⁴

Disequilibrium

Disequilibrium is predominantly a loss of balance. Patients with disequilibrium have the feeling that they are about to fall, specifically without the sensation of spinning. They may appear to sway, and will reach out for something to support them. Disequilibrium can be a component of vertigo, or it may suggest a more specific diagnosis, such as ataxia, which is a lack of coordination when walking.

Atypical causes of dizziness

"Light-headedness" may have an element of

euphoria or may be indistinguishable from the early part of a syncopal episode. Because other causes of light-headedness can be difficult to distinguish from presyncope, it is important to consider syncope in the differential diagnosis.

The differential of light-headedness can also include panic attack, early hyperventilation, and toxin exposure (such as diphenylarsinic acid,²⁵ pregabalin,²⁶ or paint thinner²⁷). **JFP**

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The Epley maneuver: A procedure for treating BPPV

Benign paroxysmal positional vertigo (BPPV) can be treated with the Epley maneuver. Like the Dix-Hallpike maneuver, the Epley maneuver isolates the posterior semicircular canal of the affected ear. However, it goes a step further to reposition otolithic debris away from the ampulla of the posterior canal, rolling it through the canal and depositing it in the utricle, where it will not stimulate nerve endings and produce symptoms.

For a demonstration of the Epley maneuver, see <https://youtu.be/jBzID5nVQjk>. A computer-controlled form of the Epley maneuver has been developed and can be as effective as the manual version of this procedure.¹³

In 38% of patients, BPPV spontaneously resolves. The Epley maneuver can improve this rate to 64% with a single treatment, and one additional maneuver improves the success rate to 83.3%.¹⁴ If this procedure doesn't work the first time, there may be more sediment that didn't have enough time to settle during the procedure. Therefore, the Epley maneuver can be repeated 3 times a day, and performed on subsequent days as needed.

symptoms overlap during attacks in Menière's disease and vestibular migraine. *Front Neurol*. 2014;5:265.

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