Evaluation of the Dizzy Patient

What does the word “dizzy” mean?
A feeling that the room is spinning? A woozy feeling like you have when you get off an amusement park ride? The sensation you get when you twirl in circles? Feeling like thinks are moving back and forth? Visual gray out? Nausea? “Butterflies” in your stomach? Feeling like you are going to pass out? Lightheadedness? Feeling unsteady? Feeling off balance? Feeling drunk? Confusion? Giddiness? Trouble focusing or thinking clearly? Feeling like you legs are going to give out?

How will I know what the patient means by “dizzy”?
Ask them! Start with an open ended question, “what do you mean when you say dizzy?” If the patient replies “You know doc, just dizzy”, then offer a multiple choice question. “By dizzy do you mean the room is spinning, you feel lightheaded like are going to pass out, or you feel that you are walking off balance, like a drunk?”

What needs to work to not feel dizzy?
• You need to have enough blood going to your brain (adequate cerebral perfusion)
• You need enough oxygen going to your brain
• You need a relatively stable metabolic state
• You need to have a sense of where your body is in space. This is achieved by integrating multiple sources of input including:
  • Visual – you can see where your body is relative to the environment and how it is moving
  • Proprioceptive - lets you know about movement and position of your body
  • Vestibular – lets you know about movement and position of your head in space.
  One system may compensate for the other (for example, you don’t feel dizzy and fall over every time you close your eyes), but at least two out of the three must be working to not feel dizzy or off-balance. Information coming in from these systems must also be compatible (non-contradictory) for your brain to reconcile the input.
• You need good mental health – anxiety, depression, and phobias can be psychogenic causes of dizziness, or may exacerbate dizziness of other etiologies

To maintain your equilibrium, you also need to have your cerebellum and motor systems functioning properly.

What causes inadequate global cerebral perfusion?
Autoregulation preserves cerebral perfusion across a wide range of blood pressure. However, a point is reached where hypotension is of sufficient magnitude to be symptomatic. Hypotension can be triggered by assumption of an upright posture (orthostatic hypotension) or worsened by it. Causes include cardiac problems (arrhythmias, valve disease, cardiomyopathy), volume depletion (dehydration, diuretics, blood loss, vomiting/diarrhea, excessive sweating, excessive urination), venous pooling (heat, exercise, alcohol consumption, postprandial, fever, sepsis), neurological disorders affecting the autonomic nervous system (autonomic neuropathy, Parkinson’s disease, dysautonomias, spinal cord disease, neurocardiogenic syncope) and drugs.

What causes inadequate oxygen to reach the brain?
Causes include insufficient oxygen in the environment, airway obstruction, pulmonary disease, anemia, and carbon monoxide poisoning. In patients with anemia, you need to consider not only the
hemoglobin level, but the temporal course of the change in hemoglobin levels. Patients with anemia associated with a chronic illness may tolerate a much lower hemoglobin level without dizziness than a patient with sudden blood loss.

**What metabolic derangements cause dizziness?**

Any major metabolic abnormality can cause dizziness, with derangements in serum glucose and sodium levels topping the list.

**What causes proprioceptive problems?**

Peripheral neuropathy and central lesions affecting the posterior columns, medial lemniscus, thalamus, or somatosensory cortex. B12 deficiency can cause peripheral neuropathy and subacute combined degeneration of the spinal cord involving the posterior columns and corticospinal tracts. AIDS can cause a vacuolar myelopathy of the spinal cord, which commonly affects the posterior columns in the thoracic cord.

**What causes vestibular problems?**

Disturbances in function of the peripheral vestibular apparatus can be caused by benign positional vertigo, labyrinthis, vestibular neuronitis, Meniere’s disease, head/ear trauma, cupololithiasis, cholesteatoma, perilymph fistula, autoimmune disease, and toxic vestibulopathy (alcohol, aminoglycosides, salicylates, quinine & quinidine). Central causes of vestibular dysfunction include tumor (acoustic neuroma), stroke, multiple sclerosis, encephalitis, head trauma, drugs (alcohol, barbiturates, benzodiazepines, antiepileptic drugs), seizures, and psychogenic causes (anxiety/panic attacks). Vestibular disease often causes vertigo.

**What is vertigo?**

Vertigo is the illusion of motion – usually described as a feeling that the environment is spinning. Vertigo can have a central or peripheral etiology.

**What questions should be included in the history when a patient complains of dizziness?**

In addition to getting a good description of what the patient means by “dizzy”, it’s important to ask:

- Did the dizziness begin after an identifiable event such as a head injury, infection, a change in corrective lenses, or treatment with a new medication?
- Is the dizziness always present, or does it come and go?
- If the dizziness is episodic, what precipitates it? Is the dizziness associated with movement of the head in a particular direction? Turning over in bed? Standing up? Walking into a dark room? Walking on an uneven surface? Hyperventilating?
- What symptoms are temporally associated with the dizziness? Does the patient get nauseated? Vomit? Fall? Sweat? Have jerky movements of the eyes?

**What should I check on physical exam?**

In addition to a general physical and neurological, attention should be given to the following:

- Check blood pressure and pulse with the patient supine, immediately on standing, and after the patient has been standing for 3 minutes.
- Have the patient hyperventilate – this will produce a dizzy feeling in normal individuals. Ask if the sensation produced by hyperventilation recreates the type of dizziness they are experiencing.
- Examine the ears for evidence of infection or obstruction of the ear canal.
Check hearing, including a Weber and Rinne test. Do a careful eye exam. Do a funduscopic exam to check for papilledema. Check visual fields for any defect (patients are not always aware of a visual field defect – the only manifestation may be the patient walking into things resulting in a feeling of disorientation/feeling off balance). Look for evidence of impairment of any of the extraocular muscles. Look for evidence of nystagmus at rest and with movement of the eyes. Check the corneal reflex in addition to checking facial sensation and muscles of facial expression. Check for sensory loss in a stocking/glove distribution. Perform a Romberg test. Look for truncal, limb, or gait ataxia. Perform tandem gait.

If the patient complains of vertigo, perform a head-hanging maneuver (Nylen-Barany or Dix-Hallpike maneuver). Have the patient assume the long sit position on the exam table, such that when the patient lies flat, his head will hang off the exam table. Instruct the patient that you are going to have him assume a supine position with the neck extended 30°- 45°, and that you will support his head with your hands. On the first trial, as you have the patient lie back, have him turn his head and eyes to the right. Instruct the patient to keep his eyes open, even if the posture makes him very dizzy. Observe to see if this position elicits nystagmus (either immediately or following a latent period), and watch to see if the nystagmus is sustained or fatigues. Have the patient return to the long sit position and after a pause, repeat this maneuver with the patient turning his head and eyes to the left. If nystagmus is elicited, repeat the maneuver several times with the head and eyes turned in the direction that elicited nystagmus to see if habituation occurs. Peripheral vestibular lesions tend to produce severe vertigo, with positional nystagmus that has a latency of up to 40 seconds, fatigues, and shows habituation. Central vertigo is usually mild, and positional nystagmus shows no latency, does not fatigue, and does not habituate.

Caloric testing – before beginning, you must perform an otoscopic exam to make sure the tympanic membrane is intact (not perforated) and that there is no visible obstruction to the flow of water in the ear canal (such as a large amount of wax). Have the patient lie on his back with the head elevated 30°. Fill a 50 cc. syringe with cold or warm water and inject it into the ear canal over a 40 second time period. Place a small basin under the ear to catch the water as it drains out of the ear canal. If comparing the response to warm water vs. cold water in the same ear, wait at least five minutes between trials. Cold water should produce tonic deviation of the gaze to the same side, with nystagmus with the fast component in the opposite direction. Warm water produces the opposite results. In patients with unilateral impairment of vestibular or labyrinthine function, caloric testing on the affected side will fail to produce nystagmus or will produce nystagmus that is delayed in onset and of briefer duration than expected.

What other workup should I order?
This will vary, depending on information elicited on history & physical exam. Lab work often includes a complete metabolic profile, CBC, B12/folate levels, ESR and thyroid function tests. An EKG, and 24 hr. Holter monitor should be ordered if cardiac arrhythmia is a consideration. Pulse oximetry and an arterial blood gas are helpful in assessing oxygenation. A carboxyhemoglobin level should be ordered in cases of possible carbon monoxide poisoning. If a CNS lesion such as an acoustic neuroma is suspected, an MRI of the brain should be ordered. An EMG/NCS can be helpful in ascertaining a diagnosis of peripheral neuropathy. An audiogram should be ordered for patients with suspected hearing loss. An electronystagmogram (ENG) is helpful in quantify nystagmus and other eye movements induced by caloric testing.