Common Problem of the Neurological System - I

Dizziness, Syncope, Headache

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Dizziness

Dizziness

- Vertigo, vs. lightheadedness, loss of balance
- Vertigo
  - Sensation感覺
    - Subjective vertigo主觀性眩暈: body moving
    - Objective vertigo客觀性眩暈: environmental moving
  - Involved organ
    - Central vertigo: brainstem, cerebellum
    - Peripheral vertigo: the inner ear, vestibular apparatus
    - Systemic causes

Loss of balance

- May occur with and without vertigo
- Loss of balance and lack of coordination in the absence of vertigo may be the result of degenerative, neoplastic, vascular, or metabolic disorder
- Lightheadedness: about to faint
  - In elderly common cause: orthostatic hypotension
  - In child and adult: anemia, hypoglycemia, hyperventilation

DIFFERENTIAL DIAGNOSIS OF *Common Causes of dizziness*			
DISORDER	**HISTORY**	**PHYSICAL FINDINGS**	**DIAGNOSTIC STUDIES**
Central causes			
Brainstem dysfunction/ cerebellar dysfunction	Elderly; acute-onset; recurrent vertigo; tinnitus; hearing OK	Symptoms of brainstem/vertebrobasilar vascular abnormality: ataxia, double visiion; lack of coordination; sensory/ motor deficits; vertical, lateral, rotary nystagmus; hearing normal; cerebellar: impaired RAM, finger-to-finger testing	MRI
Multiple sclerosis	Often in third to fourth decade of life	May have no other findings or may have other neurological symptoms	MRI
Migraine headache	Headache history; other migraine symptoms	May have symptoms of vertebrobasilar vascular abnormdlities, as above	None

DIFFERENTIAL DIAGNOSIS OF *Common Causes of dizziness*			
DISORDER	**HISTORY**	**PHYSICAL FINDINGS**	**DIAGNOSTIC STUDIES**
Peripheral causes			
Benign paroxysmal positional vertigo (BPPV)	Adults: associated with positional changes; recurrent episodes; lasts seconds to minutes; some relief if motionless	Lateral or rotary nystagmus; no tinnitus or hearing loss	Provoke nystagmus and vertigo by position that causes response; ENG
Benign paroxysmal vertigo of childhood	Children: usually preschoolers, sudden onset with crying by child	Vomiting, pallor, sweating, and nystagmus common; no loss of consciousness; neurological and audiological examination may be normal	May have hypoactive or absent response to caloric testing
Meniere's disease	Sudden onset; lasts hours, recurrent; tinnitus and fullness in ears	Lateral or rotary nystagmus; fluctuating hearing loss: low tones; sensorineural	Positional maneuvers, audiometry, ENG

DIFFERENTIAL DIAGNOSIS OF *Common Causes of dizziness cont'd*			
DISORDER	**HISTORY**	**PHYSICAL FINDINGS**	**DIAGNOSTIC STUDIES**
Vestibular neurnoitis	Sudden onset; antecedent viral infection	Nausea and vomiting; nystagmus; no hearing loss	Positional maneuvers
Labyrinthitis	Sudden onset, lasts hours to days	May currently be ill; lateral nystagmus; hearing loss; rarely tinnitus; nausea and vomiting may be present	Positional maneuvers, audiometry
Acoustic neuroma	Adults; gradual onset; mild vertigo; persistent tinnitus; facial numbness, weakness	Unilateral hearing loss, poor speech discrimination	MRI; audiometry
Perilymph fistula	History of trauma; hearing loss	Nystagmus and vertigo with pneumatic otoscopy; sensorineural hearing loss	Audiometry
Otitis/ sinusitis	Pain in ear or face; history of ear or sinus infections; gradual onset of vertigo	Serous otitis, otitis media; tenderness over sinuses; purulent nasal discharge; no nystagmus	See chapters 2 and 4
Cholesteatoma	History of chronic middle ear infections	Shiny white irregular mass on otoscopic examination; foul-smelling discharge may be present; bone destruction may ve visible; conductive hearing loss may be present	Audiometry

DIFFERENTIAL DIAGNOSIS OF *Common Causes of dizziness cont'd*			
DISORDER	**HISTORY**	**PHYSICAL FINDINGS**	**DIAGNOSTIC STUDIES**
Systemic causes			
Psychonegic	Vague symptoms; recurrent; may describe self as anxious; may have other psychiatric diagnoses	Normal neurological and auditory examinations	Hyperventilation to reproduce the vertigo
Cardiovascular	CV history; antihypertensive medications	Orthostatic blood pressure; dysrhythmias; carotid or temporal bruits	Depends on client condition and symptoms
Neurosyphilis	Vertigo, tinnitus, fullness in ears	Various clinical symptoms; papilledema, aphasia, monoplegia or hemiplegia, central nervous palsies, pupillary abnormalities, argyll- robertson pupil; focal neurological deficits	Serology for syphilis

DIFFERENTIAL DIAGNOSIS OF *Common Causes of dizziness cont'd*			
DISORDER	**HISTORY**	**PHYSICAL FINDINGS**	**DIAGNOSTIC STUDIES**
Other causes			
Ototoxic and salt-retaining drugs	Medication history: steroids, phenylbutazone, ethacrynic acid, aspirin, streptomycin, gentamicin, aminoglycosides, furosemide, psychotropic drugs	Sensorineural hearing loss	Audiometry
Trauma	History of trauma to head or ear	Depends on nature and location of injury; may exhibit peripheral or central symptoms	MRI/CT

Diagnostic Reasoning: Focused Hx

- **What Does the Patient Mean by Dizziness？**
  - Describe how you feel when you are dizzy？
  - Do you feel as though you or the room is spinning？
  - Do you feel balance is off？
  - Do you feel like you are about faint？

■Subjective vertigo vs. objective vertigo

- **Does the Vertigo Result From a Systemic Cause？**
  - What other medical problems do you have？
  - Would you describe yourself as anxious or nervous？
  - Do the episodes occur with any specific activity or movement？

■Impaired visual or kinetic sensory input such as peripheral neuropathy

■Dizziness when turning (vertigo) or on standing (dysfucntion of vestibular or cerebellar system)

Diagnostic Reasoning: Focused Hx

- **Is the vertigo central (brainstem or cerebellar) or peripheral (vestibular) in origin？**
  - Do you have migraine headaches？
  - Do you have other symptoms that bother you？
  - Do you have nausea and vomiting？
  - When do the episodes occur？

■Headache: vascular-related cause of vertigo

■Migraine with and without headache is a source of dizziness in children

■Patients with central vertigo always have neurological symptoms such as double vision, facial numbness, and hemiparesis. Pay attention to complaints of motor dysfunction or lack of coordination

■If the patient has N/V, suspect a peripheral vestibular appararus problem rather than a central cause.

Diagnostic Reasoning: Focused Hx

- **What do characteristics of the episodes tell me？**
  - How long do the episodes of dizziness last？
  - Is the onset sudden or gradual？
  - Do you have any hearing loss？
  - Do you have ringing in your ears？(tinnitus)

BPPV (benign paraxysmal position vertigo): last a few second, elicit by rapid head movement, gradual onset

Meniere's disease: lasting minutes to hours, acute onset

triad symptoms: vertigo, hearing loss, and tinnitus

Central cause (infection, brainstem infarction, vestibular hemorrage)

: last > 60 minutes (in child: may < 30 minutes), acute onset

Labyrinthitis and perilymphatic fistula: hearing loss without tinnitus

Acoustic neuroma: unilateral hearing loss with tinnitus

Recurrent vestibulopathy: not complaint of hearing loss

Diagnostic Reasoning: Focused Hx

- **What Else Should I Consider？**
  - What medications are you taking？
  - Are you now or have you recently been ill？
  - Have you had any recent injury to your head
  - Did you have dizziness before the head injury？
  - Have you had any previous ear surgery？

■Medication that are salt-retaining or ototoxic may produce vertigo, lightheadedness, or unsteadiness

■Psychotropic drugs may also produce vertigo.

Diagnostic Reasoning-Focused PE

- Take Vital Signs
- Note General Appearance
- Have Patient Hyperventilate and Perform Valsalva maneuver
- Perform Vision Examination
- Perform Ear Examination
- Perform Screening Hearing Tests
- Perform Positional Nystagmus Testing/ Provoking Maneuvers
- Positional Maneuvers (Barany or Dix-Hallpike Maneuvers)
- Perform Neurological Examination
  - gait difference in blindfolded
  - walk on straight line
  - rapid alternating movement
  - past-point test
- Perform Cardiovascular Evaluation

Comparison of Nystagmus

characteristics	central	peripheral
severity	May be disproportionate to vertigo	Proportionate to vertigo
Axis	Horizontal, vertical, rotary; unidirectional upgaze or downgaze	Horizontal, rotary
Consistency of directiom	May be inconsistent	Consistent; always beats in same direction
Type	Irregular or rapid in both directions	Has both slow and quick components
Resolve	Not in 48 hours	General in 24~48 hrs

Lab and diagnostic studies

- Audiometry
- Magnetic Resonance Imaging
- Computed Tomography
- Electroencephalography
- Cardiac Monitoring
- Hematology and urinalysis
- Serological Testing for Syphilis

Syncope

A reversible loss of conscious and postural tone
A sudden decrease in cerebral perfusion

DIFFERENTIAL DIAGNOSIS OF *Common Causes of Syncope*

CONDITION	HISTORY	PHYSICAL FINDINGS	DIAGNOSTIC STUDIES
Cardiac causes			
Organic hear disease	SOB, chest pain, palpitation, exercise associated	May have bradycardia or tachycardia, cyanosis	Refer
Arrhythmia		Lound S3,S4, murmur	EKG, Holter, Echo, Treadmill
Neurocardiogenic causes			
vagovagal	Emotinal events, prolonged standing, crowed room, warm environment	None	Tilt-table test
situational	Occur with cough, micturition, defecation, swallowing	None	None
Breathing hold	Children with 5,6 y/o, associated with anger, pain, brief cry, LOC, may have twitching	Cyanosis or pale	None
Hyperventilation	Anxiety or fear-induced events, SOB	None	None
Cough syncope	History of asthma, cough paraxysmal awaken child from sleep, become flaccid with chronic muscle spasm	Wheeze	None

DIFFERENTIAL DIAGNOSIS OF *Common Causes of Syncope*			
CONDITION	**HISTORY**	**PHYSICAL FINDINGS**	**DIAGNOSTIC STUDIES**
Orthostatic Orthostatic hypotension	Position from lying/sitting to standing, pregnancy, prolonged rest		20 mmHg drop in SBP on standing
Medication related			
medication	Antidepressant, beta-blocker, anti-arrhythmic agent, or diuretics	Dependent on undelying condition. Arrhythmia may present	None
Neurological cause			
migraine	Headache, vomiting, photophobia, positive family history	Usually none, photophobia, nystagmus	None
seizure	Convulsion, incontinence	Usually none, nystagmus	EEG
Psychiatric causes			
Mental disorder	Symptoms consistent with depressant, anxiety, panicr	None	Psychiatric evaluation
Hysteric reaction	Adolescent, event occurs when audience present, gentle fall, memory of incident	None	None

Diagnostic Reasoning: Focused Hx

- Is this really syncope?
  - Did you loss consciousness?
  - Did you have any prodromal symptoms?
  - What are you doing when the event occurred?
  - If you lost consciousness, how long did it last?
  - Did your limbs jerk during the event?
  - Did anyone see you faint?

Dizziness, vertigo do not cause loss of consciousness.

Pordormal symptoms of sweating, vertigo, nausea, and yawning are associated with syncope; seizure may be associated with an aura or tongue biting.

Precipitating factor: pain, urination, defecation or stressful event

Syncope that occur without warning is considered cardiovascular in origin.

Rhythmic movement of extremities during the event are usually a seizure. Disorientation after the event, slowness in returning to consciousness, and unconsciousness lasting longer that 5 minutes indicate seizure.

Diagnostic Reasoning: Focused Hx

- Does this require immediate referral ?
  - Do you have a hx of heart disease? What is it?
  - Do you have a congenital heart problem ?
  - Are you having chest pain and/or short of breath?
  - DI this occur after exercise ?

Patients with a history of congenital heart failure, CAD, or ventricular arrhythmia should be hospitalized. (mechanical or arrhythmic origin)

Syncope that accompanies exercise should be considered cardiac origin.

Syncope after exertion in a well-trained athlete who has no heart disease is likely vagovagal in origin.

Diagnostic Reasoning: Focused Hx

- What do associated symptoms tell me?
  - What other symptoms did you have?
  - Do you have palpitation?
  - Have you had headache?
  - Have you had vertigo, dizziness, diplopia, or other visual changes?

Palpitation: supraventricular or ventricular tachycardia are associated with syncope and sudden death.

The effect of migraine on the brainstem can cause syncope.

Diagnostic Reasoning: Focused Hx

- Is this neurological origin?
  - Did this occur in response to a specific situation (e.g. stressful event, urination, defecation)?
  - What position were you in when you fainted? Were you sitting, standing, or lying flat?

Situational syncope can occur in response to urination, defecation, cough, or emotional stress. (Posttussive syncope, postmicturition syncope)

Vasovagial syncope: neurocardiogenic, precipitated by emotional stress, fear, extreme fatigue, or injury, or without any obvious antecedent.

Warm temperature, anxiety, blood drawing, and crowded room may cause peripheral vasodilation. Lack of muscle activity prevent the venous return that is needed for cardiac filling with consequent bradycardia or fainting. Once supine, venous return to the heart occurs, awakening the patient. Rapids standing will cause recurrence of the episode.

Diagnostic Reasoning: Focused Hx

- Is this orthostasis?
  - What medication are you taking?
  - Have you recently start taking blood pressure medication or increase the dose ?
  - What other health problems/conditions do you have?

Medication which cause syncope: antidepressants, antiarrhythmia, beta-blockers, diuretics), alcohol, cocaine

Hypoglycemia, anemia also may cause syncope.

Diagnostic Reasoning: Focused Hx

- Is this explain by other factors?
  - Have you had this before? How often?
  - Did it occur with sudden head turning?
  - If a child: has the child had Kawasaki disease?
  - Do you have Lyme disease ?
- What other things do I need to consider?
  - Do you have a family history of fainting, sudden death?
  - If a child: Does the mother had SLE while pregnant ?

Diagnostic reasoning-Focused PE

- Measure BP and PR
- Observe hydration status
- Perform heart and lung examination
- Perform neurological examination
- Perform abdominal examination
- Examination extremities

Lab and diagnostic studies

- Suspect or known cardiac cause
  - EKG
  - Event monitoring or continuous lop monitoring
  - Doppler studies
  - Treadmill
  - Echocardiogram
  - EPS
- Suspect neurological cause
  - Baseline blood testing
  - EEG
  - CT
- Unexplained syncope
  - Toxicology screen
  - Tilt-table testing

Q&A