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Critical Issues in Dizziness & Syncope

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Why is this subject important?

- Dizziness and syncope are fairly common symptoms and thus often encountered by underwriters.
- There are a host of potential causes for both.
- Their diagnostic assessment is often complex.
- In many cases, no diagnosis is made.
- Most dizziness episodes arising under age 65 have no insurability significance, whereas syncope at younger ages is more apt to have underwriting implications.
- Both symptoms have substantial significance in elders.
- In order to properly assess dizziness and syncope, underwriters need to recognize the **YELLOW** and **RED FLAGS** associated with increased morbidity and mortality risk.

Dizziness

“...evaluating dizziness symptoms remains a challenge for many physicians, particularly since symptoms are often poorly characterized by patients and physicians alike and can incorporate a multitude of related symptoms such as vertigo, lightheadedness, balance disturbance, anxiety and general malaise.”

Babak B. Navi, MD, et al
Cornell University Medical Center
Mayo Clinic Proceedings
87(2012):1080

Vertigo “...is often alarming for both the patient and the assessing doctor, yet it is usually due to self-limiting disease. Equally, the features that differentiate between major and minor illness may be subtle unless verified by analytical reasoning.”

Kevin Barraclough, MD, et al
Imperial College, London
British Medical Journal
339(2009):749

Overview

What is dizziness?

It is a notoriously imprecise term generally defined as "...a subjective feeling of the illusion of movement, a disorientation of the body in space or postural instability." [Albuquerque de Moraes]

There are 4 recognized presentations/subtypes of dizziness: [Delaney, Grossman, Eaton, Post]

1. **Vertigo** – motion/spinning sensation due to a condition affecting the inner ear or its blood supply
2. **Disequilibrium** – feeling off-balance or wobbly when standing; feeling that a fall is imminent
3. **Lightheadedness** – vague, nonspecific feeling of being "disconnected with the environment"
4. **Presyncope** – sense of impending loss of consciousness or graying out without overt syncope. Presyncope, sometimes called near-syncope, is often due to cardiac causes in elders and should be underwritten akin to syncope.

When questioned by physicians, patients often describe features that overlap between these subtypes. [Newman-Toker]

How common is dizziness?

- It accounts for 3-5% of MD visits overall, with 25% presenting in emergency departments (ED) and 7% of those seen in an ED being admitted to the hospital.
- Roughly 10 million cases present for care annually in the US alone.
- The prevalence is substantially higher in the elderly.
- In one study, 42% of patients acknowledging a history of dizziness/vertigo did not seek out medical care.
- Approximately 6% of all dizziness episodes are due to serious causes.
- The likelihood of a serious cause increases with age, to 15% at ages 50-74 and 25% at ages 75 and older.

[Kim, Kroenke, Lin, Neuhauser, Newman-Toker and Hsieh, Tarnutzer]

➔ Seeking urgent care is a **YELLOW FLAG** at ages 50+, and hospitalized (inpatient) cases are always **RED FLAGS**, regardless of age. [Weimer]

What are the more prevalent and most significant causes of dizziness?

“...in one study, 46 different diagnoses were given to 106 patients presenting with dizziness.”

David E. Newman-Toker, MD, et al
Johns Hopkins Medical School
Mayo Clinic Proceedings
83(2008):765

Please see Table One.

Table 1: Main & Most Important Causes of Dizziness/Vertigo

Peripheral

- Acute labyrinthitis – inner ear inflammation due to infection
- Vestibular neuritis – inflammation of the vestibular nerve
- Benign paroxysmal positional vertigo (BPPV)
- Ménière disease – recurring vertigo with distinctive features
- Otosclerosis – hardening of the tympanic membrane in the ear
- Cholesteatoma – cyst-like ear lesion

Central

- Migraine – dizziness occurs in 15%, mainly migraine with aura
- Multiple sclerosis – 5% present with dizziness
- Parkinson disease – mainly as gait dysfunction with imbalance
- TIA/stroke
- Tumors – mainly acoustic neuromas; rarely, malignant tumors

Other

- Psychogenic – mainly anxiety disorders
- Drug-induced

[Barraclough, Calhoun, Kutz, Labuguen, Navi, Post, Staab, Tusa]

While “peripheral” and “other” causes can culminate in disability, most mortality risk is associated with “central” causes, mainly multiple sclerosis, cerebrovascular disease (TIA/stroke), Parkinson disease and, occasionally, tumors.

What are the associations between dizziness and psychiatric disorders?

- Roughly 1 in 4 persons with anxiety disorders, most notably panic disorder, report dizziness as a significant symptom.
- 60% with chronic subjective dizziness have an anxiety disorder.
- A current or recent anxiety disorder diagnosis greatly reduces the risk of a serious underlying cause in dizziness cases.

[Nagy, Navi, Wiltink]

Which clinical features help distinguish peripheral vs. central dizziness/vertigo? [Delaney, Eaton, Kutz, Labuguen, Newman-Toker]

Clinical Feature	Peripheral	Central
Onset	Sudden	Gradual
Episode duration	Seconds to hours	Seconds to days
Nausea, vomiting and/or diaphoresis	Usually	Rarely
Hearing loss, tinnitus	Often	Rarely
Neurological symptoms	Rarely	Usually
Vertical nystagmus	Never	Often

Peripheral Dizziness/Vertigo**What is benign paroxysmal positional vertigo (BPPV)?**

It is a syndrome characterized by brief but intense objective and subjective rotational dizziness occurring sporadically and triggered by head movement.

- It may also be called chronic subjective dizziness.
- Most cases are caused by loose particles within the inner ear called canalithiases.
- BPPV accounts for 85% of positional vertigo and 25% of all dizziness cases.
- The interval from symptom onset to correct diagnosis is often several years.
- Other symptoms frequently present include anxiety, disordered sleep, sound hypersensitivity, headaches and nausea/vomiting.

- The diagnosis is often established with the Dix-Hallpike maneuver.
- The Epley maneuver is the most commonly used treatment.
- Despite initially effective intervention, BPPV recurs in 40% of cases within 1 to 2 years.

[Helminski, Parnes, Ruckstein, Sakaida, Vaz, Wang, Weimer]

Is there extra mortality in BPPV?

No; however, there are 2 underwriting concerns in elders with BPPV.

1. Osteopenia/osteoporosis is 3 times more common in postmenopausal women and elderly men with BPPV, and up to 80% of those with recurring BPPV will have abnormally low bone mineral density. [Jeong, Parham, Yamanaka]

This association is made worse because BPPV predisposes patients to falls, and osteoporosis accounts for a substantial portion of fall-related fractures in the elderly.

2. The Timed Get Up and Go (TUG) test is often abnormal in elders with BPPV despite the absence of overt physical frailty. [Vaz]

The TUG test is the #1 frailty test used by insurers at ages 70+.

What is Ménière disease?

It is an uncommon disorder characterized by the triad of hearing loss (unilateral in 80%), tinnitus and episodes of vertigo.

- This is a challenging diagnosis until all 3 features are present.
- When it is difficult to treat, 60% of patients will have major depression.
- Major depression is the only mortality concern once a definite Ménière diagnosis is established.

[da Costa and de Sousa, Eckhardt-Henn, Furukawa and Kitahara, Kotimaki, Minor, Sajjadi]

Key Take-Away Points:

- There are 4 subtypes of dizziness: vertigo, disequilibrium, lightheadedness and presyncope.
- Dizziness is common; 6% of cases are due to serious causes, and these occur mainly at ages 50 and over.

- Seeking emergency care is a **YELLOW FLAG** at ages 50+, and inpatient care is a **RED FLAG** at all ages.
- There are over a dozen common/serious causes of dizziness; most are deemed either peripheral (little or no mortality) or central (significant mortality in most cases).
- Peripheral vs. central dizziness/vertigo can be distinguished on the basis of clinical features.
- BPPV is the leading cause of positional vertigo; it has no direct mortality risk, but is associated with osteopenia/osteoporosis and abnormal TUG tests.
- Ménière disease consists of a triad of symptoms, and the only mortality concern is the high prevalence of major depression in difficult-to-treat cases.

Acute Vestibular Syndrome

What is the vestibular system?

It is the balance control system mediated by the semicircular canals and associated organs in the inner ear. [Agarwal]

What is the acute vestibular syndrome?

A clinical condition characterized by acute vertigo accompanied by various features such as nausea/vomiting, unsteady gait, nystagmus and/or intolerance to head motion.

- It is said to be “isolated” when focal neurological signs and symptoms are absent. In isolated cases, the main diagnoses are vestibular neuritis (also called vestibular neuronitis) and acute labyrinthitis.
- Isolated acute vestibular syndrome accounts for 150,000 US emergency department visits each year.
- The risk of recurrence is only 2%.

[Baloh, Halmagyi, Kutz, Mandala, Tarnutzer]

Is acute vestibular syndrome often associated with TIA/stroke?

No – less than 1.5% of strokes present with isolated vertigo. [Kerber, Paul, Seemungal]

On the other hand, acute vestibular syndrome due to TIA/stroke is misdiagnosed as being due to vestibular neuritis and other insignificant causes in 25% to 44% of TIA/stroke patients under age 50. [Kattah, Tarnutzer]

What factors should prompt us to further underwrite dizziness/vertigo cases attributed to vestibular neuritis or where a definite diagnosis has not been made?

- Age 60 and over
- History of circulatory disease
- Highly unfavorable cardiovascular risk profile, especially longstanding hypertension and/or diabetes
- Neurological features present, such as ataxia/abnormal gait, speech abnormalities (dysarthria), diplopia and other visual disturbances, sensory loss, weakness, dysphagia, etc.
- Treatment with antiplatelet therapy (aspirin, clopidogrel) or anticoagulants (warfarin, etc.)
- Referral from primary care to a neurologist
- Inpatient care

In addition, we would include all cases evaluated with a CT scan or MR if a definite diagnosis of an insignificant cause was not made.

[Delaney, Emsley, Kutz, Lee and Su, Navi, Staab, Tarnutzer, Weimer]

What is an acoustic neuroma?

It is a benign cerebellopontine angle tumor, also called a vestibular schwannoma, and it accounts for 6% of intracranial neoplasms.

- Onset is insidious.
- Vestibular manifestations typically develop gradually over a period of years before the diagnosis is made.
- Many are found incidentally on MRI scans done for other reasons.
- Initial symptoms are unilateral hearing loss and tinnitus.
- Large ones may only be partially resectable.
- This tumor is rarely fatal, and most deaths occur in patients age 70 and over.
- Morbidity may be substantial and can be greater after surgery.

[Halmagyi, Katsarkas, Kutz, McClelland, Milligan, Pan, Patel, Yashar]

How is dizziness/vertigo treated medically?

Short duration treatment is usually one of the following drugs:

- Acetazolamide
- Benzodiazepines – alprazolam, diazepam and lorazepam
- Dimenhydrinate
- Droperidol
- Meclizine
- Metoclopramide
- Ondansetron
- Prednisone
- Prochlorperazine
- Promethazine
- Scopolamine
- Selective serotonin reuptake inhibitors

Most of these drugs are used for various causes of dizziness/vertigo and/or in other clinically unrelated contexts as well.

[Baloh, Eaton, Hain, Ruckstein, Weimer, Tusa]

Dizziness in the Elderly

“Dizziness affects more than 50% of the elderly population and is the most common reason for visiting a physician at the age of 75 years.”

Ronald J. Tusa, MD, PhD
Emory University Medical School
Medical Clinics of North America
93(2009):263

- The prevalence of dizziness increases steeply with age. [Gassman, Stevens]
- 20-40% of cases will not have an underlying cause determined, and the doctor will treat the symptoms as a *de facto* diagnosis. [Dros, Maarsingh]

Why is a diagnosis often not established in elders with dizziness?

- Elderly persons are typically vague, inconsistent or even contradictory when reporting their symptoms. [Newman-Toker]
- The symptoms are often the product of multiple underlying disorders. [Drachman]

“The 17-minute managed care visit will rarely suffice for evaluating the elderly patient with dizziness. This geriatric syndrome requires careful attention to sort out the underlying diagnoses and most often to treat successfully.”

David A. Drachman, MD
University of Massachusetts Medical School
Annals of Internal Medicine
132(2000):404[editorial]

Why do all cases of dizziness in elders require thorough underwriting assessment?

Circulatory and neurological causes are far more common in elders. [Delaney, Katsarkas]

In addition, there are other major insurability concerns that are more prevalent in elders with dizziness than in those who do not have this symptom:

- Diabetes
- Fatigue
- Poor self-rated health
- Osteoporosis
- Fear of falling
- Recurring falls
- Frailty and ADL disability
- Major depression
- Cognitive dysfunction
- Polypharmacy (taking 5 or more medications)

[Albuquerque de Moraes, Dros, Gassman, Gomez, Hardy, Menant]

Key Take-Away Points:

- Acute vestibular syndrome may be an isolated phenomenon (vestibular neuritis/neuritis, labyrinthitis) or due to TIA/stroke.
- The importance of pursuing medical records in vestibular neuritis cases is based on specific high-risk criteria.
- Acoustic neuromas are benign “brain” tumors.
- There are at least a dozen drugs that may be given for dizziness/vertigo, and most are used in several other contexts.
- Dizziness is more common and less often fully diagnosed in elderly applicants and always requires thorough underwriting.
- In addition to underlying chronic circulatory and neurological diseases, there are many other unfavorable insurability factors seen more often in elderly applicants with dizziness than in those who do not experience this symptom.

Syncope

“Syncope, although perhaps benign from a mortality perspective in most cases, is rarely a solitary event; recurrences, physical injury, diminished quality-of-life and possible lifestyle limitations are real concerns.”

David G. Benditt, MD, et al
University of Minnesota Medical School
Journal of the American College of Cardiology
53(2009):1741

The #1 factor in syncope mortality is the cause.

Overview

What is syncope?

“Syncope is best considered as a syndrome in which a relatively sudden-onset, brief and self-terminating loss of consciousness results from a temporary period of global cerebral hypoperfusion.”

Rajat Jhanjee, MD, et al
Disease-a-Month
55(2009):527

A syncopal episode typically lasts < 30 seconds and almost always < 5 minutes. [Del Rosso, Parry and Reeve]

1. The term “pseudosyncope” is sometimes used to describe events where there is no observed true loss of consciousness but the patient’s history suggests that syncope did occur. This is most common in psychiatric patients and associated with so-called conversion disorders and malingering. [Jhanjee, Saklani]
2. “Drop attacks” involve sudden falling to the knees without loss of consciousness. They are typically investigated at older ages or in the presence of a known/suspected cardiac or neurological disorder. [Jhanjee]

How common in syncope?

- Between 25% and 40% of persons will experience at least one syncopal episode in their lifetime; 1 in 10 will seek emergency department care.

- Peak ages are 10-35 and 70-80.
- Syncope is the 6th most common reason for hospitalization after age 65.

[Kenny, Malasana, Moya, Nordkamp, Saklani, Serletis]

What are the main causes of syncope?

Please see Table Two.

Table 2: Main Causes of Syncope
<ul style="list-style-type: none"> • Neurally mediated reflex syncope <ul style="list-style-type: none"> ○ Vasovagal (simple faint) ○ Carotid sinus syndrome ○ Situational (cough, micturition, venipuncture, etc.) ○ Psychogenic • Orthostatic hypotension • Cardiac arrhythmias • Structural cardiac and cardiopulmonary disease <p>[Arnar, Benditt, Parry]</p>

In addition:

- 18% of syncope patients have multiple potential causes. [Chen]
- Cerebrovascular disease is a rare cause of syncope, accounting for just 1.7% of cases. [Jhanjee, Kulakowski and Lelonek]
- In a substantial portion of cases, the cause cannot be determined even after a complete workup. This is most common in elders. [Menda, Roussanov, Sud, Tan]
- However, when syncope patients are referred to specialty diagnostic centers only 10% come away designated as having “syncope of undetermined cause.” [Kulakowski and Lelonek]

What do we know about psychogenic syncope?

- Like psychogenic dizziness, it occurs predominantly in persons known to have, or suspected of having, psychiatric disorders.
- Anxiety disorders predominate.
- Most patients will have at least one event prior to age 40.
- Multiple, even frequent, episodes are common.

- There is rarely any added mortality risk beyond that associated with the underlying psychiatric disorder.

[D'Antono, Kouakam, Lee, Pezawas, Wiener]

What is the #1 focus in the clinical assessment of syncope?

Identifying cases due to cardiac causes, because most syncope cases with extra mortality will be due to heart conditions. [Saklani]

What are the 7 main factors considered in the diagnostic evaluation of patients with syncope? [Brignole]

- Age
- Cardiovascular disease history and risk factors
- Other comorbid conditions associated with increased risk of syncope (anxiety disorders, etc.)
- Context in which the episode occurs (exertional, stress, etc.)
- Number of episodes
- Physical findings (heart murmur, etc.)
- Results of diagnostic testing

What is the tilt-table test?

The patient is supine on a table, which is then tilted to an upright position.

- A tilt-table test (TTT) is a widely used method of assessing recurring unexplained syncope, as well as lone episodes in high-risk individuals. [Weimer]
- Most positive tests are due to vasovagal syncope or orthostatic hypotension. [Deharo, Strickberger]
- A positive TTT is a favorable finding from a mortality perspective.

Why is the resting ECG a critical consideration in syncope evaluation?

“An abnormal ECG has been shown to be an independent predictor of adverse outcomes, a predictor of arrhythmic events during followup... and a predictor of cardiac syncope in patients undergoing an extensive diagnostic workup for unexplained syncope.”

Sachin Sud, MD, et al
University of Western Ontario Medical School

Heart Rhythm
6(2009):238

While the ECG is the most helpful syncope screening test overall, there are important caveats regarding its role in the diagnosis:

- In 1,920 consecutive syncope cases at an average age of 79, 21% had an abnormal ECG, but only 1/3rd of these were significant in terms of detecting the cause of the event. [Menda]
- Under age 40, screening syncope patients with an ECG seldom reveals anything of value in terms of making the diagnosis. [Sun]

What test is usually done if the resting ECG shows an abnormal cardiac rate or rhythm, or the patient said he experienced palpitations at the time of the syncopal event?

Some form of heart monitoring, ranging from a Holter monitor to implantable loop recorders that may be run for years in difficult-to-diagnose cases. [Furukawa, Parry, Paruchuri, Westby]

In one study, Holter monitoring pinpointed the cause of suspected cardiac syncope in just 17% of elderly applicants. [Kuhne] Therefore, a negative Holter is not very reassuring in terms of whether a cardiac cause is present.

Additional cardiac tests such as echocardiograms and treadmill ECGs will be done in many cases where structural heart disease suspected.

- Holter monitoring is a **YELLOW FLAG** requiring details of the findings.
- • Implantable loop recorders and other extended recording procedures, as well as echocardiograms and TSTs, are all **RED FLAGS** pending further underwriting investigation.

What do we need to know about emergency department syncope cases?

- The ED focus is on whether the patient can be safely discharged or needs to be admitted... rather than trying to determine the precise cause of the event. [Chen]
- Almost half of discharged patients will be said to have “syncope of undetermined cause,” and these patients will usually be advised to see their personal physician. [Alsheklee]

We believe that underwriters should always pursue ED records within 18 months of the syncopal event when 2 conditions are met:

- The applicant is age 50 or older.

- The applicant was discharged from the ED and did not see his personal physician or any other doctor for follow-up on the syncopal episode.

What are the recommended criteria for admitting ED syncope patients?

- History of cardiovascular disease
- ECG showing any brady- or tachyarrhythmia, conduction system abnormality, acute ischemia or suspected prior MI
- Palpitations at the time of the syncope
- Exertional syncope
- Signs or symptoms of moderate-to-severe heart valve disease
- Signs or symptoms – especially dyspnea – suspicious for heart failure, including elevated NT-proBNP
- Hypotension when baseline systolic BP is < 90 mmHg
- Family history of cardiac sudden death < age 50
- Hematocrit < 30%

[Chen, Costantino, McCarthy, Moya, Quinn and McDermott]

We believe that hospitalization for syncope is an absolute indication for pursuing medical records at all ages; regardless of any cryptic explanations the applicant may give on the application or teleinterview.

Key Take-Away Points:

- The #1 factor in syncope mortality – and underwriting – is the cause.
- Syncope is common, and the peak ages for a 1st event are 10-35 and 70-80.
- There are 4 main categories of syncope causes: neurally mediated, orthostatic, cardiac arrhythmias and structural cardiac/cardiopulmonary disease.
- Psychogenic syncope is seldom of any mortality significance, independent of the underlying psychiatric disorder.
- There are 7 main factors involved in the diagnostic assessment of syncope.
- The resting ECG is always a key underwriting consideration; additional cardiac testing is almost always a **RED FLAG**.
- There are 9 major recommended criteria for admitting ED syncope patients.

Neurally Mediated Syncope

What is the most common type of neurally mediated syncope?

Vasovagal syncope (VVS), which is also often referred to simply as a “common faint.”

- It is triggered by emotional upset, fear, pain, etc.
- One or more prodromal features usually occur prior to an episode, such as sweatiness, abdominal discomfort, dizziness and lightheadedness.
- Situational syncope is similar, but this term is used for very specific triggers such as micturition, laughing, coughing, etc.
- Some patients experience only one event during their lifetime, whereas others have frequent episodes.
- In the vast majority of cases, VVS is not associated with cardiac or other disease-related causes.

[Alboni, Cooper, Jhanjee, Medow, Tan]

When should ostensible VVS cases be fully investigated by underwriters?

- Onset at ages 65 and over
- Known/suspected CV or neurological disease
- No prodromal symptoms cited

[Alboni, Anpalahan]

What is carotid sinus syncope (CSS)?

Fainting triggered by manipulation of the carotid sinus in the neck, typically incited by shaving, having a tight collar or fitting a tie, or induced by carotid sinus massage.

- Both bradycardia and hypotension are usually present.
- It may be referred to as carotid sinus hypersensitivity (CSH) or carotid sinus syndrome.
- Both the tilt-table test and carotid sinus massage are highly effective in making the diagnosis in patients with typical symptoms.
- It is common; in one study, CSS was induced in 35% of asymptomatic elders by performing carotid sinus massage.
- It is present in 25-50% of elders referred for hospital care due to unexplained syncope or dizziness.
- It is the most common cause of syncope at age 80+.

- There is no excess mortality risk in CSS, based on a 10-year study of 1,504 patients.
- In the elderly, CSS is associated with considerable disability risk due to falls and other accidents.

[Hampton, Krediet, Kulakowski, Paling, Tan and Kenny]

What is orthostatic hypotension (OH)?

Fainting induced by a fall in BP after assuming an upright position; official diagnostic criteria require a fall of 20 mmHg (systolic) and/or 10 mmHg (diastolic) within 3 minutes of standing. [Medow]

Common co-occurring symptoms include lightheadedness, blurred vision, headache and presyncope. It resolves rapidly upon sitting back down. [Nwazue, Sathyapalan]

- OH accounts for up to 21% of syncope cases presenting in the emergency department.
- There are roughly 80,000 hospitalizations annually in the US where OH is a primary or secondary diagnosis.
- The prevalence increases steeply with age, and OH is most common in those over age 65.
- In one study, OH was present in 28% of patients age 70+.
- It is almost twice as common in diabetics.
- The diagnosis is usually made based on the symptoms, with repeated BP measurements crucial to an accurate assessment.
- Recurrent episodes are infrequent because the patient comes to recognize and avoid those specific circumstances associated with inducing OH syncope.

[Goldstein, Hiitola, Medow, Nwazue, Shibao, van Hateren]

Are there any clues to OH based on advice the physician may give a patient who has experienced a syncopal episode?

Yes; the teleinterview drilldown of the applicant with known or suspected OH may cite MD instruction to avoid some or all of the following: [Medow]

- Prolonged daytime recumbency
- Large meals
- Hot showers
- Being outside in hot weather
- Rapid ascent to high altitudes

- Isometric exercises
- Straining at stool

Is there excess mortality in OH?

We reviewed 5 studies; 4 of these demonstrated either no increased mortality or minor excess risk of death that became insignificant after adjusting for age, frailty status, etc.

[Fedorowski, Rockwood, Rose, Verwoert, Weiss]

However, at ages 70 and over, a marked drop in systolic BP (> 20 mmHg) associated with OH was linked to a 2.5-fold increase in mortality. [Lagro]

In addition, OH predisposes to hypertension as well as difficult-to-control BP in patients with existing high blood pressure. [Kamarozzaman]

Therefore, our main life underwriting concerns are the comorbidities in applicants with OH, including those with underlying predisposing conditions.

Several studies show significantly greater disability in patients with OH, as well as an increased incidence in major depression. [Perlmutter, Richardson]

Potential OH **RED FLAGS** are:

- Diagnosed under age 65
- Markedly low BP response (see above)
- Need for ongoing medical treatment
- Presence of underlying disorder inciting OH
- Diabetic applicant

Note: There are over 35 conditions and circumstances inducing OH, including a wide range of so-called “orthostatic syndromes” such as pure autonomic failure, postural tachycardia syndrome (POTS), etc. [Medow]

A discussion of these scenarios is beyond the scope of this course.

Cardiac Syncope

What are the clues to a potential cardiac cause in syncope?

- Known CV disease
- History of an abnormal ECG without details
- Family history of syncope or cardiac sudden death under age 50

- Examination findings suggestive of structural heart disease
- Syncope induced by exertion
- Syncope when lying down
- Syncope associated with chest pain
- Syncope with complaint of palpitations or irregular heartbeat
- Absence of prodromal symptoms
- Treatment of syncope with cardiac drugs other than low dose beta-blockers
- Diagnostic assessment with any heart-related test other than a resting ECG
- Elevated NT-proBNP

[Alboni and Brignole, Benditt, Del Rosso, Huff, Jhanjee, Kulakowski, Pfister and Diedrichs, Saklani, Shen]

What are the main causes of cardiac syncope found on ECGs?

- Severe and/or persistent bradycardia
- Tachyarrhythmias, especially supraventricular tachycardia, atrial fibrillation and ventricular tachycardia
- Sinoatrial and atrioventricular blocks
- Bundle branch blocks
- Pre-excitation, including Wolff-Parkinson-White syndrome
- Prolonged QT intervals (QTc), including Long QT syndrome
- Brugada syndrome
- Inverted T waves in the right precordial leads

[Arnar, Galizia, Kulakowski and Lelonek, Quinn, Saklani, Westby]

What forms of treatment are used on cardiac syncope?

- Antiarrhythmic drugs
- Catheter ablation of an arrhythmia-inducing lesion
- Pacemaker
- Implantable cardioverter-defibrillator
- Antianginal medication
- Heart failure drugs

[Benditt, Chen, Furukawa, Medow, Palmisano, Venugopal]

→ Any applicant treated for syncope with any of these interventions is a **RED FLAG** at any age, regardless of what we are told about the diagnosis.

Syncope While Driving

How common is syncope while driving?

In one study, 9.8% of syncopal episodes occurred while driving. The overall incidence is unknown, but it is clearly modest. [Sorajja]

The most common causes of syncope while driving are vasovagal, “cause unknown,” arrhythmias, structural heart disease, OH and CSS, in that order. [Sakaguchi, Sorajja]

How often do these individuals have multiple episodes while driving?

The recurrence rate in the largest study was 1.1% in 12 months; new episodes are therefore quite uncommon. [Sorajja]

Is denial of driving privileges a **RED FLAG** in these cases?

Actually, it is a **YELLOW FLAG** because criteria differ markedly between jurisdictions. Cardiac and “cause unknown” are most likely to be restricted. Guidelines are generally tougher on commercial drivers than others. [Parry, Sakaguchi]

What test would we require in all syncope cases with the following features?

- Adverse CV risk profile, especially diabetes and longstanding high blood pressure
- Suspected or known cardiac origin
- Cause unknown over age 50
- Age 65 and over regardless of stated cause
- Heart murmur present

NT-proBNP – because it is the best marker we have for significant cardiac pathology. [Pfister]

If we were setting guidelines for getting medical records when applicants acknowledge a syncope history, what would be our absolute indications (**RED FLAGS**)?

→ Please see Table Three.

Table 3: Absolute Red Flags in Syncope Cases

- Age 65 and over
- Cause unknown at age 50 and over
- Referred to a specialist, especially a cardiologist or neurologist
- Known/suspected cardiac or neurological cause
- Abnormal resting ECG showing ischemia or any of the features linked to inducing syncope (see above)
- Any other abnormal cardiac test
- Advanced cardiac testing (extended cardiac monitoring, electrophysiology testing, TST, echo, etc.) done
- Cardiac Rx prescribed, except for low-dose beta blockers in cases with noncardiac diagnoses
- Hospitalized because of syncope
- Family history: multiple premature CV events or any cardiac sudden death under age 50
- Syncope induced by exertion, coughing, micturition or defecation
- Syncope while lying down
- Syncope with palpitations, dyspnea and/or chest pain
- Dyspnea present in ED
- Systolic BP < 90 or diastolic < 65 in the elderly
- Associated with drinking episode (blackout?)
- Heavy cigarette smoking (> 20/day)
- Over 40 pack years of smoking... *and still puffing away!*

[Aggarwal, Chen, Costatino, Da Costa, Derose, Getchell, Holmegard, Kapoor, Khera, Kulakowski and Lelonek, Racco, Roussanov, Saklani, Ungar, Van Dijk, Weimer]

Key Take-Away Points:

- Vasovagal syncope (VVS) is usually not associated with cardiac and other disease-related causes.
- There is no significant extra mortality in carotid sinus syncope.
- Orthostatic hypotension has minimal overall mortality except in cases due to serious underlying disorders and when there is a marked drop in systolic BP (> 20 mmHg) in elders.
- There are a dozen clues to cardiac syncope.
- The main causes of cardiac syncope are arrhythmias and structural heart disease.

- The highest syncope mortality occurs in cases of cardiac origin.
- Driving syncope is uncommon, but some cases are incited by cardiac causes.
- NT-proBNP is the ideal underwriting test in syncope cases with known or possible cardiac causes.
- The most important issue is to know the **RED FLAGS** that make medical records essential when assessing applicants with a history of syncope.

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Self-Examination

True/False

1. Presyncope is defined as a sense of impending loss of consciousness and is rarely due to cardiac causes.
2. Benign paroxysmal positional vertigo is defined as brief but intense objective and subjective rotational dizziness triggered by head movement.
3. The 3 main symptoms in Ménière disease are hearing loss, tinnitus and vertigo.
4. When syncope is induced by the tilt-table test, this is an unfavorable mortality risk finding in an applicant with undiagnosed syncope.
5. The Brugada syndrome is one of the leading causes of noncardiac syncope.

Multiple Choice

6. All of the following are considered peripheral causes of dizziness/vertigo, EXCEPT:
 - A. Acute labyrinthitis
 - B. Parkinson disease
 - C. Otosclerosis
 - D. Vestibular neuritis
7. Which of the following is LEAST LIKELY to be associated with dizziness/vertigo of peripheral origin?
 - A. Sudden onset
 - B. Hearing loss
 - C. Vertical nystagmus
 - D. Tinnitus
8. All of the following statements are TRUE about vasovagal syncope, EXCEPT:
 - A. It is the most common type of neurally mediated syncope.
 - B. Some patients experience just one episode, while others have frequent episodes.
 - C. Prodromal features usually occur prior to an episode.
 - D. It is typically triggered by such things as shaving or wearing a tight collar.
9. Which of the following is LEAST LIKELY to be associated with syncope of cardiac origin?
 - A. Syncope induced by carotid sinus massage

- B. Syncope accompanied by palpitations
- C. Syncope while lying down
- D. Syncope induced by exertion

10. All of the following are situations are absolute RED FLAGS when underwriting syncope, EXCEPT:

- A. Syncope induced by coughing
- B. Family history of cardiac sudden death under age 50
- C. Syncope of undetermined cause at any age
- D. Referral to a neurologist for further assessment

Answer Key

Correct Answer	Page References			
True/False				
1. False	3			
2. True	5			
3. True	6			
4. False	14			
5. False	20			
Multiple Choice				
	A	B	C	D
6. B	4	4	4	4
7. C	5	5	5	5
8. D	17	17	17	17
9. A	18	20	20	20
10. C	22	22	22	22

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