



# General Internal Medicine

## ACP MKSAP18

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### Internal Medicine Board Review

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Medical Content Category	% of Exam
Allergy and Immunology	2%
Cardiovascular Disease	14%
Dermatology	3%
Endocrinology, Diabetes, and Metabolism	9%
Gastroenterology	9%
Geriatric Syndromes	3%
Hematology	6%
Infectious Disease	9%
Nephrology and Urology	6%
Neurology	4%
Obstetrics and Gynecology	3%
Medical Oncology	6%
Ophthalmology	1%
Otolaryngology and Dental Medicine	1%
Psychiatry	4%
Pulmonary Disease	9%
Rheumatology and Orthopedics	9%
Miscellaneous	2%
<b>Total</b>	<b>100%</b>

**23%**

# Dermatology 1

A 71 yo man is evaluated for erythema and tenderness of the left lower leg for 1 week. He had a prior episode on the left lower leg 2 months ago and was previously treated successfully with antibiotics.

On exam T 38.1 C, 125/75, RR 16, P 85. There is a well demarcated, warm and tender erythematous patch on the anterior lower left leg extending from dorsal foot to mid shin. There is tissue maceration and fissuring between 2<sup>nd</sup>/3<sup>rd</sup> toe spaces bilaterally. The remainder is normal.

# Dermatology 1 continued

In addition to antibiotics, which is the most appropriate management?

- A Following acute therapy, start prophylactic antibiotics
- B Obtain blood cultures
- C Obtain skin punch biopsy
- D Staphylococcal decolonization with intranasal mupirocin
- E Treat the interdigital intertrigo

- **E Treat the interdigital intertrigo**

# Dermatology 1 continued

The diagnosis of cellulitis is often made based on the presentation of a well demarcated warm and tender erythematous plaque. Bacteria enter through superficial breaks in the skin or gain access by hematogenous spread. Treatment of the maceration and fissuring in the toe web spaces can decrease the recurrence of cellulitis. This fissuring, maceration and scaling are often due to tinea pedis, which allows entry for Strep and Staph. In addition, attempts should be made to identify other predisposing conditions such as eczema, edema, obesity, and venous insufficiency.

As this is only the 2<sup>nd</sup> episode, prophylactic antibiotics are inappropriate. This can be considered when there are 3-4 episodes per year and is usually oral penicillin or erythromycin but predisposing factors should be addressed first.

Blood culture is not recommended for cellulitis unless a patient is on chemotherapy or has neutropenia, severe immunodeficiency, an immersion injury, or animal bite.

With classic cellulitis, skin biopsy is not necessary.

Staph decolonization can be considered for recurrent skin abscesses, but is not effective for cellulitis.

## Dermatology 2

A 43 yo woman is evaluated for painful wheals on the upper legs and back that have been present for 2 weeks. Individual lesions resolve with bruising in 3-4 days. She reports some associated joint pain, particularly of the small joints in her hands. Medical history is unremarkable and she takes no medications.

On exam, vitals are normal. There are polycyclic edematous plaques on the back and upper legs. The remainder, including joint exam, is normal.

# Dermatology 2 continued

Which of the following is the most appropriate management?

- A Epicutaneous patch testing
- B Ice cube provocation test
- C Oral prednisone
- D Skin biopsies
- E Topical triamcinolone

- **D Skin biopsies**

## Dermatology 2 continued

She has **urticarial vasculitis** and skin biopsies for histology and direct immunofluorescence (for Ig and complement deposits) should be obtained for diagnosis and to guide further work up and treatment.

Typical urticarial wheals last <24h with individual lesions lasting only a few hours, resolve without cutaneous sequelae, and are pruritic and not painful. Urticarial vasculitis differs from urticaria in that individual lesions persist >24h, more commonly present with painful or burning lesions instead of pruritus, and leave bruise-like changes when they resolve. Patients often have an underlying autoimmune disease, most often lupus, but even without an autoimmune disease, patients are at risk of multisystem disease, including nephritis. The joint pain suggests an underlying disorder.

Epicutaneous patch testing is performed to diagnose allergic contact dermatitis. This is can occasionally present as typical urticarial, but this history suggests urticarial vasculitis.

## Dermatology 2 continued

Physical urticarial is induced by a physical stimulus such as the sun, sweating, pressure, or cold temperature. An ice cube provocation test helps diagnose cold urticarial but would not be helpful here. Neither allergic contact dermatitis nor physical urticarial explain the joint symptoms.

Treatment of urticaria is most effective with long-acting antihistamines, since they help treat active disease and prevent new flares. Systemic glucocorticoids and immunosuppressive agents have been used for urticarial, but in most patients, maximizing the dose of long-acting antihistamines is equally effective and safer.

Glucocorticoids are often the mainstay treatment for urticarial vasculitis, but it is inappropriate to commit her to this without confirming the diagnosis.

Topical glucocorticoids, such as triamcinolone, have limited efficacy in typical and urticarial vasculitis and are not best for either.

# Dermatology 3

A 42 yo man reported to the ED yesterday with a painful blistering rash, mouth sores, and eye pain. He started allopurinol 10 days ago for gout and developed flu-like symptoms and skin pain 2 days ago. He was admitted last night with a diagnosis of toxic epidermal necrolysis. Allopurinol was discontinued, fluid and electrolyte resuscitation was initiated, and he was started on IV glucocorticoids.

On exam, HR 95, SpO2 98% on RA, and remaining vitals are normal. He appears to be in pain. Excessive oral ulcerations are present but do not extend across the vermillion border. Large sheets of skin are denuding, affecting >35 % of his body surface area. Conjunctivae are injected and red and he has generalized lymphadenopathy.

AST 92 HCO3 22 Plasma glucose 210

ALT 87 BUN 27

# Dermatology 3 continued

Which of the following has the greatest impact on prognosis?

- A Age
- B Heart rate
- C Affected body surface area
- D Plasma glucose
- E Serum bicarbonate

- **C Affected body surface area**

# Dermatology 3 continued

Body surface area (BSA) is the strongest prognosticator in Stevens-Johnson syndrome/toxic epidermal necrolysis (SJS/TEN). SJS and TEN are related clinical syndromes characterized by acute epidermal necrosis and the classification is determined by % BSA with epidermal detachment: SJS <10%, SJS-TEN overlap 10-30%, TEN > 30%.

TEN is almost exclusively caused by medications, whereas SJS can also be triggered uncommonly by vaccines or infection. Patients may have flu-like symptoms for 1-3 days prior to the skin eruption. Initially, painful red-purple macules or patches develop on the trunk and extremities, which enlarge and coalesce. Two or more mucosal surfaces, such as the eyes, nasopharynx, mouth, and genitals are involved in >80% of patients. Systemic inflammation can result in pneumonia, hepatitis, nephritis, arthralgia, and myocarditis. Loss of the skin barrier function can lead to infection, hypovolemia, electrolyte disturbances, and death.

Prognosis for SJS/TEN can be estimated by the SCORTEN tool 24h after presentation. SCORTEN is a severity score directly correlated with mortality and validated for TEN. All the listed answers are features of SCORTEN but BSA has the greatest impact.

# Geriatric Syndromes 1

An 84 yo woman in hospice is evaluated for 'death rattle' that is disturbing to family members. She is in the active phases of dying, and her family is distressed by her noisy respiratory secretions; they are worried that she is choking. Medications are haloperidol, hydromorphone, lactulose, and acetaminophen.

On exam, RR 12. She is not responsive but does not appear uncomfortable. Extremities are cool. There are oropharyngeal secretions that produce a rattling and gurgling sound with inspiration.

# Geriatric Syndromes 1 continued

Which is the most appropriate initial management?

- A Atropine ophthalmic drops given sublingually
- B Glycopyrronium
- C Scopolamine patch
- D Suctioning by catheter
- E Symptom explanation and reassurance

- **E Symptom explanation and reassurance**

# Geriatric Syndromes 1 continued

Although several studies suggest respiratory distress is not typically associated with these secretions, caregivers are often concerned by the 'death rattle'.

Posterior oropharyngeal secretions are most appropriately managed with family reassurance and anticipatory guidance. Additionally, repositioning often allows secretions to drain without pharmacologic intervention. Mouth hygiene with a sponge may also be helpful.

A 2014 review of studies of atropine, glycopyrronium, scopolamine, hyoscine, and/or octreotide acknowledged the distress in both relatives and professional caregivers; however, its impact on patients is unclear. There is no evidence that any antimuscarinic is superior to no treatment and anticholinergics in patients who are awake can lead to dry mouth and urinary retention.

Suctioning by catheter can cause local trauma and should be avoided in managing end-of-life secretions unless they are causing obvious distress or cough.

## Geriatric Syndromes 2

An 87 yo woman is evaluated following a recent diagnosis of breast cancer. In the 18 months before diagnosis, she noted a generalized decline in her energy and appetite. She is no longer able to keep up with others when walking any distance, and she now requires assistance with dressing because of generalized weakness. She has unintentionally lost 3.6 Kg in the last 6 months.

History is significant for breast cancer, CABG at 74, COPD and HTN. Medications are albuterol, tiotropium, salmeterol, atorvastatin, aspirin, lisinopril, and metoprolol.

On exam, vitals are normal. BMI is 19 and the remainder is normal.

## Geriatric Syndromes 2 continued

Which of the following is most likely to predict morbidity, mortality, and response to cancer treatment?

- A FRAIL scale score
- B Pharmacologic cardiac stress test
- C Six-minute walk test
- D Timed Up and Go test

- **A FRAIL scale score**

# Geriatric Syndromes 2 continued

Frailty is a multifactorial geriatric syndrome that may predict response to certain treatments as well as morbidity/mortality in light of chronic illness. This patient has unintentional weight loss, low energy and activity levels, slow walking speed, and weakness, all of which are associated with frailty.

Indices such as the Frailty Index, the FRAIL (fatigue, resistance, ambulation, illness, and loss of weight) scale, and the Osteoporotic Fractures Frailty Scale have been validated for primary care use.

The Frailty Index has been in use longer than the others; however, its length and complexity limit its usefulness for primary care. The FRAIL scale consisting of 5 self-reported measures is easy to score in an office setting.

# Geriatric Syndromes 2 continued

Pharmacologic cardiac stress testing is recommended for those with symptoms of cardiac ischemia who cannot exercise.

Lung function during exertion during the 6-minute walk test is helpful to assess disability and prognosis in chronic lung conditions. Simple pulse oximetry and desaturation studies performed at rest and with exertion assess the need for oxygen supplementation. During a 6-minute walk test, O<sub>2</sub> sat, HR, dyspnea and fatigue levels, and distance walked are recorded.

The Timed Up and Go test identifies risk for falls. The components (rising from the chair, gait, walking speed, balance while turning, and sitting) offer insight into the mechanics of mobility and guide more focused evaluation.

There is no established role for any of these as predictors of response to cancer treatment.

## Geriatric Syndromes 3

A 92 yo woman is evaluated for urinary incontinence. 6 months ago she occasionally lost control of small amounts of urine, which was managed with an adult diaper. Now, she seems to have lost the ability to recognize that she needs to urinate until it is too late to reach the bathroom. There have been no noticeable changes in cognition but history is significant for dementia treated with donepezil.

On exam, vitals are normal. She appears frail and is not oriented to place or time. Gait is stable and narrow based. She is slow to rise from a chair, and requires the arm rests to get up.

# Geriatric Syndromes 3 continued

Which is the most appropriate treatment?

- A Oxybutynin
  - B Pelvic floor muscle training (Kegel exercises)
  - C Prompted voiding
  - D Sling cytourethropexy
- 
- **C Prompted voiding**

## Geriatric Syndromes 3 continued

There are 4 main classifications of urinary incontinence: urgency, stress, mixed, and overflow. Functional incontinence where people cannot reach and use the toilet in time, may occur in patients with significant cognitive or mobility impairments. This patient's decreased cognition limits her ability to recognize early signs of the need to void, and impaired mobility limits her ability to reach the bathroom when she does recognize the need. Providing assistance and scheduled toileting through prompting every 2-3h should be effective.

Oxybutynin is appropriate for urgency, but only after behavioral therapy has failed. Additionally, in this elderly woman, anticholinergic therapy risks increased confusion.

## Geriatric Syndromes 3 continued

Stress incontinence occurs with increased intra-abdominal pressure (coughing, laughing, sneezing) and is best treated with pelvic muscle floor training. However, she does not report symptoms and the ability of a cognitively impaired patient to comprehend the training instructions and remember to perform the maneuvers is likely limited.

Sling cystourethropexy is used for stress incontinence when pelvic floor training has failed after balancing surgical risk against benefit.

# Geriatric Syndromes 4

A 91 yo woman is establishing care following discharge from a hospital to SNF. She had been living in her home until 2 weeks ago when she fell and sustained a left intertrochanteric femur fracture. Her fracture was surgically stabilized, but her post-op course was complicated by delirium and UTI. Since discharge, she has had no major problems. Left hip pain is controlled with acetaminophen PRN.

History is otherwise significant for HTN and T2D. Medications before admission were amlodipine, lisinopril, and metformin. In hospital, acetaminophen was added for pain and quetiapine for agitated post-op delirium.

On exam, BP 148/78 without orthostatic changes; other vitals are normal. She has mildly antalgic gait. Cardiac, neurologic, and pulmonary exams are normal.

# Geriatric Syndromes 4 continued

Which medication should be discontinued to prevent adverse effects?

A Acetaminophen

B Amlodipine

C Lisinopril

D Quetiapine

• **D Quetiapine**

# Geriatric Syndromes 4 continued

Quetiapine has the greatest potential for adverse effects in this older patient with polypharmacy. Although treatment of comorbid conditions often requires multiple medications, evidence shows half of older adults take 1 or more unnecessary medications (i.e. not indicated, not effective, or therapeutically duplicative). Frequent review to verify necessity and proper dosing is essential for optimal geriatric care.

Certain medications carry a particularly high risk for geriatric patients and the American Geriatrics Society has compiled a list of high-risk drugs that must be carefully considered for risk/benefit in the elderly (**Beers criteria 2015**).

All antipsychotics, both 1<sup>st</sup> and 2<sup>nd</sup> generation, have significant adverse effects, including anticholinergic, extrapyramidal, and sedation, and older patients are particularly susceptible.

# Geriatric Syndromes 4 continued

Acetaminophen is relatively safe if not used at maximal doses for extended periods and side effects are far less likely and less severe than for other common systemic analgesics, including opioids and NSAIDs.

Amlodipine is not listed in the Beers Criteria. Although it could potentially cause low BP, her BP is acceptable and without orthostatic changes.

Lisinopril is also not in the Beers Criteria. Though it can cause electrolyte abnormalities, orthostatic hypotension, and kidney insufficiency, she has no evidence of these problems.

# Geriatric Syndromes 5

An 81 yo woman was admitted to the ICU 8 days ago for multisystem organ failure associated with severe multilobar pneumonia. She has required mechanical ventilation since admission. Efforts to wean her have not succeeded and she remains somnolent and unresponsive to verbal stimuli. History is significant for dementia, diabetes, COPD, CKD, and CHF.

The care team shares with the family that she will not have a meaningful recovery; however, the patient's children request continued ICU-level care. She does not have an advance directive, and her wishes are unknown. After a family meeting to discuss prognosis, the children continue to request all treatment.

# Geriatric Syndromes 5 continued

Which is the most appropriate management?

- A Consult with the hospital ethics committee
- B Discontinue ICU care in 48h if no improvement
- C Transfer the patient to another institution
- D Continue current level of care

- **A Consult with the hospital ethics committee**

# Geriatric Syndromes 5 continued

A recent statement from the Society of Critical Care Medicine recommends appropriate treatment goals of ICU care include treatment that provides a reasonable expectation of survival outside the acute care setting with sufficient cognitive ability to perceive benefits of treatment, or palliative care through the dying process in the ICU. Because conflicts between the desire to provide benefit to the patient and desire to minimize the burden of treatment can be very difficult, one of the most important skills of the physician is the ability to communicate and negotiate a reasonable treatment plan with families.

If these situations become intractable, many organizations recommend initiating a process to resolve disagreements, including notifying surrogates of the process, seeking a 2<sup>nd</sup> medical opinion, obtaining review by an interdisciplinary ethics committee, offering the surrogate the opportunity to seek care elsewhere, and implementing the decision of the resolution process. This family is requesting treatment that the care team does not think will achieve reasonable goals, and an ethics consultation may resolve the conflict.

## Geriatric Syndromes 5 continued

In some situations, the physician and family may mutually establish a time frame in which care will be withdrawn if there is no improvement; however, these decisions should not be made unilaterally by the care team.

A physician should not provide treatment that conflicts with professional obligations and will not meet goals of care. However, often by communicating the concerns, a physician is able to help a family understand the burden of continued, ineffective treatment. If resolution is not possible, family may seek transfer to another institution; however, the physician is not obliged to initiate such arrangements.

# Neurology 1

A 78 yo man is evaluated in the ED with 1 day of worsening dizziness. He describes a room-spinning sensation and notes some nausea and imbalance. He reports no other symptoms. History is notable for HTN, HL, and T2D. Medications are aspirin, lisinopril, atorvastatin, and metformin.

On exam, BP 172/88; other vitals are normal. He has difficulty with tandem walking and vertical nystagmus. The neurologic exam is otherwise non-focal and without mental status changes.

Which is the most appropriate test to perform next?

- A CT head
- B MRI brain
- C Vestibular lab testing
- D No further testing

- **B MRI brain**

# Neurology 1 continued

The most important test in the patient with risk factors for stroke is MRI brain. Patients with central vertigo secondary to vertebrobasilar stroke (posterior circulation ischemic or hemorrhagic events) frequently display concomitant neurologic findings in addition to vertigo. However, 20 % of vertebrobasilar strokes present with isolated vertigo, and studies have shown  $<1/3^{\text{rd}}$  of vertebrobasilar strokes that manifest as isolated vertigo are misclassified as peripheral vertigo, leading to considerable morbidity/mortality.

With findings concerning for central vertigo (nystagmus, dysphagia, dysarthria, diplopia, ataxia, postural instability, hemiparesis, mental status changes), or with acute sustained vertigo and risk factors for vertebrobasilar stroke (age, HTN, HL, DM, PVD, Afib), urgent MRI is strongly recommended. MRI can detect infarction in the posterior fossa on day 1 and is typically performed with MRA which is both sensitive and specific in identifying stenosis or occlusion of the posterior circulation.

# Neurology 1 continued

CT provides effective and expedited evaluation of hemorrhagic stroke, although hemorrhagic vertebrobasilar stroke accounts for a very small minority of central vertigo. MRI is far more sensitive for early detection of ischemic posterior stroke.

Vestibular lab testing (electronystagmography and videonystagmography using electrodes and video to record eye movements) can distinguish between peripheral and central vertigo. They record and quantify spontaneous and induced nystagmus. However, it should not take precedence over urgent brain imaging for a potentially life-threatening cerebellar stroke.

Imaging is generally unnecessary in the diagnosis of peripheral vertigo. However, because of CV risk factors; acute and sustained vertigo; and gait ataxia, he is at high risk for posterior stroke and further evaluation is urgently required.

# Neurology 2

A 49 yo man is evaluated for 2 days of posterior neck stiffness and pain that radiates down his left arm and into the 4<sup>th</sup>/5<sup>th</sup> fingers of his left hand. He is left-handed and works as a roofer. The pain worsens when he turns his head to the left and improves when he lies down, although he sometimes has pain when rising from a prone position. He has not had any arm or hand weakness or problems writing. He has no systemic symptoms.

On exam, vitals are normal. On palpation, the pain is reproduced when the examiner applies downward pressure with the patient's head bent to the left and extended (Spurling test). Pain is relieved when the patient holds his left arm above the plane of his shoulder. Neck range of motion is limited with both left and right lateral rotation. There is no cervical spine tenderness to palpation and the neurologic exam is normal.

## Neurology 2 continued

Which is the most appropriate management?

- A Cervical collar
- B Cervical MRI
- C Electrodiagnostic testing
- D Gabapentin
- E Neck exercises

- **E Neck exercises**

## Neurology 2 continued

Neck exercises are the best treatment for cervical radiculopathy. Stretching and strengthening exercises provide medium-term relief and should be part of a multimodal approach. Other non-pharmacologic options include acupuncture, early mobilization, and spinal manipulation. Cervical traction is of limited benefit. Patients should be informed that most pain resolves within 2-3 months using conservative measures.

A cervical collar should be avoided because it leads to neck muscle atrophy, especially when used for >1-2 weeks. Shorter-term use appears to be no more effective than sham interventions.

There are no red flags to warrant imaging, whether plain XR or MRI. However, these would include constitutional symptoms; personal history of or concern for malignancy; progressive neurologic symptoms; or myelopathic findings (dysgraphia, ataxia, hypertonia, hyperreflexia, or fine motor difficulty).

## Neurology 2 continued

Electrodiagnostic testing is most helpful to diagnose peripheral nerve entrapment or neuropathy as the cause of arm symptoms. Both should be considered when arm symptoms are more prominent than neck symptoms. Electrodiagnostic testing can also identify cervical radiculopathy as the cause of neck pain when axonal injury is present, but cervical radicular pain can exist in the absence of axonal injury.

NSAIDs are 1<sup>st</sup> line therapy for acute neck pain, including acute cervical radiculopathy. Cyclobenzaprine at doses >15 mg/day has been shown to be effective when muscle spasm is present, although it should be used with caution in older patients. Gabapentin, a neuromodulator, can treat chronic radicular pain; however, it does not have a role with acute symptoms.

# Neurology 3

A 53 yo woman is seen during follow up for several chronic medical problems without a medical explanation despite extensive evaluation. Symptoms include nonpositional lightheadedness, difficulty concentrating, and total body numbness. Her symptoms have been stable for the past 2 years. She has a history of anxiety and depression, and her mood is well controlled with medical therapy. Medications are sertraline and acetaminophen PRN.

Exam, including vitals, is normal. MRI brain 2 years ago was normal.

Which is the most appropriate management?

- A Anti-Hu Ab assay
- B Anti-N-methyl-D-aspartate (Anti-NMDA) receptor Ab assay
- C Cognitive behavioral therapy (CBT)
- D No further management

- **C Cognitive behavioral therapy**

## Neurology 3 continued

The best strategy in this patient with medically unexplained symptoms (MUS) is CBT. The foundation of management with MUS is an open, honest, and effective therapeutic relationship. Patients must be treated respectfully and cared for in a nonjudgmental manner, accepting their frustration. Acknowledging these feelings early can build the therapeutic alliance. The goals of management are functional restoration, decreased symptom focus, and acquisition of coping skills, rather than abatement of symptoms, and requires a holistic and multimodal approach.

Visits should be scheduled at regular intervals, allowing for additional discussion, educational opportunities, and longitudinal reassessment. It should be made clear that treatment of MUS will not be curative and symptoms may persist. Other interventions that may help include PT, OT, psychotherapy, social support, biofeedback, graded exercise therapy, and training in stress management and coping mechanisms.

## Neurology 3 continued

A systematic review of 29 RCTs comparing CBT with various control treatments found CBT was effective for somatization syndromes, and physical symptoms were more responsive than were psychological. At least 1 trial found CBT decreased clinic visits.

Anti-Hu paraneoplastic syndrome, commonly associated with small cell lung cancer, can cause temporal lobe, brainstem, and cerebellar dysfunction and may also involve the dorsal roots and autonomic nervous system. The long duration and nature of this patient's symptoms make this unlikely and Ab testing is not indicated.

Anti-NMDA receptor Ab encephalitis has emerged as an increasingly common cause of encephalitis. It is suggested by the presence of choreoathetosis, psychiatric symptoms, seizures, and autonomic instability, and is confirmed by detection of antibodies in serum. However, she has no compatible symptoms.

Given the ongoing symptoms and numerous available, providing no further treatment is inappropriate.

# Neurology 4

A 55 yo woman is evaluated for left-sided tinnitus that has gradually emerged over the last 6 months. It is a high-pitched continuous (non-pulsatile) buzzing. She reports no hearing loss, balance difficulty, dizziness, or headache, and her history is otherwise unremarkable.

On exam, vitals are normal. Direct visualization of the external ear canals and TMs is unremarkable. Weber and Rinne tests suggest left sensorineural hearing loss, and the whispered voice test suggests hearing loss on the left. Romberg, cerebellar, and CN tests are all normal. Audiologic tests confirm mild-moderate left sensorineural hearing loss.

Which is the most appropriate management?

- A CT angiography of the posterior fossa
- B MRI internal auditory canal
- C Referral for hearing aids
- D Urgent ENT referral

• **B MRI internal auditory canal**

# Neurology 4 continued

The assessment of tinnitus must differentiate dangerous causes (neoplasm, stroke/TIA) from benign causes (infections, drugs). Most commonly, tinnitus is bilateral; unilateral may indicate serious pathology. Patients with unilateral tinnitus should undergo prompt hearing testing; if hearing loss is found, MRI of the internal auditory canal is necessary to exclude acoustic neuroma. It is important to note that **patients may not recognize hearing loss** that is only revealed on audiologic testing.

The type of tinnitus is an important factor in evaluation. Pulsatile tinnitus, when synchronous with the heartbeat, may suggest a vascular anomaly, including atherosclerotic disease, A-V fistulas, or paraganglioma (commonly in the jugular bulb or tympanic arteries of middle ear). A patient with pulsatile tinnitus should be examined for bruits over the neck, periauricular area, temple, orbit, and mastoid areas. If exam findings do not explain it, CT or MR angiography should be performed. This patient does not have pulsatile tinnitus, but rather, unilateral hearing loss, so internal auditory canal imaging will have higher yield than vascular imaging.

## Neurology 4 continued

The primary symptom is tinnitus with asymptomatic hearing loss. A hearing aid will be of more use with symptomatic deafness. The priority is to exclude acoustic neuroma.

Gradual onset tinnitus requires further evaluation but does not require urgent ENT evaluation. Urgent referral is indicated for tinnitus associated with serious, reversible underlying pathology, including sudden sensorineural hearing loss, pulsatile tinnitus, vestibular symptoms, ear pain, or drainage/malodor that fails to resolve.

# Ob/Gyn 1

A 29 yo woman is here for routine examination. She is asymptomatic. Her last Pap smear 3 years ago was normal. She completed the HPV vaccine series at age 26. Medical and family histories are unremarkable. She takes no medications.

Which is the most appropriate cervical cancer screening strategy at this time?

- A Cervical cytology (Pap)
- B Cervical cytology (Pap) and HPV testing
- C High-risk HPV testing
- D No further testing

- **A Cervical cytology**

# Ob/Gyn 1 continued

She should be screened with cytology (Pap) alone. Nearly all cases of cervical cancer are precipitated by persistent HPV infection, and HPV is detected in most patients with cervical cancer (most commonly subtypes 16 and 18 'high-risk HPV'). Immunization against HPV protects against 70-90 % of cervical cancers depending on the type of vaccine received. However, in patients who have completed the vaccine series, routine cervical screening is still strongly recommended.

Vaccine recipients may have been infected prior to immunization and vaccination is not effective in clearing HPV infection, and does not protect against all HPV types. USPSTF concluded the benefits of screening women ages 21-29 every 3 years with cytology alone substantially outweighs the harms.

HPV testing is not indicated <30 years because of the higher prevalence of transient HPV. Therefore, she should receive Pap alone without any kind of HPV detection.

# Ob/Gyn 1 continued

In 2018, USPSTF concluded that in women ages 30-65, the benefits of screening every 3 years with cytology alone, or every 5 years with high-risk HPV testing alone outweigh the harms.

Modeling suggests that screening every 5 years with high-risk HPV alone in this group results in a slightly lower mortality rate than screening every 3 years with cytology alone, but incurs much higher rates of follow-up testing and colposcopy.

4 HPV screening tests are FDA-approved that screen for <14 types, but only 1 test specifically identifies high-risk HPV (types 16 and 18); the others report a positive result if any type is present.

## Ob/Gyn 2

A 45 yo woman is evaluated for heavy menstrual bleeding. She reports heavy unpredictable bleeding of variable flow and duration for the past year. Her last period was 12 days ago. She has a history of provoked DVT 3 years ago following a long flight. She is a current smoker with a 10-pack-year history and does not wish to quit at this time. She has never been pregnant and does not wish to become pregnant.

On exam, vitals are normal. BMI is 24. Breast and pelvic exams are normal. Labs reveal Hb 10.2 g/dL and MCV 68 fL. Pregnancy test is negative.

Subsequent evaluation for secondary causes of abnormal uterine bleeding, including endometrial cancer, was negative.

## Ob/Gyn 2 continued

In addition to oral iron supplements, which is the most appropriate management?

- A Combination oral contraceptive pill
- B Endometrial ablation
- C Levonorgestrol-containing IUD
- D Medroxyprogesterone acetate for the 2<sup>nd</sup> half of the menstrual cycle

- **C Levonorgestrol-containing IUD**

## Ob/Gyn 2 continued

Abnormal uterine bleeding can be categorized into ovulatory and anovulatory patterns.

Ovulatory menorrhagia occurs at normal regular intervals but is excessive in volume or duration. Women with ovulatory bleeding have estrogen-mediated endometrial proliferation, produce progesterone, slough the endometrium regularly following progesterone withdrawal, and have minimal risk for uterine cancer.

Anovulatory cycles are characterized by unpredictable bleeding of variable flow and duration caused by the absence of normal cyclic hormonal flux. Without cyclic progesterone, the estrogen-mediated endometrium proliferates excessively, resulting in instability, erratic bleeding, and increased risk for uterine cancer.

## Ob/Gyn 2 continued

For this perimenopausal woman who is anemic secondary to excessive menstrual blood loss and has contraindications to combination OCP (prior DVT and current smoking), using a progestin-containing IUD would likely result in amenorrhea and prevent further blood loss. Managing anovulatory cycles involves the use of progestin to maintain endometrial stability to reduce the risk for cancer, which a levonorgestrel IUD would do.

An estrogen-progestin OCP protects against unplanned pregnancy and regulates the menstrual cycle to prevent bleeding between cycles. However, this patient has contraindications to combination hormone therapy, leaving a progestin-containing IUD as the best choice.

Endometrial ablation or hysterectomy may be considered for patients who do not respond to medical treatment or in whom anatomic causes are identified as the cause of bleeding so are not indicated at this time.

Treatment of anovulatory bleeding is directed toward restoring hormonal balance and stabilizing the endometrium. A progestin such as medroxyprogesterone can promote withdrawal bleeding for women who wish to become pregnant. However, she does not, and this treatment is unlikely to prevent future abnormal bleeding with continued anovulatory cycles.

## Ob/Gyn 3

A 34 yo woman is evaluated at follow-up for BP control. She hopes to become pregnant and would like to stop her OCP. She does not smoke, drink alcohol, or use illicit drugs. She is in a monogamous sexual relationship and has had no STI. History is significant for HTN, T2D, and depression since childhood. Medications are an OCP, lisinopril, metformin, citalopram, and acetaminophen PRN.

On exam, vitals are normal and the remainder is unremarkable.

In addition to starting folic acid, which medication should be stopped at this time?

- A Acetaminophen
- B Citalopram
- C Lisinopril
- D Metformin

- **C Lisinopril**

## Ob/Gyn 3 continued

Medication adjustments are important in preconception counselling. All anti-hypertensives cross the placenta. Some are absolutely contraindicated during pregnancy, including ACE inhibitors, ARBs, and, likely, renin inhibitors. Women taking these should be counseled about the associated teratogenicity during all trimesters, and they should be stopped if pregnancy is anticipated or possible.

BP goals for chronic HTN during pregnancy are 120-160 / 80-105 mmHg. However, the treatment of HTN during pregnancy is controversial. If BP control is not adequate after stopping lisinopril, methyldopa and labetalol have been used safely. Calcium channel blockers (e.g. long-acting nifedipine) can also be used. Diuretics may induce oligohydramnios if initiated during pregnancy but generally can be continued if the patient was taking one preconception. Spironolactone and eplerenone should be avoided because their safety has never been proven.

## Ob/Gyn 3 continued

Although acetaminophen is generally considered safe during pregnancy, caution is needed with NSAIDs due to their effect on organogenesis.

A goal for preconception wellness is the absence of uncontrolled depression. Evidence shows that women who are depressed during pregnancy have worse birth outcomes. SSRI, including citalopram, fluvoxamine, and sertraline, and pregnancy category C agents that can be continued. An alternative to antidepressant therapy is psychotherapy, specifically CBT, which is as effective as drug therapy. As she is already taking an antidepressant, it is more important to continue than to stop treatment.

Optimal glycemic control with goal HbA1c < 6.5 % is recommended for those planning pregnancy. Metformin is FDA category B (safe during pregnancy) meaning animal reproduction studies have not shown a fetal risk and no controlled studies in pregnant women have shown adverse effects.

## Ob/Gyn 4

A 32 yo woman is evaluated during a commercial flight for an episode of weakness and lightheadedness. She is at 35 weeks gestation and has had several contractions since take-off but without regularity. She reports no abdominal pain. She has no medical problems and her only medication is a prenatal vitamin.

On exam, she appears weak and clammy. Temp is normal. BP 105/60, P 99, RR 14. CV exam is unremarkable and lungs are clear. On abdominal exam, she has a gravid uterus.

O2 2 L/min by NC is started. IV access is obtained and fluids are initiated.

## Ob/Gyn 4 continued

Which is the most appropriate next step?

- A Ask the pilot to descend to a lower altitude
- B Connect with the ground-based physician
- C Recommend flight diversion
- D No further management

- **B Connect with the ground-based physician**

## Ob/Gyn 4 continued

In-flight medical emergencies are relatively common occurring in 1/600 flights. Airlines based in the US are mandated by FAA to carry at least one AED; supplemental O<sub>2</sub>; and a medical kit that contains a stethoscope, sphygmomanometer, gloves, airway and IV access supplies, and some basic medications. In case of an emergency, the physician's role generally involves assessing the patient, establishing a diagnosis when possible, administering basic treatments, providing reassurance as appropriate, and recommending flight diversion if necessary. Physicians should practice within their scope of training, be mindful of privacy, and document the encounter.

Although not an FAA requirement, most airlines have contracts with 24h call centers with a ground-based physician, often trained in emergency or aerospace medicine, who can assist remotely and help direct care. This can be particularly helpful when the problem is outside the physician's scope of practice.

## Ob/Gyn 4 continued

The principles of hypobaric hypoxia apply to commercial airplane cabins which are pressurized to 1500-2500 m altitude, resulting in inspired O<sub>2</sub> tension 110-120 mmHg (70 % that at sea level). Although this correlates with arterial PO<sub>2</sub> of ~60 mmHg in healthy individuals, those with underlying pulmonary disease are at risk for significant hypoxemia during a flight. This patient has no difficulty maintaining O<sub>2</sub> saturation > 90 % and descending to a lower altitude will serve no purpose.

Although dizzy and weak, her clinical status and vitals appear stable. She needs further evaluation and management; however diversion is not indicated at this time. Furthermore, the ground-based medical team can also help determine whether diversion is needed.

# Ophthalmology

A 45 yo woman is evaluated for 2 days of deep boring pain in her right eye. She also describes eye redness and photophobia but no recent trauma to the eye. She has a 10-year history of RA, treated with etanercept.

On exam, vitals are normal. Diffuse right eye redness is noted, and there is pain on extraocular movement testing. Gentle pressure over the eye with the lid closed results in pain. There is no scleromalacia in either eye. There is diminished acuity of the right eye.

Which is the most likely diagnosis?

- A      Episcleritis
- B      Scleritis
- C      Subconjunctival hemorrhage
- D      Viral conjunctivitis

- **B      Scleritis**

# Ophthalmology continued

RA is one of the most common diseases associated with scleritis. Typical features include eye pain, pain with gentle globe palpation, and photophobia. The deep scleral vessels are involved and may lead to scleromalacia, which is characterized by thinning of the sclera and is seen as a dark area in the white sclera. Scleromalacia may lead to perforation of the sclera, called scleromalacia perforans. Scleritis can be vision-threatening and lead to blindness; it is therefore important to urgently refer to ophthalmology.

Episcleritis is an abrupt inflammation of the superficial vessels of the episclera, a thin membrane that lies just beneath the conjunctiva. The cause is often unclear; rarely, it is associated with systemic rheumatologic disease. Episcleritis frequently presents without pain or decreased acuity. On exam, the inflammation appears localized. White sclera can be seen between superficial dilated blood vessels. Episcleritis typically resolves spontaneously. The presence of severe pain, diffuse redness, and decreased acuity make episcleritis unlikely.

# Ophthalmology continued

Subconjunctival hemorrhage is common and typically benign. It is caused by painless bleeding into the superficial portion of the eye. Exam reveals a blotchy redness (extravascular blood) that is typically confined to one area of the conjunctiva.

Subconjunctival hemorrhage is painless and not associated with vision loss. Most cases resolve within several weeks without intervention. These findings are not compatible.

Viral conjunctivitis also causes a red eye. Typically, the underlying vessels are visible, a watery discharge may be seen, and the eyelids are matted in the morning. The eye may feel irritated, but there is no pain or loss of acuity. Conjunctivitis is generally a diagnosis of exclusion but the pain and decreased acuity exclude it here.

# ENT

A 28 yo man is evaluated for 10 months of dizziness. He describes a sense of nonvertiginous imbalance and notes that it worsens with personal motion, movement of objects around him, and sitting or standing upright. The dizziness has persisted since he experienced a concussion without LOC while playing soccer 10 months ago. He reports no focal neurologic symptoms and takes no medications.

On exam, vitals are normal. Cranial nerve findings are normal, motor strength is intact, and DTRs are normal. Romberg is negative and gait is normal.

Brain MRI is normal.

## ENT continued

In addition to vestibular and balance rehabilitation therapy (VBRT), which is the most appropriate treatment?

- A Amitriptyline
- B Canalith repositioning maneuver (Epley)
- C Lorazepam
- D Sertraline

- **D Sertraline**

# ENT continued

Dizziness that remains nonspecific despite a thorough history, exam, and evaluation is referred to as persistent postural-perceptual dizziness (PPPD; formerly known as chronic subjective dizziness). PPPD is a persistent, nonvertiginous dizziness or imbalance that worsens with personal motion, upright positioning, and movement of objects in the surrounding environment.

Symptoms must be present on most days for > 3 months. PPPD is most often preceded by another vestibular process (BPPV, vestibular neuronitis, vestibular migraine, stroke), concussion/TBI, infection, or certain psychiatric conditions (anxiety, panic disorder, MDD). 75 % have concomitant anxiety or depressive symptoms.

The treatments of choice are vestibular and balance rehabilitation therapy (VBRT) and medical therapy, including SSRIs or SNRIs. VBRT focuses on balance training, core stabilization, and desensitization exercises; it is often performed by PT/OT.

# ENT continued

SSRIs and SNRIs take 8-12 weeks to produce a response; if effective, treatment for at least 1 year is recommended. A positive response to these medications does not depend on the presence of psychiatric symptoms.

Treatment with other classes of antidepressants has been disappointing, and amitriptyline is not effective for PPPD.

The Epley is used for BPPV. These symptoms are not compatible with BPPV, where patients have brief episodes of vertigo (10-30s) precipitated by abrupt head movement.

Lorazepam and other BDZ have been used for acute vertigo. This patient does not have vertigo, which is characterized by a spinning, swaying, or tilting sensation often accompanied by nausea/vomiting. In addition, long-term treatment with lorazepam can lead to dependence and may suppress vestibular feedback and central compensation mechanisms, resulting in worsening PPPD symptoms.

# Psychiatry 1

A 31 yo man is here for follow-up for depression. He previously experienced 2 episodes of MDD that were effectively treated with fluoxetine. 3 months ago, he presented with recurrent symptoms of depression. His PHQ-9 score was 14, indicating moderate depression. Fluoxetine was initiated and uptitrated to an effective dosage. The patient now reports significant improvement and PHQ-9 score is 6, indicating mild depression; he reports no adverse effects from the medication.

Which is the most appropriate next step?

- A Complete 8 months of fluoxetine
- B Complete 8 months of fluoxetine, then switch to bupropion for long-term maintenance
- C Continue fluoxetine as long-term maintenance
- D Discontinue fluoxetine

- **C Continue fluoxetine as long-term maintenance**

# Psychiatry 1 continued

Long-term continuation of fluoxetine at the current dosage is appropriate for recurrent depression. APA guidelines recommend long-term maintenance for patients with 3 or more episodes of major depressive disorder, persistent depressive disorder, or residual depressive symptoms. The same antidepressant and dosage that were effective for the acute depression should be continued.

Fluoxetine for 8 months should be sufficient for the major depressive disorder, but, because he has had 2 other episodes, he should be maintained on current therapy to prevent recurrence. Switching to another antidepressant (bupropion) is not indicated unless he develops intolerable adverse effects from the initial medication.

# Psychiatry 1 continued

Discontinuing treatment after 3 months is not recommended, even if he were not a candidate for long-term therapy. APA guidelines recommend continuing treatment for at least 4-9 months after resolution of major depressive disorder, followed by gradual tapering of the dosage.

Antidepressant drugs should not be stopped abruptly because of the risk for discontinuation syndrome, which is most frequently seen in patients who abruptly stop SSRIs. The most common discontinuation symptoms include dizziness, fatigue, headache, and nausea. Others include agitation, anxiety, dysphoria, and irritability. Onset is within 1-4 days of abruptly stopping antidepressant therapy or a rapid taper.

Although fluoxetine has the lowest incidence of discontinuation syndrome, therapy should always be tapered rather than abruptly stopped.

## Psychiatry 2

A 52 yo man fails to attend a scheduled appointment. He was initially evaluated for bilateral knee OA 1 year ago, and treatment with weight loss, NSAIDs, and physical therapy was recommended. Over the past year, he missed 3 scheduled appointments, did not attend PT, arrived for urgent care assessment twice requesting stronger pain medication, and did not complete sufficient trials of oral nonopioid pharmacologic agents. Attempts to reach him by phone to discuss adherence to his plan have not been successful.

The visit today was scheduled to discuss the difficulties in his treatment and assess his barriers to care. History is significant for bipolar disorder, but in past visits, he has not appeared manic or suicidal.

# Psychiatry 2 continued

Which is the most appropriate management?

- A Refer him to a psychiatrist
- B Report him to the local mental health crisis team
- C Send him a letter warning the relationship may be terminated
- D Terminate the relationship immediately

- **C Send him a letter warning the relationship may be terminated**

## Psychiatry 2 continued

The best option is to send a formal, written warning informing him that the patient-physician relationship may be terminated unless he is able to meaningfully participate in the plan of care. Patient-physician relationships are formed on the basis of mutual agreement. Rarely, the relationship fails to reach mutual goals and becomes unproductive. In some cases, the patient may not adhere to recommended therapies or may demonstrate inappropriate behavior with the physician or staff, and it may be appropriate to terminate the relationship.

After reasonable attempts to resolve differences have failed, he should be notified in writing that the relationship has been terminated and that care should be obtained from a different source, usually with a several-week time frame for the patient to continue receiving urgent care.

## Psychiatry 2 continued

Terminations should occur only if the patient is medically stable and when alternative care is available, but if a patient threatens staff, termination may be immediate.

Although a psychiatrist might provide interventions to help him better adhere to recommendations, such a referral is unnecessary in making a decision to terminate an ineffective patient-physician relationship.

This patient has not shown signs of an unstable mental health condition that warrants intervention by a crisis team.

Patient abandonment is unethical and may be a cause for legal action. In this case, he has not yet received a formal warning that his failure to adhere to treatment goals may result in termination, therefore, he should not be released from the practice immediately.

# Psychiatry 3

A 47 yo woman is here for follow-up for major depressive disorder that was diagnosed 2 months ago. At the time, she reported a 4 month history of anhedonia, depressed mood, decreased energy, insomnia, and weight loss. Her PHQ-9 score was 14, indicating moderate depression. She was prescribed sertraline, and her symptoms improved; her PHQ-9 is now 9 (mild). However, she is distressed because she has had anorgasmia since starting sertraline.

Which is the most appropriate next step?

- A Continue sertraline and initiate CBT
- B Discontinue sertraline and initiate bupropion
- C Discontinue sertraline and initiate paroxetine
- D Discontinue sertraline and refer for ECT

- **B Discontinue sertraline and initiate bupropion**

# Psychiatry 3 continued

CBT or a 2<sup>nd</sup>-generation antidepressant are both appropriate first choices for major depressive disorder. Side effects, comorbid conditions, and cost are important considerations in the selection of therapy for a patient with depression. The most widely prescribed antidepressants are SSRIs which have excellent safety profiles compared with TCAs, but adverse sexual side effects (reduced libido, anorgasmia, or delayed orgasm) are common.

Bupropion is an appropriate substitute for those experiencing sexual side effects with a SSRI because it is effective and has a low rate of sexual side effects. Bupropion can also be added to SSRI therapy to reduce SSRI-induced sexual side effects, but note bupropion is contraindicated in patients with seizure disorders. Substituting CBT for SSRI in a patient experiencing sexual side effects is also acceptable.

## Psychiatry 3 continued

The addition of CBT to antidepressant is reasonable for depression that does not respond to 1<sup>st</sup>-line therapy, but this patient has responded to treatment, and the addition of CBT without stopping sertraline will not affect the sexual side effects.

In patients who develop sexual side effects with one SSRI, there is substantial risk for similar problems with all SSRIs. In fact, paroxetine has the highest rate of of all SSRIs making this a poor choice.

Electroconvulsive therapy (ECT) is appropriate for treatment-resistant depression, but she is responding to 1<sup>st</sup>-line therapy; therefore ECT is not appropriate.

# Psychiatry 4

A 42 yo woman is approaching discharge from hospital for alcohol withdrawal. She has had severe alcohol use disorder for several years but says she is willing to do whatever it takes to quit. History is also significant for HTN and CKD. Medications are amlodipine and chlorthalidone.

Exam, including vitals, is normal. CBC and CMP are normal. eGFR is 50 mL/min/1.73 m<sup>2</sup>.

Which is the most appropriate treatment?

- A Acamprosate
- B Chlordiazepoxide
- C Disulfiram
- D Naltrexone

- **D Naltrexone**

# Psychiatry 4 continued

Recent developments in treatment of alcohol use disorder focus on modifying the reinforcing effects of alcohol use. Physicians underprescribe medications to treat alcohol use disorder and prevent relapse, despite demonstrated efficacy. This patient, with HTN and stage 3 CKD, would likely benefit most from naltrexone. Available in both oral and long-acting injectable forms, naltrexone has been associated with a substantial decrease in 30-day readmission and ED visits when prescribed at the time of hospital discharge. Multiple systematic reviews and meta-analyses of clinical trials have found naltrexone to reduce alcohol consumption vs placebo.

Naltrexone carries risk for hepatotoxicity, for which patients should be monitored; however, this is rare with the dosages use for alcohol use disorder. Because naltrexone is an opioid receptor antagonist, opioids are contraindicated while taking naltrexone. Caution should also be used in patients with depression due to increased suicidal ideation.

# Psychiatry 4 continued

Acamprosate is FDA approved for the maintenance of abstinence in alcohol use disorder. It likely works through the NMDA receptor to modulate GABA and glutamate levels. In moderate kidney disease, dosage should be adjusted; acamprosate is contraindicated with severe kidney disease (eGFR < 30). Recently, conflicting evidence regarding its effectiveness has been published, with some studies finding it is no more effective than placebo. Although methodology may explain these discrepant results, many experts now prefer naltrexone in those without contraindications. Additionally, the t.i.d. regimen can hinder adherence to acamprosate.

Although chlordiazepoxide can be used to treat alcohol withdrawal, it is not indicated for relapse prevention because of its addiction potential and ineffectiveness.

Disulfiram inhibits acetaldehyde dehydrogenase, causing buildup of aldehyde after alcohol consumption; the associated flushing, nausea, and vomiting act as a deterrent to further use. Unlike naltrexone and acamprosate, disulfiram does not directly diminish the urge to drink, but is an aversion therapy and is now considered 2<sup>nd</sup>-line treatment.

# Miscellaneous 1

A 46 yo woman is evaluated for knee pain. Seven months ago, she underwent sleeve gastrectomy for obesity. Before the procedure, her BMI was 36. She recently initiated a running program to enhance her weight loss and is now experiencing knee pain, which she treats with ibuprofen PRN. History is significant for HTN, obesity, and T2D. Medications are atorvastatin, ibuprofen, lisinopril, and metformin.

On exam, BP 118/64, other vitals are normal. The knee is tender with compression of the patella. There is not joint instability or tenderness along the medial or lateral joint lines.

Which of the following medications should be discontinued?

- A Atorvastatin
- B Ibuprofen
- C Lisinopril
- D Metformin

• **B Ibuprofen**

## Miscellaneous 1 continued

She likely has patellofemoral pain syndrome, which is characterized by anterior knee pain that is usually gradual in onset and worsens with running, prolonged sitting, and climbing stairs. Applying direct pressure to the patella with the knee extended reproduces the pain. Treatment generally includes activity modification and physical therapy. NSAIDs, acetaminophen, bracing, and patellar taping all have limited efficacy.

Additionally, the use of NSAIDs post-bariatric surgery is associated with increased risk for internal bleeding; bleeding risk is increased at anastomotic sites and staple/suture lines in the early postop period, with increased risk of marginal or gastric ulceration in the later postop period.

## Miscellaneous 1 continued

This patient with CV risk factors meets the criteria for moderate-high intensity statin therapy and should continue atorvastatin. There is no association between statins and adverse events post-bariatric surgery.

BP and glucose intolerance may decline post-bariatric surgery such that antihypertensive and antidiabetic agents need to be reduced/stopped. Close post-op BP and glucose monitoring is recommended. The BP here is appropriate on the current dose of lisinopril and hypoglycemia is unlikely with metformin so these do not need to be discontinued.

## Miscellaneous 2

A 47 yo man is evaluated for 2 days of cough productive of small amounts of yellow sputum, as well as sinus congestion, frontal headache, rhinorrhea, and malaise. He has had no fever, chest pain, or dyspnea. History is otherwise unremarkable.

On exam, vitals are normal. There is tenderness over the maxillary sinuses bilaterally. The nasal mucosa is diffusely edematous with moderate amounts of clear discharge. Pharyngeal exam reveals erythema without tonsillar exudate. The TMs appear normal and there is no cervical LAD. The remainder of the exam is normal.

Which is the most appropriate treatment?

- A Amoxicillin
- B Codeine
- C Inhaled albuterol
- D Intranasal fluticasone

- **D Intranasal fluticasone**

## Miscellaneous 2 continued

Acute cough due to acute rhinosinusitis should be treated with an intranasal glucocorticoid, such as fluticasone. Most URIs are caused by viruses and resolve spontaneously within a few days. Patients without clear evidence of bacterial infection should be treated symptomatically. A meta-analysis found that intranasal glucocorticoids increased the rate of symptom response vs placebo, with higher doses offering greater relief.

Analgesics may relieve pain. Only limited evidence supports saline irrigation in the relief of nasal symptoms; careful attention should be paid to the use of sterile or bottled water. 1<sup>st</sup>-generation antihistamines may help dry nasal secretions; however, evidence supporting their efficacy is lacking, and sedation is common. Decongestants are of possible benefit with Eustachian tube dysfunction but should be used with caution in elderly patients and those with CV disease, HTN, angle-closure glaucoma, or bladder neck obstruction.

## Miscellaneous 2 continued

Empiric URI symptom treatment with antibiotics is ineffective, increased antibiotic resistance, and may cause multiple adverse effects, including C diff colitis. Antibiotics should be reserved for symptoms lasting > 10 days, worsening symptoms after initially improving viral illness, severe symptoms of fever >39 C with purulent nasal discharge or facial pain for > 3 consecutive days.

A systematic review found centrally (codeine, dextromethorphan) or peripherally (moguisteine) acting antitussives are generally ineffective.

Inhaled albuterol is indicated for patients with wheezing which he doesn't have. For post-infectious airway hyperreactivity with a subacute or chronic cough, asthma therapies are beneficial.

## Miscellaneous 3

A 31 yo woman requests genetic testing for Huntington disease. She has a close friend who recently had a positive genetic test result for the *huntingtin* gene mutation, and she would like to undergo testing for assurance that she is not affected. She is asymptomatic. History is unremarkable and she takes no medications.

On exam, vitals are normal. Neurologic exam and the remainder of the exam are normal.

Which is the most appropriate management?

- A Brain MRI
  - B Obtain a 3-generation family history
  - C Perform genetic testing
  - D Refer for genetic counseling
- 
- **B Obtain a 3-generation family history**

## Miscellaneous 3 continued

Obtaining a family history is an inexpensive and important risk assessment tool that allows clinicians to identify persons at risk for developing certain conditions. < 40 % of genetic risk factors that would otherwise be missed can be detected with a family history. Features that suggest an inherited condition include earlier onset than usually expected; 2 or more relatives with the same disorder (especially if the disease uncommon or known to be caused by a mutation); and the presence of disease in the less-often-affected gender (e.g. male breast cancer).

Although Huntington causes various abnormalities on MRI, including cortical atrophy and ventriculomegaly, obtaining MRI in this patient given the absence of deficits.

## Miscellaneous 3 continued

Genetic testing should be for those at increased risk of developing a disease who have received appropriate counseling. Presymptomatic testing raises many ethical questions, and the results also affect the other family members. Testing can lead to possible discrimination involving disability, life and long-term care insurance.

Genetic counseling is indicated for all patients for whom genetic testing is being considered. The basic components are education on the condition being tested; the risks/benefits of knowing the result; alternatives to testing, including the option to forgo; and the implications to family members and future offspring. Referral would be indicated if the family history was positive and the patient still wished to consider testing.

## Miscellaneous 4

A 67 yo woman with multiple myeloma is evaluated for back pain that began several months ago but has dramatically worsened in the past 2 weeks. It is in the lumbar and thoracic spine with associated paraspinal muscle spasms. The pain does not radiate into the buttocks or legs, and there has been no change in gait/bowel/bladder function. She rates it 8/10 at worst. History is significant for myeloma and ESRD on hemodialysis. Medications are acetaminophen, amlodipine, aspirin, metoprolol, sertraline, bortezomib, dexamethasone, and lenalidomide.

On exam, vitals are normal. Palpation elicits tenderness over the thoracic and lumbar spine. The abdomen is not distended, and there is no palpable mass. Neurologic exam is normal.

Restaging CT from 2 months ago revealed lytic lesions in the lumbar spine and left iliac crest. Spine MRI is scheduled.

## Miscellaneous 4 continued

Which is the most appropriate treatment of her pain?

- A Fentanyl patch
  - B Gabapentin
  - C Hydromorphone
  - D Morphine
  - E Tramadol
- 
- **C Hydromorphone**

## Miscellaneous 4 continued

Her back pain is caused by progressive myeloma, and she requires rapid treatment with oral opioids initially. Given the concerns for worsening back pain in the setting of malignancy, she requires an urgent MRI spine to exclude impending malignant cord compression. Aggressive pain treatment while pursuing a diagnostic strategy is critical. Hydromorphone is a potent opioid agonist thought to be safer with severe renal impairment and dialysis.

A transdermal fentanyl patch is an effective analgesic for opioid-tolerant patients. It does not have clinically relevant active metabolites that would accumulate in ESRD; however, it should not be used in the opioid-naïve. Her total daily opioid needs should be identified before she is started on an equianalgesic dose of long-acting fentanyl.

## Miscellaneous 4 continued

Gabapentin binds to voltage-gated calcium channels; it can be an effective non-opioid adjuvant in the treatment of various pain types, including neuropathic pain. Titration can be prolonged to avoid adverse effects; therefore, it would not be helpful in a patient needing rapid analgesia.

Morphine is a prototypical opioid agonist, but its active metabolites accumulate in kidney failure and increase the risk for adverse neuroexcitatory effects with aggressive titration. Morphine, codeine, and meperidine are all contraindicated for GFR <30.

Tramadol is a weak opioid agonist whose analgesic activity is influenced by its inhibition of serotonin and norepinephrine reuptake. It is a poor analgesic for cancer-related pain and also has accumulation of active metabolites with kidney failure. It also has potential for significant drug interactions.

## Miscellaneous 5

A 64 yo man is evaluated for 5 years of intermittent erectile dysfunction. He experiences nocturnal and early-morning penile tumescence, and he is able to achieve and maintain an erection sufficient for sex approximately 50 % of the time. History is significant for CAD, depression, HL, HTN, OSA, PVD, and T2D. Medications are aspirin, atorvastatin, isosorbide mononitrate, lisinopril, metformin, metoprolol, and sertraline. He does not use CPAP.

On exam, all vitals are normal. BMI is 26. He has normal body hair growth and pattern, normal testicular size, and no gynecomastia.

8 am serum fasting total testosterone is 380 ng/dL (13.2 mmol/L).

# Miscellaneous 5 continued

Which is the most appropriate treatment?

- A Alprostadil
  - B Psychotherapy
  - C Sildenafil
  - D Testosterone gel
- 
- **B Psychotherapy**

# Miscellaneous 5 continued

He has a history of depression, which can predispose to intermittent ED. Given that he can still achieve an erection 50 % of the time and has nocturnal tumescence, ED secondary to his medical comorbidities or medications is far less likely. He likely has situational or mood-related ED and CBT, biofeedback, and sensory awareness exercises can be beneficial.

Alprostadil is 2<sup>nd</sup>-line therapy as it requires routine intracavernous or transurethral injections, or transurethral suppositories. For many, this is poorly tolerated. With depression and intermittent ED, Alprostadil would not be recommended before psychotherapy, which is much better tolerated.

Sildenafil and other oral PDE-5 inhibitors are considered 1<sup>st</sup>-line medical therapy for ED. However, sildenafil is contraindicated with nitrates, as here.

Testosterone supplementation is recommended only with confirmed symptomatic androgen deficiency. He has normal total testosterone and no alterations in secondary sexual characteristics, which makes clinically relevant androgen deficiency unlikely. Testosterone should also be avoided with untreated OSA.

## Miscellaneous 6

A 52 yo man is evaluated for substernal chest pain. It is not consistently associated with exertion, nor is it always relieved by rest; it sometimes occurs when he is eating or anxious. He has a 30-pack-year smoking history, but quit 2 years ago. History is significant for HTN and HL, for which he takes lisinopril and rosuvastatin.

On exam, vitals and CV exam are normal. ECG reveals LVH with associated ST-T wave changes, unchanged from 2 years ago.

His pretest probability of ischemic CAD is estimated to be 50%.

Treadmill stress echo is performed. This has a positive likelihood ratio of 10.0 and negative likelihood ratio of 0.1.

The stress test is positive.

## Miscellaneous 6 continued

Which best approximates his posttest probability of ischemic CAD?

A 65 %

B 75 %

C 85 %

D 95 %

• **D 95 %**

# Miscellaneous 6 continued

Likelihood ratios (LR) are a statistical indicator of how much the result of a test will increase/decrease the pretest probability of a disease. LRs may be determined from the sensitivity and specificity of a test, and separate LRs are calculated for positive (LR+) or negative (LR-) results.

Although very specific posttest probabilities may be found using a nomogram, a rule of thumb is LR+ values of 2, 5, and 10 correspond to an increase in disease probability of 15 %, 30 %, and 45 %, respectively.

His pretest probability is estimated to be 50 % based on clinical variables. The LR+ for a positive treadmill stress echo is 10 so the likelihood of disease increases by ~45 %, leading to a posttest probability ~95 %; very useful for clinical decision-making!

If the test had been negative, LR- values of 0.5, 0.2, and 0.1 correspond to decreases in disease probability of 15 %, 30 %, and 45 %.

Hence, tests with LRs between 0.5 and 2 do NOT alter the pretest probability significantly, irrespective of result, and knowing the LR of a test may help select a study that will add useful information to the diagnostic process.

## Miscellaneous 7

A 50 yo woman is evaluated in hospital following a NSTEMI treated with DES. She is currently asymptomatic. History is significant only for HTN. Medications are clopidogrel, aspirin, lisinopril, and metoprolol.

Exam, including vitals, is normal. BMI is 29.

Labs:

Total cholesterol	239	mg/dL
LDL	155	mg/dL
HDL	45	mg/dL
Triglycerides	195	mg/DI

## Miscellaneous 7 continued

Which is the most appropriate additional test before initiating high-intensity statin therapy?

- A ALT
- B ALT and CK
- C CK
- D No further testing

- **A ALT**

## Miscellaneous 7 continued

She has clinical atherosclerotic CV disease and meets the criteria for high-intensity statin for secondary prevention of CV events. When statins are being considered, an initial fasting lipid panel is recommended. A lipid panel should be repeated 4-12 weeks after initiating therapy to determine adherence and response.

Because statins may infrequently cause liver dysfunction, the 2013 ACC/AHA cholesterol guideline recommends measuring ALT at baseline before initiating. Further hepatic monitoring is unnecessary if baseline ALT is normal, unless symptoms of liver dysfunction develop.

In those at risk for adverse muscle events due to personal history of muscle disease, current muscle symptoms, or concomitant drug therapy that might increase risk for myopathy, it is reasonable to obtain a CK before beginning a statin, but routine baseline measurement is not recommended.

## Miscellaneous 8

A 49 yo woman is evaluated for a 3-year history of pelvic pain. An extensive evaluation has not found a clearly defined pathophysiologic or anatomic cause, and therapy has been targeted to general pain management lately. She has been a willing and cooperative participant in biofeedback, CBT, PT, hypnosis, acupuncture, meditation, and stress-reduction techniques, without significant relief.

The pain has not responded to multiple trials of nonopioid analgesics and antidepressants, and she has tried oral tapentadol and tramadol, which were also ineffective. She currently takes acetaminophen and gabapentin. History is significant for HTN and ESRD for which she is on hemodialysis. Other medications are metoprolol succinate (XL), amlodipine, IV iron, and erythropoietin.

## Miscellaneous 8 continued

Which is the most reasonable treatment option for her chronic pain?

- A Oral immediate-release morphine sulfate
- B Oral medical cannabis oil
- C Oral methadone
- D Topical lidocaine

- **B Oral medical cannabis oil**

# Miscellaneous 8 continued

A trial of oral medical cannabis oil would be reasonable. Although classified as a scheduled agent by the federal DEA, it has been approved by many states for chronic pain. Current data on its effectiveness are characterized by significant heterogeneity in both study populations and preparations, but recent systematic reviews have demonstrated that cannabis has some efficacy for chronic noncancer pain. Only 2 cannabinoid drugs (dronabinol and nabilone) are licensed in the US, and both are only available in oral form. The pharmacokinetics of oral cannabis differ greatly from smoked cannabis, which has varying implications.

Oral cannabis has slow onset of action but produces more pronounced, and often unfavorable, psychoactive effects that last much longer than those experienced with smoking. Smoked cannabis is quickly absorbed into the blood and the effects are immediate. However, examining its effects can be difficult because the absorption and efficacy depend on subject familiarity with smoking and inhaling.

## Miscellaneous 8 continued

This patient with ESRD has a complex pain syndrome that is unresponsive to multiple nonpharmacologic and nonopioid trials. If she resides in a state where medical cannabis is available, oral cannabis oil would be a reasonable option.

Oral immediate-release morphine sulfate should be avoided in ESRD because it could cause opioid-induced neurotoxicity with repeated use.

Oral methadone is a potent opioid agonist and NMDA receptor antagonist. Its complex pharmacokinetics and variable half-life restrict its general use, and it should not be prescribed by clinicians who lack experience with it.

Topical lidocaine does not penetrate into the deep myofascial tissues and would not be effective for pelvic pain.



# Questions & Discussion