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United States Medical Licensing Step 3

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QUESTION 1

A 23-year-old pregnant woman with type 1 diabetes was admitted to the Obstetrics service for DKA. The DKA was appropriately treated and has resolved. You were consulted for medical management of the diabetes, as her sugars have been labile throughout the hospital stay. Your history and review of records reveals that the patient has a long-standing history of noncompliance with diet and medication regimens. She currently uses any insulin she can get and does not eat regular meals. She has fluctuating blood sugars with episodes of hypoglycemia. You counsel the patient extensively, order nutrition and diabetic teaching consults, and discuss keeping home glucose logs. Assuming the patient will follow your advice, which regimen would you recommend to minimize fluctuating glucose readings?

- A. NPH insulin twice daily
- B. insulin glargine once daily and insulin lispro before meals
- C. Humulin 70/30 twice daily
- D. NPH twice daily and regular insulin three times daily with meals
- E. insulin glargine twice daily

Correct Answer: B Section: (none)

Explanation:

See Table below for onset, peak, and duration of the various types of insulin.

Insulin type	Onset	Peak	Duration
NPH	1–3 h	4–9 h	12–16 h
Regular	30–45 min	2–4 h	5–7 h
Lente	1–2 h	6–8 h	12–18 h
Ultralente	2–4 h	8–14 h	18–24 h
Lispro or Aspart	2–10 min	1.5–2.5 h	4–5 h
Glargine	1–2 h	No peaks/valleys Usually steady basal levels	18–26 h

Multiple randomized-controlled trials have shown that tight blood sugar control type I diabetics will reduce the risk of micro-and macrovascular complications, such as retinopathy, neuropathy, and cardiovascular disease. The Diabetes Control and Complications Trial (DCCT) showed that, compared with conventional therapy, intensive therapy significantly reduced the risk of retinopathy progression and clinical neuropathy. Other studies have shown that intensive therapy prevented one cardiovascular event for every 25 patients treated over a 10-year period in a relatively young group of patients. Intensive therapy is not without risk, however. The risk of severe hypoglycemia and subsequent coma or seizure was significantly higher in the intensive therapy group. Control of type I diabetes is dependent on controlling diet with regular low fat meals, keeping blood sugar logs (fasting/ preprandial and postprandial) and adherence to insulin. In type I diabetes, oral hypoglycemics are not useful, as patients have a lack of endogenous insulin production. Most oral hypoglycemic agents work either as insulin sensitizers, secretagogues, or a combination. Type I diabetics need insulin for glycemic control and for prevention of ketoacidosis. Patient acceptance and compliance is critical, for which education is key. Patients must be taught the implications of poor control, and the means to optimize control. Blood sugar testing techniques and nutrition counseling are essential features of success. Regular cardiovascular exercise is also of paramount importance. For patients with poor diet regimens, medication compliance, and blood sugar testing, a longacting agent without peaks and valleys of insulin levels would be an ideal agent for basal insulin. For patients who have no regular mealtimes and history of hypoglycemia, rapidacting insulin is

taken at the time of meals is recommended. Patients should also be taught to count carbohydrates and adjust the insulin accordingly (1 g carbohydrate = 1 unit of lispro).

Another option is to use a sliding scale for the lispro based on the premeal sugar levels (using 1 unit for every 3050 mg/dL that the blood sugar is above target). Thus, based on these recommendations, the best option for this patient would be to use insulin glargine as the basal insulin and insulin lispro at the time of meals. However, regular follow-up and compliance with lifestyle measures are key to achieve optimal short-and long-term control and reduction of complications.

QUESTION 2

While you are working in the community health center, a 40-year-old male presents to you as a referral from the dental clinic. The patient reported on the intake history form at the dental office that he had rheumatic fever at the age of 7. The dentist refused to allow him to have a dental examination and cleaning until he was cleared by a medical doctor. Other than rheumatic fever, the patient has no medical history and does not take any medications. He denies chest pain, palpitations, dyspnea, or any other symptoms. On examination, he has normal vital signs and a normal general examination. On auscultation of his heart, you hear a 2/6 systolic ejection murmur at the left upper sternal border without radiation. Review of his chart shows that he had an echocardiogram approximately 9 months ago that revealed mild mitral valve prolapse without evidence of mitral regurgitation, but otherwise normal valves and cardiac function.

Which of the following would be the most appropriate management at this time?

- A. Proceed with the dental work.
- B. Give the patient a 2 g dose of oral amoxicillin and then perform the dental cleaning an hour later.
- C. Delay the dental work until the patient can undergo a repeat echocardiogram.
- D. Delay the dental work until the patient is cleared by a cardiologist.
- E. Allow the patient to undergo the dental cleaning now, but caution that he will need antibiotic prophylaxis if he requires any fillings.

Correct Answer: A Section: (none)

Explanation: Explanations: Bacterial endocarditis is a rare, but life-threatening, disease. It occurs primarily in persons with underlying structural heart defects who develop bacteremia with organisms that are likely to cause endocarditis. Most cases of endocarditis are not a complication of invasive medical or dental procedures. Because of the risks associated with the disease, efforts should be made to prevent bacterial endocarditis when appropriate. The American Heart Association has published updated, evidence-based recommendations on the prevention of bacterial endocarditis. These guidelines are available at the American Heart Association web site (www.americanheart.org). These guidelines outline conditions for which endocarditis prophylaxis is appropriate, procedures for which endocarditis prophylaxis is necessary, and antibiotic regimens that are recommended.

Cardiac conditions are stratified into high-risk, moderate-risk, and negligible risk. Negligible risk conditions are those in which, although endocarditis may develop, the risk is no greater than in the general population. This patient has a history of rheumatic fever, which can potentially result in high-risk valvular damage. However, his echocardiogram did not reveal any such condition. Mitral valve prolapse without a regurgitant jet (which is not a complication of rheumatic fever) is considered a negligible risk condition, so the proposed dental work can proceed without delay. Of the conditions listed in question 30, only bicuspid aortic valve would require antibiotic prophylaxis, as it is a moderate-risk congenital cardiac malformation. All of the other conditions listed are considered to be of negligible risk. Procedures which require antibiotic prophylaxis are those which produce a significant bacteremia with organisms commonly causing endocarditis. For dental procedures, those that tend to cause significant bleeding from hard or soft tissues would

necessitate prophylaxis. Of the procedures listed, only dental extraction is likely to do this. During the course of other procedures, if unexpected significant bleeding occurs, antibiotics within 2 hours following the procedure would be recommended

QUESTION 3

A 60-year-old Asian male presents with early satiety and 40-lb weight loss over 3 months. Upper endoscopy shows an irregular mass in the antrum of the stomach. What can you tell him and his family about his situation?

- A. Weight loss indicates distant metastases, and surgical resection is not indicated.
- B. Antral tumors have a worse prognosis than tumors at other sites in the stomach.
- C. CT is the most effective imaging modality for determining TNM (tumor, nodes, and metastases) stage.
- D. 5-year survival for patients with gastric adenocarcinoma confined to the mucosa with no nodal metastasis approaches 90%.
- E. Chemotherapy is an effective treatment modality in stage IV gastric adenocarcinoma, with significant benefit in overall survival.

Correct Answer: D Section: (none)

Explanation:

Gastric adenocarcinoma is associated with dismal overall prognosis, with long-term survival seen only in patients with early stage disease. Surgical resection remains the mainstay of potentially curative therapy, with poor responses to chemotherapy in the majority of clinical trials. Patients often present with vague epigastric discomfort, occult GI bleeding/anemia, anorexia, weight loss, and even hematemesis/ vomiting. Patients are staged with endoscopic ultrasound, which is the most effective imaging modality for determining T and N stage. CT may also be useful for determining nodal metastases, but is more accurate for determining distant metastases (liver). Antral tumors may have a better prognosis than more proximal gastric tumors, with a decreased incidence of nodal metastases. Five-year survival rates for stage I disease is excellent, approaching 80-90% in both the Western countries and in Asia. However, 5-year survival rates are dismal for stage III and stage IV disease, and most Western series report overall 5-year survival rates for gastric cancer of 10-21%.

In contrast to gastric adenocarcinoma in the United States, the incidence of gastric lymphoma is rising. Gastric lymphoma accounts for two-thirds of GI lymphomas. Symptoms are similar to gastric adenocarcinoma, but obstruction, perforation, and massive bleeding are very uncommon symptoms. Because gastric lymphoma spreads by submucosal infiltration, mucosal biopsies at the time of upper endoscopy can often be nondiagnostic. Repeated biopsies to obtain submucosal tissue are needed to establish a diagnosis. Treatment protocols vary among institutions, but most often center on chemotherapy; surgical resection of isolated or localized gastric lymphoma can be curative, but is rarely seen. Fortunately, survival rates for gastric lymphoma are much better than those seen in gastric adenocarcinoma, with cure rates of 70% seen in patients with stage IE and IIE disease treated with chemotherapy alone.

QUESTION 4

An 86-year-old woman is brought to the emergency room by her daughter. The patient is a poor historian with limited insight. Her daughter understands that she has a history of high BP and is treated with an unknown medication. The patient has been living by herself in a retirement community. The daughter became concerned a year prior, when she noticed that her mother seemed more confused. She had attributed this to "old age," but 2 weeks ago she noticed an

abrupt worsening in her condition. Her mother now has difficulty recognizing close relatives and remembering information. For the past 2 weeks, she has been getting lost, forgetting to turn off the stove, and has been unable to bathe herself. The daughter is concerned that she may inadvertently harm herself.

Which of the following will be the most likely course of her illness?

- A. gradual improvement
- B. rapid decline
- C. stable course
- D. steady worsening
- E. stepwise deterioration

Correct Answer: E Section: (none)

Explanation:

This is a case of dementia, vascular type (multiinfarct dementia), caused by poorly controlled hypertension. Atrophy of the caudate nucleus is seen in Huntington chorea, which accounts for the movement disorder and dementia that are seen in that illness. Dilated ventricles without atrophy are characteristic of normal pressure hydrocephalus (NPH), one of the potentially reversible causes of dementia. The triad seen in NPH consists of dementia, gait disturbance, and urinary incontinence. Pick's disease is a gradually progressing dementia, displaying marked but preferential atrophy of the frontal and temporal lobes of the brain. Generalized atrophy can often be seen with neuroimaging in Alzheimer dementia. Vascular dementia classically will show lacunar infarcts of the white matter on MRI. With the exception of reversible causes (e.g., NPH, metabolic causes, or heavy metal toxicity), improvement is unusual in dementing illnesses. A rapid decline is common in dementias due to prion infection, such as Creutzfeldt-Jakob disease. Stable dementias are also unusual, most notably seen in dementia due to a head injury. Both Alzheimer's and Pick's dementias demonstrate a steady worsening of the illness over many years. The multiple small infarcts causing vascular dementia correspond to a stepwise deterioration in functioning of the patient

QUESTION 5

A 30-year-old married male with a history of depression presents to the family medicine clinic. He appears embarrassed and somewhat anxious during his appointment. He denies significant sadness or crying spells. He is sleeping adequately and eating well, without recent changes in his weight. His energy and concentration are normal, and he denies any suicidal or homicidal ideation. He claims to be compliant with his citalopram (Celexa), which he is taking for his depression, but he complains of "problems with sex."

Which of the following symptoms would this patient most likely exhibit?

- A. decreased libido
- B. painful intercourse
- C. premature ejaculation
- D. priapism
- E. retrograde ejaculation

Correct Answer: A Section: (none)

Explanation:

Many psychotropic medications, including most of the antidepressants, cause a variety of sexual dysfunction symptoms. Both painful intercourse and retrograde ejaculation are not seen with antidepressant therapy. These are usually caused by other classes of medications, medical conditions, or surgical procedures. Premature ejaculation is not caused by antidepressants and, in fact, may actually be helped by antidepressants, especially SSRIs. Priapism is an uncommon side effect seen in patients treated with trazodone and even more rarely with the other antidepressants. Decreased libido is a frequent sexual side effect seen in individuals taking antidepressants, especially SSRIs. Other sexual problems caused by these medications include decreased erection and delayed ejaculation.

Almost all of the antidepressants, including the tricyclic antidepressants such as desipramine and the monoamine oxidase inhibitors such as phenelzine, can cause sexual dysfunction. Fluoxetine is a SSRI that commonly causes sexual dysfunction. Venlafaxine is a serotonin and norepinephrine reuptake inhibitor that has also been shown to cause similar problems with sexual performance. Mirtazapine, a novel antidepressant which blocks serotonin and noradrenergic receptors, causes little to no sexual dysfunction. Bupropion has likely dopaminergic properties, and it not only causes little sexual dysfunction, but it also is used to help treat antidepressant-induced sexual dysfunction in some patients.

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