**AMERICAN COLLEGE OF CLINICAL PHARMACY**

**Updates in Therapeutics:**
**2013 Pharmacotherapy Preparatory Review and Recertification Course**

**POSTTEST ANSWERS – SESSION 4**

## Ambulatory Care

1. **Answer C:** *Not well controlled*
   Her $FEV_1$ and daytime symptoms fall under the "well-controlled" category in assessing asthma control, but the frequency of her nighttime symptoms and some limitation of activity fall under the "not well-controlled" category. When signs and symptoms fall under different categories, the most severe category should be used; therefore, she is categorized as "not well controlled." Not well controlled is if the patient has symptoms and/or short-acting β-agonist (SABA) use more than 2 days/week, nighttime symptoms one to three times/week, $FEV_1$ of 60%–80% of personal best, and/or some limitation of activity. Preexercise albuterol use does not "count" when assessing severity. There is no category of just "controlled."
   Reference:
   National Institutes of Health (NIH) National Heart Lung and Blood Institute (NHLBI). National Asthma Education and Prevention Program (NAEPP) Guidelines. NAEPP Expert Panel Report 3. NIH Publication 08-5846. July 2007. Available at www.nhlbi.nih.gov/guidelines/index.htm. Accessed September 26, 2012.

2. **Answer C:** *Discontinue fluticasone MDI and start fluticasone/salmeterol DPI 250/50 1 puff two times/day.*
   Because she is not well controlled, the recommended action is to step-up one step. She is currently on step 3, which is medium-dose inhaled corticosteroid (ICS). Step 4 preferred therapy is a medium-dose ICS plus a long-acting β-agonist (LABA). Adding a leukotriene modifier such as montelukast is an alternative (not preferred) therapy; therefore, Answer B is not the best answer because preferred therapy would be first line. Fluticasone MDI 220 mcg 2 puffs two times daily would be categorized as high-dose ICS, which is not used until step 5.
   Reference:
   National Institutes of Health (NIH) National Heart Lung and Blood Institute (NHLBI). National Asthma Education and Prevention Program (NAEPP) Guidelines. NAEPP Expert Panel Report 3. NIH Publication 08-5846. July 2007. Available at www.nhlbi.nih.gov/guidelines/index.htm. Accessed September 26, 2012.

3. **Answer B:** *Patient group B*
   He is now in GOLD risk group B (low risk, more symptoms) because of his worsening symptoms since his previous classification as risk group A. Patient groups A and B have the same $FEV_1$ categories (50% or greater of predicted) and number of exacerbations (1 or none). Patient group B has a higher symptom score than patient group A (an mMRC [Modified Medical Research Council] of 2 or greater or a CAT of 10 or greater]).
   Reference:
   Global Initiative for Chronic Obstructive Lung Disease. Global Strategy for Diagnosis, Management and Prevention of COPD. Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2013 Update. Available at www.goldcopd.org/. Accessed February 21, 2013.

4. **Answer B:** *Start tiotropium DPI.*
   The recommended treatment (first choice) for patient group B is either a long-acting anticholinergic (e.g., tiotropium) or a LABA. Inhaled corticosteroids are only recommended in patient groups C and D and are not recommended alone without a long-acting bronchodilator. This is not an acute exacerbation; rather, this has been a gradual worsening of symptoms during the past 6 months. It is not necessary to discontinue β-blockers in COPD because they do not worsen, and may even help, COPD.
   Reference:
   Global Initiative for Chronic Obstructive Lung Disease. Global Strategy for Diagnosis, Management and Prevention of COPD. Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2013 Update. Available at www.goldcopd.org/. Accessed February 21, 2013.

5. **Answer D:** *Decrease warfarin dose to 8 mg/day.*
   Her goal INR is 2–3. A recommended dosage adjustment for someone taking long-term warfarin is 5%–20% of the weekly warfarin dose. Oral vitamin K (5–10 mg) is now recommended only if the INR is greater than 10. Holding warfarin doses is generally recommended only when the INR is 4.5 or higher. This patient takes warfarin 63 mg/week. Decreasing the dose to 8 mg/day is a decrease of 11% of the weekly dose, which is within the 5%–20% range.
   Reference:
   Guyatt GH, Akl EA, Crowther M, et al. Antithrombotic Therapy and Prevention of Thrombosis, 9th ed. American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. Chest 2012;141(suppl):1S-70S.

6. **Answer A:** *No bridge therapy with low-molecular-weight heparin (LMWH) is necessary.*
   She is considered low thromboembolism risk (less than 5% the annual risk of thromboembolism) during the perioperative period. No bridge therapy is recommended for these low-risk patients undergoing surgery. If she had any risk factors for atrial fibrillation, stroke/transient ischemic attack (TIA), HTN, diabetes, CHF, or age older than 75, then she would be considered moderate thromboembolic risk, in which the decision to bridge or not to bridge is based on individual patient risk factors (risk 5%–10%). High thromboembolic risk would be either any mechanical mitral valve or an older aortic valve or recent stroke/TIA, when bridge therapy would be recommended. Prophylactic dose (Answer B) is generally not recommended for bridging, but only for postoperative venous thromboembolism (VTE) prophylaxis if there is a risk. Answer C (1 mg/kg once daily) is only for patients with CKD (chronic kidney disease) (creatinine clearance less than 30 mL/minute). Answer D would be the correct dose (1.5 mg/kg once daily) if bridge therapy with LMWH were being used.
   Reference:
   Guyatt GH, Akl EA, Crowther M, et al. Antithrombotic Therapy and Prevention of Thrombosis, 9th ed. American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. Chest 2012;141(suppl):1S-70S.

7. **Answer C:** *Tdap and MCV4*
   He should receive the Tdap and MCV4. It is recommended that all adults younger than 65 get a one-time Tdap vaccination, regardless of how much time has elapsed since their last Td. The MCV4 is recommended for first-year college students living in a dormitory, so this patient should receive it. He does not have an indication for PPSV (e.g., asthma, smoking), so it is not necessary.
   Reference:
   Centers for Disease Control and Prevention (CDC). Advisory Committee on Immunization Practices (ACIP). Recommended Immunization Schedule for Adults Aged 19 Years and Older – United States, 2013. Available at www.cdc.gov/vaccines/schedules/downloads/adult/mmwr-adult-schedule.pdf. Accessed February 5, 2013.

**Endocrine & Metabolic Disorders**

8. **Answer B:** *Liraglutide.*
   This scenario is common in which metformin no longer provides adequate glycemic control, making additional medications necessary. Although glyburide (Answer A) may provide significant A1c reduction and is inexpensive, its adverse effect profile (primarily weight gain and hypoglycemia) limits its use in this patient. Answer C, pioglitazone, is also incorrect because it, too, will likely cause an increase in weight, not a decrease. Linagliptin, Answer D, is a dipeptidyl peptidase 4 inhibitor. This class is considered neutral in its effects on weight. The class of medications with significant data showing improvements in weight in addition to improved glycemic control is the glucagon-like peptide 1 agonists. Liraglutide would be the best choice in this patient.
   References:
   
   1. Inzucchi S, Bergenstal R, Buse J, et al. Management of hyperglycemia in type 2 diabetes: a patient-centered approach. Diabetes Care 2012;35:1364-79.
   2. Garber A, Henry R, Ratner R, et al. Liraglutide versus glimepiride monotherapy for type 2 diabetes (LEAD-3 Mono): a randomised, 52-week, phase III, double-blind, parallel-treatment trial. Lancet 2009;373:473-81.
   

9. **Answer C:** *75 mcg once daily.*
   Initial doses of levothyroxine are estimated according to weight. The recommended daily requirement in otherwise healthy individuals for levothyroxine is 1.6 mcg/kg. Answer A, 25 mcg, would be appropriate for elderly patients and those with existing cardiovascular disease because too much levothyroxine in these patients could cause tachycardia or arrhythmias. Answer B, 50 mcg, is an appropriate starting dose in patients at least 50 years of age. Answer D would provide too much levothyroxine and could cause the patient to become hyperthyroid. This patient weighs 47 kg: 47 kg x 1.6 mcg/kg = 75 mcg.
   References:
   
   1. Garber J, Cobin R, Gharib H, et al. Clinical practice guidelines for hypothyroidism in adults: co-sponsored by the American Association of Clinical Endocrinologists and the American Thyroid Association. Thyroid 2012;22:1200-35.
   

10. **Answer A:** *Pioglitazone.*
    The addition of medications to metformin monotherapy that no longer controls hyperglycemia is based on several factors including degree of hyperglycemia, comorbidities, cost, and hypoglycemic risk. In this case, the A1c is not markedly elevated, and most agents should improve the patient's glycemic control. This patient has dyslipidemia, depression, and osteoporosis in addition to diabetes. The only agent listed that a clinician would use caution in initiating given these conditions is pioglitazone; it should be avoided with existing osteoporosis because of the increased risk of proximal fractures associated with its use.
    References:
    
    1. Inzucchi S, Bergenstal R, Buse J, et al. Management of hyperglycemia in type 2 diabetes: a patient-centered approach. Diabetes Care 2012;35:1364-79.
    2. Dormuth C, Carney G, Carleton B, et al. Thiazolidinediones and fractures in men and women. Arch Intern Med 2009;169:1395-402.
    

11. **Answer A:** *She has subclinical hypothyroidism, which should be treated.*
    This patient's TSH concentration is elevated well above the reference range, whereas the free T4 concentration is within normal limits. With mild symptoms of hypothyroidism, this meets the criteria for subclinical hypothyroidism. Most clinicians would treat her, ruling out Answer C. Answer B and Answer D are incorrect because this patient's symptoms and TSH concentration do not suggest

hyperthyroidism.
References:
Garber J, Cobin R, Gharib H, et al. Clinical practice guidelines for hypothyroidism in adults: co-sponsored by the American Association of Clinical Endocrinologists and the American Thyroid Association. Thyroid 2012;22:1200-35.

12. **Answer D:** *After 12 weeks of therapy and his weight is 211 lb.*
The minimal therapy duration to assess the effectiveness of an individual patient's weight loss is 12 weeks. Answer A and Answer C are too short to make a decision in this patient. A 5% weight loss is the cutoff for what would be considered successful in an individual patient. Given his baseline weight, the cutoff would be 209 lb. Answer B is incorrect because it exceeds a 5% weight loss.
References:
Qsymia. Highlights of Prescribing Information. U.S. Food and Drug Administration. Available at www.accessdata.fda.gov/scripts/cder/drugsatfda/index.cfm?fuseaction=Search.Label_ApprovalHistory#labelinfo. Accessed January 9, 2012.

13. **Answer B:** *Potassium chloride 20 mEq over 1 hour.*
This patient has hypokalemia. Although an insulin infusion is standard care for diabetic ketoacidosis (Answer A), it can exacerbate hypokalemia and should be held until potassium concentrations have been normalized. Answer C, glucagon, is incorrect because this would have exactly the opposite effect of insulin and would make the situation worse. Answer D, bicarbonate, is also incorrect. Although this patient's bicarbonate levels are low because of the acidosis, the pH is not low enough to warrant bicarbonate therapy.
References:
Kitabchi A, Umpierrez G, Miles J, et al. Hyperglycemic crises in adult patients with diabetes. Diabetes Care 2009;32:1335-43.