**Clinical Case Segment – August 2018 StuNews**

**Reviewed by the Clinical Pharmacy Challenge Oversight Panel**

History of Present Illness: A 65-year-old woman (height 152 cm, weight 85 kg) presents to the ED in atrial fibrillation (Afib) with shortness of breath, crackles on lung examination, and lower-extremity edema. She has had these symptoms for 3 days.

Past Medical History: Myocardial infarction 6 months ago, hypertension, and hyperlipidemia

Social History: 1/2 pack/day smoker; she does not drink any alcohol; she is married and has three children. She works for Macy’s as a manager. She was adopted and does not know her family medical history.

Current Medications: Aspirin 81 mg daily, lisinopril 40 mg daily, ticagrelor 90 mg twice daily, carvedilol 12.5 mg twice daily, and atorvastatin 80 mg daily

Allergies: No known drug allergies

Vital Signs: Blood pressure 185/90 mm Hg, heart rate 100–120 beats/minute; ECG reveals Afib with a QTc of 440.

Laboratory Values: K 4.5 mEq/L (4.5 mmol/L), magnesium 2.2 mEq/L (1.1 mmol/L), and SCr 1.0 mg/dL (88.4 micromoles/L). All other laboratory values are within normal limits.

Procedure Data: Transesophageal echocardiogram (TEE) reveals an ejection fraction of 20%–30% with no thrombus.

Other Data: N/A

**Question 1**

If a rhythm control strategy were selected, which medication would be most appropriate?

1. Dofetilide 500 mcg twice daily
2. Dronedarone 400 mg twice daily
3. Flecainide 300 mg 1 as needed for palpitations
4. Mexiletine 200 mg every 8 hours

Answer: 1. Dofetilide 500 mcg twice daily

Rationale: Because the patient has signs and symptoms consistent with heart failure with reduced ejection fraction and coronary artery disease, the last three options would not be ideal. The two antiarrhythmic agents most appropriate for patients with heart failure are dofetilide and amiodarone, assuming no contraindications. Mexiletine would also be better for ventricular arrhythmias.

Citation: January CT, Wann LS, Alpert JS, et al. 2015 AHA/ACC/HRS guideline for the management of patients with atrial fibrillation: a report of the American College of Cardiology/American Heart Association Task Force on practice guidelines and the Heart Rhythm Society. Circulation 2014;129:2071-104.

**Question 2**

The cardiologist has decided to proceed with electrical cardioversion during this hospitalization. Which is the best anticoagulation strategy for the patient?

1. No anticoagulation is needed before procedure; after procedure, initiate apixaban 2.5 mg twice daily and continue for a longer period (more than 4 weeks).
2. Give intravenous bolus of heparin, and initiate drip before procedure; after procedure, initiate apixaban 5 mg twice daily and continue for only 4 weeks.
3. Give intravenous bolus of heparin, and initiate drip before procedure; after procedure, initiate apixaban 5 mg twice daily and continue for a longer period (more than 4 weeks).
4. Give intravenous bolus of heparin, and initiate drip before procedure; after procedure, initiate apixaban 2.5 mg twice daily and continue for a longer period (more than 4 weeks).

Answer: 3. Give intravenous bolus of heparin, and initiate drip before procedure; after procedure, initiate apixaban 5 mg twice daily and continue for a longer period (more than 4 weeks).

Rationale: The patient has been in Afib for more than 48 hours and will undergo cardioversion. According to the AHA/ACC/HRS Afib guidelines, the patient can undergo cardioversion during this admission (vs. delaying need for full anticoagulation for 3 weeks) because the TEE did not reveal a thrombus. However, she will need some anticoagulation with heparin. Had she been in Afib for less than 48 hours, no anticoagulation would have been needed. Thus, option 1 is incorrect because her symptoms have been present for 3 days. Given the patient’s CHADS2-VASC score, she will need to be on anticoagulation beyond the 4 weeks’ post-cardioversion. A dose of apixaban 2.5 mg twice daily is recommended if patient has at least 2 of the following factors, age > 80 year, body weight <60 kg, or serum creatinine >1.5g/dL. Given her patient factors, she would qualify for apixaban 5 mg twice daily versus the 2.5-mg daily dose. Thus, options 1, 2, and 4 are incorrect.

Citation: January CT, Wann LS, Alpert JS, et al. 2015 AHA/ACC/HRS guideline for the management of patients with atrial fibrillation: a report of the American College of Cardiology/American Heart Association Task Force on practice guidelines and the Heart Rhythm Society. Circulation 2014;129:2071-104.

**Question 3**

The patient’s signs and symptoms are most consistent with what description?

1. Low cardiac output
2. Fluid overload
3. Both fluid overload and low cardiac output
4. Neither fluid overload nor low cardiac output

Answer: 2. Fluid overload

Rationale: The presenting signs and symptoms of acute decompensated heart failure are generally classified as symptoms of fluid overload or low cardiac output. Pulmonary symptoms, such as crackles and wheezing, and peripheral symptoms, such as edema and ascites, reflect systemic fluid overload. These are consistent with what this patient has. Signs of low cardiac output result in reduced end-organ perfusion, such as an elevated SCr and elevated hepatic enzymes, cool peripheries and delayed capillary refill, and/or hypotension, . The patient has none of these signs. Thus, she just has fluid overload.

Citation: Yancy C, Jessup M, Bozkurt B, et al. 2013 ACCF/AHA guideline for the management of heart failure. J Am Coll Cardiol 2013;62:e147-239.

**Question 4**

Given the patient’s presentation, which would be the best agent to manage her blood pressure?

1. Intravenous labetalol
2. Intravenous lisinopril
3. Intravenous sodium nitroprusside
4. Sublingual immediate-release nifedipine

Answer: 3. Intravenous sodium nitroprusside

Rationale: Because the patient presents with symptoms of acute heart failure (ejection fraction of 20-30%, shortness of breath, crackles, and peripheral edema) with elevated pressures, sodium nitroprusside would be best because it is a potent vasodilator. Labetalol should be avoided in acute decompensated heart failure because it can lead to further decompensation. Sublingual nifedipine can lead to symptomatic hypotension because of variable blood pressure lowering and thus should be avoided. Finally, lisinopril can only be administered orally and would not work quickly enough to provide early control of blood pressure.

Citation: Marik PE, Rivera R. Hypertensive emergencies: an update. Curr Opin Crit Care 2011;17:569-680.

**Question 5**

Your attending is debating to start a patient on a diuretic continuous infusion versus intermittent bolus dosingto increase net urine output. Based on the multicenter Diuretic Optimization Strategies Evaluation (DOSE) trial for acute decompensated heart failure results, how would you respond?

1. Pursue continuous infusion. The continuous infusion arm was associated with a statistically significant increase in net urine output compared to intermittent bolus
2. Pursue intermittent bolus dose. The intermittent bolus therapy arm was as associated with a statistically significant increase in net urine output compared to continuous infusion
3. Pursue either strategy. There was no significant difference between groups regarding net urine output
4. The trial does not help answer the question because net urine output was not an outcome of measure in this trial

Answer: 3 Pursue either strategy, There was no significant difference between groups regarding net urine output

Rationale: In the DOSE trial, the investigators observed a non-significant difference in the outcome of net daily urine output. However, they did find the continuous infusion group had greater total daily urine output and urine output per dose. Thus, the other answers would be incorrect.

Citation: Felker GM, Lee KL, Bull DA, et al. Diuretic strategies in patients with acute decompensated heart failure. N Engl J Med 2011; 364: 797-805