

## **C-06 Interpretation of Viscoelastic Assays to Evaluate and Guide Perioperative Management of Coagulopathy**

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### **Objective**

After completion of this session, the participant will be able to:

- Apply viscoelastic testing to correct coagulopathy in critical clinical settings.

### **Case Stem Question**

Part I:

A 68-year-old male is admitted from an outside hospital with an intra-aortic balloon pump in place and a systemic heparin infusion. He had collapsed at home five days ago due to sudden-onset chest pain. He has a history of coronary artery disease and drug eluting stent placed in the left anterior descending artery (LAD) three years prior, for which he was placed on clopidogrel and Aspirin, and atrial fibrillation, for which he is prescribed apixaban. The patient has not had reliable follow-up to care and it is uncertain whether he has been compliant with his medications. He was diagnosed with a NSTEMI and ischemic cardiomyopathy with ejection fraction of 20% at the other hospital, then was sent to your center for heart failure work up and surgical management.

Within 24 hours in your CCU, the patient's platelet count is noted to be 105,000 per microliter, down from the baseline of 235,000 from his initial presentation at the outside hospital.

Part II:

Your work up for heparin induced thrombocytopenia (HIT) is negative. The patient is planned to undergo coronary bypass grafting the following day and your team determines that heparin is safe for anticoagulation on pump.

The patient is brought to the OR for his revascularization. He undergoes grafting of the left anterior descending artery via left internal mammary artery, first diagonal branch and posterior descending artery with saphenous vein grafts, then is successfully weaned off of cardiopulmonary bypass. You administer 1 mg protamine per 100 units heparin given and the ACT returns at 120 sec (baseline 98 sec). At the same time, the surgery team says, "The patient seems 'oozy', please give him platelets."

Part III:

Overnight post-operatively in the CTICU, the patient's MAPs dip into the low 60's and the mediastinal drains begin putting out 100 mL/hr for the past 4 hours. CBC and coagulation studies are pending and the laboratory says they will take another 45 minutes.

## **Guiding Questions for Discussion**

### Part I:

1. What is your differential diagnosis? Which tests do you order to confirm?
2. In which pathophysiologic states is the use of a viscoelastic assay (VEA) helpful? What are the limitations of these tests?
3. Is the patient potentially taking any medications that could confound the VEA analysis results?
4. What would you expect to see on the VEA if the patient has HIT? Would this be different than if the patient's thrombocytopenia were due to destruction from shear stress and platelet deposition on the IABP? What would you expect if the patient is experiencing disseminated intravascular coagulopathy?

### Part II:

1. What differential diagnosis for the patient's coagulation status? What is your next step in management?
2. The patient's skin temperature was 35.1 at the time you drew the blood sample. Does this affect your VEA results?
3. How would you manage the patient if the alpha angle or A10 comes back thin? If the FIBTEM or functional fibrinogen test comes back low, which product(s) do you feel is appropriate to administer? If more than one, is there an order in which would you administer them?
4. How would you manage the patient if the INTEM clotting time (CT) or R time comes back prolonged?
5. What is your differential diagnosis if the HEPTTEM CT or HTEG remains prolonged? How would you go about correcting it?

### Part III:

1. What is your differential diagnosis? What would be your next step in management?
2. How would you interpret the VEA if the Lysis at 30 minutes (LY30) returns at 95%? What if the maximum lysis (ML) returns at 8%? Would you use another test to confirm these results?
3. How would you interpret the VEA if the INTEM clotting time is prolonged? How would you describe the pathophysiology if the HEPTTEM CT or HTEG is normal?

## **References**

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