

Sample Applied Exam – Hematological Pathology

Case 1

Your emergency department has just received 3 dozen cruise ship passengers with major bleeding symptoms, gingival bleeding, epistaxis, gross hematuria, bruising, and gastrointestinal hemorrhage. You also receive a phone call from the emergency physician asking for advice on laboratory testing.

Question 1

How would you approach this situation?

MODEL ANSWER

- System vs. individual patient approach (systemic resource usage, triage laboratory and transfusional resources, expertise, occupation of beds/triage physical locations)
 - Triage testing (especially if low resources) – sickest patients, patients who are pregnant (antibody testing)
- Number of passengers: about two dozen; various ages; need to identify patients who would have (pediatric vs. adult-sized draw volumes)
- Childbearing vs not: how many? (for transfusion management)
- Triage: sickest patient (bleeding/other life threatening or morbidity causing symptoms)
- Potential transfusion needs: possibly overwhelm blood transfusion services; o negative inventory; ordering from CBS/redistribution from other bloodbank inventories
- Address issues of potential specimen mixup (a lot of people in the ER)
- Address billing issues, out of province
- Pandemic planning– what if this is a hemorrhagic virus, how does the laboratory and workers protected? Would need to treat specimens in laboratory this way.
- Stat response laboratory tests for everyone
 - PTT/PT/INR, CBC
 - Type and screen
 - Fibrinogen
- Important clinical history to ask:
 - Exposures (viral, meds, toxins) – which countries travelled
 - Pregnancy



Question 2

You receive the coagulation and complete blood count results from the 3 dozen patients.

- PTT – normal in all patients
- PT – prolonged in all patients (62 to > 200 s)
- INR – prolonged in all patients (9.3 to > 20)
- Fibrinogen – normal in all patients
- CBC values - normal in all patients

What is your differential diagnosis? What laboratory tests could be done to confirm your differential diagnosis?

MODEL ANSWER

- Differential diagnosis:
 - Acquired coagulopathy
 - Superwarfarin poisoning (poisoned due to disgruntled worker on cruise ship)
 - Hemorrhagic virus
- Further lab tests:
 - Levels of Long Acting Anticoagulant Rodenticide (HPLC/mass spec for LAARs) would need to be done.
- Viral PCR – hemorrhagic fever viruses
- Factor levels (especially vitamin K coagulation factor levels) – VII, IX, X, II, C, S
- Factor V level (non-vitamin-K dependent)
- Note: factor levels are not diagnostic, but tell you that there is vitamin K action blockade.

Question 3

One of the cruise ship patients is a 28-year-old pregnant woman who is having worsening vaginal hemorrhaging. What other important questions would need to be asked in this patient?

MODEL ANSWER

- blood group and antibody screen (pending)
- CBC values
- Stage of pregnancy for RhIg administration
- Pregnancy-course related questions – first/second/etc.
- Father blood group
- Previous transfusion issues

Question 4

The patient thinks she is at 11 weeks' gestation, and it's her first pregnancy. She thinks she is O negative but is unsure; pre-transfusion testing results are still pending due to specimen backlog. Would you administer RhIg now?

MODEL ANSWER

- Wait. It will be quick to get her results back. Don't want to expose patient to more blood product.
- Can wait up to 72hours from first sign of bleeding.
- Wait for her pre-transfusion specimen result to determine her Rh(D) status.



Question 5

This pregnant patient continues to bleed and is now symptomatic with shortness of breath and chest pain. A transfusion is ordered prior to getting the pre-transfusion testing results back. What would you use to transfuse her?

MODEL ANSWER

- Uncrossmatched blood - O neg, (Kell neg, CMV neg) RBCs. No other special treatments.