Transfusion Camp 2021-2022
Day 1: Seminar 1B, September 17, 2021
Plasma, PCC & Fibrinogen Cases, Dr. Aditi Khandelwal

Case 1

A 56-year-old man (78 kg) with atrial fibrillation presents to the emergency department with acute onset of severe shortness of breath and pre-syncope with any exertion. He is on warfarin – dose has been stable for 6 months without dose adjustment. He had some chest congestion last week and went to a walk-in clinic where they prescribed Clarithromycin. Heart rate is 130 bpm and blood pressure is 80/30 mmHg. Heart sounds are faint. JVP is grossly distended. Chest-x-ray reveals marked cardiomegaly. Cardiology has been paged for STAT echo for pericardial tamponade from hemorrhage. INR is 10.5 (Normal<1.2). Patient is to undergo the life-saving procedure immediately.

1. Which one of the following is the most appropriate management strategy at this time?
   A) 1 unit of plasma, vitamin K 10 mg po
   B) 4 units of plasma, vitamin K 10 mg IV
   C) PCC 3000 IU, vitamin K 10 mg IV
   D) PCC 3000 IU, vitamin K 2 mg po

2. How fast should you run the PCCs into the patient?
   A) As fast as you can push in by syringe
   B) Each 1000 units is run over 1 minute
   C) Each 1000 units is run over 5 minutes
   D) Each 1000 units is run over 30 minutes

3. The interventional cardiologist wants to know when to expect that the INR will be normalized so that she can do the procedure. Which one of the following is true about warfarin reversal in this case?
   A) Collect the INR sample immediately after infusion, proceed with the procedure, and give additional doses of PCC if the post-infusion INR>1.5 and the patient has ongoing bleeding
   B) Recheck the INR after PCCs to determine if additional doses are required before starting the procedure
   C) The effect of PCCs will be seen immediately after administration in all patients and there is no need to recheck the INR
   D) The effect of the treatment (PCCs and vitamin K) takes 6 hours to normalize the INR, so delay the procedure for 6 hours

4. Which of the following is an appropriate indication for PCC administration?
   A) Elective reversal of oral anticoagulant therapy before a scheduled invasive procedure.
   B) Rapid reversal of warfarin therapy or vitamin K deficiency in patients exhibiting major bleeding.
   C) Reversal of warfarin therapy or vitamin K deficiency in patients requiring a surgical procedure within 12-24 hours.
   D) Treatment of INRs over 8-10 without bleeding or need for surgical intervention.

Case 2

A 15-year-old girl (45 kg) presents to the emergency department feeling unwell for 2 weeks with fever, myalgias, malaise and anorexia. She was seen today by her pediatrician who noted jaundice. He promptly sends her to a tertiary care pediatric emergency. She is noted on physical exam to have mild abdominal distention (query ascites) and splenomegaly. She has no bruising except at intravenous puncture sites. On laboratory testing she has markedly elevated liver enzymes (ALT 234, N<40), a bilirubin of 76 (N<20), albumin 24 (N>35), INR of 1.6 (N<1.2), fibrinogen of 1.2 (N>2 g/L). Her platelet count is 65 (N>150). She is seen by hepatology who recommend an urgent liver biopsy to determine the cause and severity of the liver disease. The transjugular liver biopsy is scheduled for in 4 hours. The patient has been eating a full diet for the last month.

5. Which one of the following is the most appropriate transfusion strategy in this patient in lead up to the biopsy?
   A) No need for transfusion at this time
   B) Transfuse 1000 IU of PCC and 4 grams of fibrinogen concentrate (or 10 units of cryoprecipitate in the UK)
   C) Transfuse 1 adult dose of platelets
   D) Transfuse 3 units (15 ml/kg) of plasma to ensure INR is <1.5 before the procedure

6. The radiologist refuses to perform the procedure until the INR is 1.2 or less. You should:
   A) Call your staff physician and get direction on how to proceed
   B) Delay the procedure for 1 day and see if the next radiologist with do it without plasma
   C) Page the radiologist performing the procedure to discuss the risks of plasma, explain why plasma is unlikely to lower the INR, and alert them to the 2019 Society for Interventional Radiology Guidelines
   D) Transfuse 3 units plasma to ensure the liver biopsy is done

7. The patient subsequently develops a variceal bleed with hypotensive shock. Her INR is now 3.4 (N<1.2) and fibrinogen is 1.6 g/L (N>2). You should:
   A. Transfuse 1 unit of plasma and repeat INR
   B. Transfuse 5-10 mL/kg of plasma (2 units or 500 mL)
   C. Transfuse 15 ml/kg of plasma (3 or 750 mL)
   D. Transfuse 4 grams of fibrinogen concentrate (or 10 units of cryoprecipitate in the UK)

Case 3a

A 35-year-old woman (65 kg) is admitted to the ICU from the ER with endocarditis within 4 hours of presenting to the hospital. She is not bleeding. She is intubated for airway protection and hemodynamically unstable on two inotropes. Her temperature is 39° C. Her blood work is as follows: Hemoglobin 108 g/L, platelet count 18 (N>150), INR 1.6 (N<1.2), aPTT 42 s (N<36), and fibrinogen 1.3 (N>2.0) g/L. Her peripheral blood smear shows occasional fragments (schistocytes). Blood cultures are positive for gram-positive organism in 2/2 bottles; final culture results are pending. You make the correct diagnosis of sepsis related DIC. She is not bleeding and no procedures are planned in the next 6 hours.

8. Which one of the following is the most appropriate transfusion strategy for this patient?
   - A) No transfusion indicated at this time
   - B) Transfuse 1 adult dose of platelets
   - C) Transfuse 1 adult dose of platelets and 4 units of plasma
   - D) Transfuse 1 adult dose of platelets and 4 grams of fibrinogen concentrate (or 10 units of cryoprecipitate in the UK)

Case 3b

A 17 year old female is seen in the ER with profuse vaginal bleeding and hemorrhagic shock 6 hours after a pregnancy termination. Her BP is 90/50, HR 112, temperature is 38.1° C. Her blood work is as follows: Hemoglobin 65 g/L, platelet count 28 (N>150), INR 1.4 (N<1.2), aPTT 40 s (N<36), and fibrinogen 1.1 g/L (N>2.0). Ultrasound shows retained products of conception. She is hemodynamically unstable and you have ordered 2 units of uncrossmatched (you decide it would imprudent to wait 60 minutes for crossmatched blood) O D-negative and K-negative red cells.

9. Which one of the following is the most appropriate transfusion strategy for this patient in addition to RBCs?
   - A) No transfusion indicated at this time
   - B) Transfuse 1 adult dose of platelets
   - C) Transfuse 1 adult dose of platelets and 4 units of plasma
   - D) Transfuse 1 pool of platelets and 4 grams of fibrinogen concentrate (or 10 units of cryoprecipitate)

Case 3c

A 35-year-old woman is admitted to the hematology service following a diagnosis of acute promyelocytic leukemia (APL). APL is associated with a high rate of early hemorrhagic deaths from ICH. She is afebrile with stable vital signs and her only complaints are fatigue and a petechial rash on her legs. Her blood work is as follows: Hemoglobin 74 g/L, platelet count 18, WBC 63, INR 1.4, aPTT 39 s, and fibrinogen 0.9 g/L. She is to start emergency induction chemotherapy tonight, and is not bleeding.

10. Which one of the following is the most appropriate transfusion strategy for this patient?
    - A) No transfusion indicated at this time
    - B) Transfuse 1 unit RBC and 1 adult dose of platelets
    - C) Transfuse 1 unit RBC and 4 grams of fibrinogen (or 10 units of cryoprecipitate)
    - D) Transfuse 1 adult dose of platelets and 4 grams of fibrinogen (or 10 units of cryoprecipitate)

Case 4.

You are providing the anesthetic for an 11-year-old girl undergoing scoliosis surgery with a pre-op weight of 39 kg. Pre-op blood work: hemoglobin 118 g/L, MCV 78, Platelet count 288. No INR was done pre-op as her bleeding questionnaire was negative for a bleeding history. At the 2 hour mark of the surgery, she has lost approximately 2500 mL and you have transfused 3 units of RBC. STAT blood work reveals: hemoglobin 78 g/L, PLT count 134 (N>150), INR 2.1 (<1.2), PTT 45 (N<36) and fibrinogen 1.3 (N>2). The surgeon expects to lose another 1000 mL over the next hour. You have not administered any plasma, platelets or fibrinogen yet.

11. Which one of the following is the most appropriate component strategy for this patient?
    A) Transfuse 1 dose platelets (10-15 mL/kg)
    B) Transfuse 2000 IU of PCC
    C) Transfuse 3 units (15 mL/kg) of plasma and 2 grams of fibrinogen (50 mg/kg) or 5 units of cryoprecipitate
    D) Transfuse or 2 grams of fibrinogen or 5 units of cryoprecipitate

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