Transfusion Camp for Nurse Practitioners
Materials based on Transfusion Camp 2018-2022 with permission from the Transfusion Camp Steering Committee
Afternoon Seminar on Day 1

Plasma, PCC & Fibrinogen

Case 1

A 56 year old man 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. Heart sounds are faint. JVP is grossly distended. Chest-x-ray reveals marked cardiomegaly. Cardiology has been paged for STAT echo for presumed pericardial tamponade from hemorrhage. INR is 10.5 (Normal<1.2).

1. Which one of the following is the most appropriate management strategy at this time?
    A) 2 units of plasma, vitamin K 10 mg IV
    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 can 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. It is determined that the patient needs to have pericardiocentesis. The cardiac surgeon wants to know when to expect that the INR will be normalized so that he 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 to the OR, and give additional doses of PCC intra-operatively if 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 surgery if possible

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

Case 2

A 15 year old 45 kg girl presents to the emergency department feeling unwell for 2 weeks with fever, myalgia, malaise and anorexia. She was seen today by her pediatrician who noted jaundice. He promptly sent her to the Hospital for Sick Kids 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), and INR of 1.6 (N<1.2). 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 liver biopsy is scheduled for in 4 hours.

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
    C) Transfuse 1 pool of platelets
    D) Transfuse 3 units of plasma to ensure INR is <1.5

6. The radiologist refuses to perform the procedure until the INR is 1.3 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 and explain why plasma is unlikely to fully correct the INR
    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). You should:
    A. Transfuse 1 unit of plasma and repeat INR
    B. Transfuse 5-10 mL/kg of plasma (1-2 units for 250-500 mL)
    C. Transfuse 15 ml/kg of plasma (3-4 units or 750-1000 mL)
    D. Transfuse 10 units of cryoprecipitate

Case 3a

35 year old 65 kg female 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.

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 pool of platelets
    C) Transfuse 1 pool 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 3b

17 year old female is seen in the the ER with profuse vaginal bleeding 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 O negative blood.

9. Which one of the following is the most appropriate transfusion strategy for this patient?
    A) No transfusion indicated at this time
    B) Transfuse 1 pool of platelets
    C) Transfuse 1 pool 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*

You are seeing a 67 year old female who is hemodynamically stable on the medical ward. She has a Hb of 95 g/L and otherwise her CBC is within normal limits. Her INR is 1.6 and she weighs 67 kg. She has had hematochezia and coffee-ground emesis over the past two days after admission. Her admission Hb was 110 g/L. Her past medical history is consist with a presumed diagnosis of alcoholic cirrhosis, though there are plans to confirm this during admission.

10. What represents the best transfusion strategy for this patient?
    A) Transfusing 1 unit of packed RBCs
    B) Transfusing PCCs appropriate to her weight and INR
    C) Transfusing 1 unit of packed RBCs and 3 units of frozen plasma
    D) Observing until her hemoglobin drops below 70 g/L or becomes symptomatic before transfusion

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