

**Transfusion Camp for Nurse Practitioners**  
**Materials based on Transfusion Camp 2018-2022 with permission from the Transfusion Camp Steering Committee**  
**Morning Seminar on Day 3**

**Bleeding Assessment and Anticoagulants/Antiplatelets**

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**Case 1**

You are seeing a 52-year-old woman for elective hip replacement. Past medical history is significant for hypertension. When asked about other comorbidities, the patient casually notes that she had some bleeding in the past, but does not think it was really unusual or severe. Her current medications are hydrochlorothiazide and a daily multivitamin. She has two children.

- 1) Which one of the following is the appropriate next step in perioperative bleeding risk assessment?
  - A. Ask about family history of bleeding disorders
  - B. Check labs: INR, aPTT, CBC
  - C. No further assessment required, patient is ok to proceed to OR
  - D. Take more thorough history of bleeding symptoms

\*\*\*Spoiler alert (reading ahead may provide answers to earlier questions)\*\*\*

Her comprehensive bleeding history is as follows 1) tonsillectomy age 7: required return to OR at 24 hours for surgical hemostasis and 1 unit transfusion RBCs; 2) G3A1L2: prolonged bleeding following spontaneous pregnancy loss at 13 weeks and required D&C and IV iron; and 2 uncomplicated C sections. Currently post menopause. Previously menstrual cycles were regular and lasted for 7 days with 3 heavy days where she changed pads every 2 hours. She feels that this history is not unusual since her mother and sisters had similar problems. Despite her mother and sisters having similar bleeding symptoms, no one in her family has been assessed for a bleeding disorder.

- 2) Which one of the following is the appropriate next step in patient management?
- A. Book OR, note need for careful surgical hemostasis
  - B. Check labs: FVIII, FIX
  - C. Check labs: von Willebrand Factor multimer analysis
  - D. Refer to a hematologist

\*\*\*Spoiler alert (reading ahead may provide answers to earlier questions)\*\*\*

The patient is assessed by a hematologist. Initial laboratory investigations reveal the following:

- CBC within normal limits
- INR, aPTT within normal limits
- von Willebrand Factor antigen 0.28 u/mL (N=0.45-1.80)
- von Willebrand Factor activity 0.30 u/mL (N=0.45-1.80)
- FVIII 0.45 u/mL (N=0.5-1.49)

3) The patient's history and lab findings are consistent with von Willebrand's disease type 1 (VWD). Why did she not experience bleeding with her two Cesarean sections?

- A. Cesarean sections are low risk for bleeding and excessive hemorrhage would not be expected in a patient with a non-severe bleeding disorder
- B. During pregnancy there is a compensatory increase in factors IX and XI which help mitigate bleeding at delivery
- C. Von Willebrand Factor levels are hormone-responsive and increase with pregnancy and use of hormone-containing medications
- D. The patient received oxytocin which is known to increase levels of von Willebrand factor

4) Following consultation with a hematologist, the patient still wishes to proceed with hip replacement. Which one of the following is **false** about peri-operative management of this patient?

- A. According to international guidelines, her surgery should be done early in the day and early in the week at a hemophilia treatment centre
- B. As her von Willebrand factor levels and FVIII levels are both decreased, she will require factor replacement with two different products
- C. She will need factor concentrate infused before surgery and again in the post-operative period
- D. She should receive DVT prophylaxis

## Case 2

A 24-year-old male is scheduled for aortic valve replacement. Past medical history is significant for bicuspid aortic valve and only medication is Enoxaparin 40 mg daily for DVT prophylaxis (started on admission). Pre-operative testing shows APTT is 45 seconds (N= 26 to 35 seconds). A repeat test confirms the same PTT.

The resident on call remembers transfusion camp and completes a comprehensive bleeding assessment. MCMDM-1 Bleeding Questionnaire score is 0 (including no bleeding following wisdom teeth removal). They consult hematology for additional recommendations.

- 5) You are rotating through general hematology. Which one of the following represents the best next step?
- A. Stop Enoxaparin and repeat testing in 1 day
  - B. Administer vitamin K 10 mg and repeat testing in 1 day
  - C. Order 50:50 mixing study
  - D. No further testing is required as the bleeding score is 0

\*\*\*Spoiler alert (reading ahead may provide answers to earlier questions)\*\*\*

A 50:50 mixing study is done and does not correct.

- 6) Which one of the following is most likely to confirm a diagnosis?
- A. Fibrinogen level
  - B. Factors VIII and IX
  - C. Lupus anticoagulant (non-specific inhibitor) testing
  - D. Factor VIII inhibitor test

### Case 3

A 65 year old female is in the preoperative clinic in preparation for surgery for a left knee arthroplasty. She had an idiopathic DVT 1 year ago, requires indefinite anticoagulation and is taking Rivaroxaban 20 mg daily. She has hypertension and is taking ASA daily for primary prophylaxis of cardiovascular events, mild renal insufficiency (creatinine clearance 60 ml/min) secondary to hypertension and has mild hepatic dysfunction secondary to NASH (PT, APTT are normal). BMI is 30 kg/m<sup>2</sup>.

7. Which one of the following is known to increase this patient's risk of peri-operative bleeding?

- A. She is taking ASA 81 mg daily for primary prophylaxis
- B. She has mild renal insufficiency secondary to hypertension
- C. She has mild hepatic dysfunction secondary to NASH
- D. She has a BMI of 30 kg/m<sup>2</sup>

8. Which one of the following is the recommended strategy for pre-operative management of her anticoagulation?

- A. Discontinue Rivaroxaban last dose 5 days pre-op, bridge with heparin
- B. Discontinue Rivaroxaban last dose 4 days pre-op, no bridging needed
- C. Discontinue Rivaroxaban last dose 3 days pre-op, no bridging needed
- D. Discontinue Rivaroxaban last dose 2 days pre-op, no bridging needed

9. The patient's surgery is uneventful, with minimal intra-operative blood loss. She has achieved hemostasis. Which one of the following is the recommended strategy for post-operative anticoagulation in this patient?

- A. Resume Rivaroxaban at usual dose on day 2 post op if no evidence of bleeding
- B. Resume Rivaroxaban at usual dose when there is no evidence of bleeding
- C. Resume Rivaroxaban at prophylactic dose on day 1 post operatively
- D. Resume Rivaroxaban at prophylactic dose when there is no evidence of bleeding

10. 72 hours after surgery, you are called as it has been discovered that instead of the 20 mg of rivaroxaban she has been administered 20 mg bid for 2 days. The PT is 20 seconds (9.7-11.8) and APTT is 45 seconds (20-32). Which one of the following is an appropriate management plan?

- A. Assess patient and order CBC, creatinine, determine the creatinine clearance, if no evidence of bleeding no need for any change in management
- B. Assess patient and order CBC, creatinine, determine the creatinine clearance, if no evidence of bleeding hold rivaroxaban for 24 hours and then resume
- C. Assess patient and order anti-Xa level, if supratherapeutic anti-Xa level, hold rivaroxaban for 24 hours
- D. Use another anticoagulant

11. Alternate ending: 72 hours after surgery, you are called as it has been discovered that instead 20 mg of rivaroxaban she has been administered 20 mg bid for 2 days. The PT is 20 seconds (9.7-11.8 s) and APTT is 45 seconds (20-32). She begins to have hematemesis and is hypotensive (60/30 mm Hg). You aim to maintain hemoglobin > 70 g/L while bleeding and consult for endoscopic management. Which one of the following is an appropriate management plan?

- A. If rivaroxaban given within last 2 hours consider charcoal to remove the drug, administer tranexamic acid 1 g iv then 1 g iv over 8 hours, administer prothrombin complex concentrate (PCC) 25 U/kg maximum 3000 U iv or according to hospital policy.
- B. If rivaroxaban given within last 2 hours consider dialysis to remove drug, administer tranexamic acid 1 g iv administer PCC 25 U/kg maximum 3000 U iv or according to hospital policy.
- C. If rivaroxaban given within 7 hours, administer andexanet alfa.
- D. If rivaroxaban given within 6 hours, give frozen plasma to reverse anti-coagulant effect.

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