



**Transfusion Camp, University of Toronto  
Seminar Day 4, March 25 2022  
Advanced Hemostasis and Testing, Dr. Eric Tseng**

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**Case 1**

A 65 year old male is in the preoperative clinic in preparation for surgery for radical prostatectomy. He had an idiopathic DVT 1 year ago, requires extended duration anticoagulation and is taking Rivaroxaban 20 mg daily. He has hypertension, mild renal insufficiency (baseline creatinine of 115  $\mu\text{mol/L}$ ) secondary to hypertension and has hepatic dysfunction secondary to NASH. His weight is 75 kg..

1. 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
2. The patient's surgery is uneventful, with minimal intra-operative blood loss. He has achieved hemostasis. Which one of the following is the recommended strategy for post-operative anticoagulation in this patient?
  - A. Given no anticoagulation on day 1 post-op, then resume Rivaroxaban at usual therapeutic dose (20 mg) on day 2 post op if no evidence of bleeding
  - B. Give prophylactic dose Rivaroxaban (10 mg) on day 1 post-op, then resume Rivaroxaban at usual therapeutic dose (20 mg) on day 2
  - C. Rivaroxaban 10 mg daily for 14 days post-op, then resume usual therapeutic dose (20 mg) afterwards
  - D. Give IV heparin for 24-48 hours after the surgery and resume therapeutic dose Rivaroxaban after bleeding risk subsides
3. 72 hours after surgery, you are called as it has been discovered a medical error has occurred. Your patient has received Rivaroxaban 20 mg BID for two days, that instead of the usual 20 mg once daily dose. The PT is 20 seconds (9.7-11.8 s) 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. Give prothrombin complex concentrate
4. Alternate ending: 72 hours after surgery, you are called as it has been discovered that instead 20 mg once daily of rivaroxaban he 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). He 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. The last dose of Rivaroxaban was 1 hour ago. Which one of the following is an appropriate management plan?
- A. Administer prothrombin complex concentrate (PCC) 50 U/kg maximum 3000 U iv or according to hospital policy.
  - B. Andexanet alfa
  - C. Hemodialysis to remove rivaroxaban.
  - D. Fresh frozen plasma

#### **Additional Questions for Hematology/Hematopathology Residents:**

A) What would you give this patient if he had a history of heparin-induced thrombocytopenia?

B) 5 days after surgery, the patient is readmitted to hospital with reduced level of consciousness and delirium of unclear etiology. He subsequently develops a fever, headache, and neck stiffness. The admitting team is concerned about meningitis, and would like to perform a lumbar puncture. The team orders a rivaroxaban anti-Xa level and it is 115 ng/ml. Is it safe to perform this procedure?

#### **Case 2**

An 87 year old man with atrial fibrillation presents to the emergency department with moderate dyspnea and pre-syncope which led to fall. Heart rate is 110 bpm and blood pressure is 100/70. He was recently prescribed dabigatran 150 mg b.i.d. (switched over from warfarin by his cardiologist 2 weeks ago). His creatinine clearance is 40 ml/min. CT head shows a small intracranial hemorrhage.

5. The patient's INR is 1.1 (0.9-1.1), aPTT is 60 (20-32) seconds, TT is >60 (14-21) seconds. Which one of the following is likely true about his anticoagulation therapy?
- A. There is evidence of presence of dabigatran effect
  - B. There is evidence of presence of warfarin effect
  - C. Levels suggest that the patient has not been taking either warfarin or dabigatran
  - D. Levels suggest that the patient is taking both warfarin and dabigatran

6. Which one of the following represents an appropriate management strategy for this patient?

- A. Hold dabigatran
- B. Hold dabigatran, give activated PCC (FEIBA) 50 U/kg
- C. Hold dabigatran, give idarucizumab 5 grams IV
- D. Hold dabigatran, give plasma and cryoprecipitate /fibrinogen concentrate

### Case 3

A 17 year old female is referred to a hematologist for a slightly elevated APTT. This has been confirmed on more than one occasion. Her bleeding history reveals epistaxis as a child that was recurrent and required several visits to the emergency department. She has had no procedures or operations. She has a history of menorrhagia. Both her mother and only sister have menorrhagia. Her younger brother had recurrent epistaxis as a child.

#### Initial Laboratory Tests

Hemoglobin	122 g/L	RI: 115-165 g/L
Platelet count	256	RI: 150-400 X 10 <sup>9</sup> /L
PT/INR:	1.0	RI: 0.8 - 1.2 INR
APTT:	45 s	RI: 22 - 35 s
1:1 immediate APTT mix:	29 s	RI: 22 - 35 s
Thrombin Time:	22 s	RI: 20 - 30 s
Fibrinogen (Claus):	3.1 g/L	RI: 1.6 - 4.2 g/L

7. Which one of the following represents an appropriate laboratory testing strategy for this patient?

- A. Check factors VIII, IX, XI, XII and vWF
- B. Check factors X, IX, VII and II
- C. Check vWF: Ag, vWF: Activity, FVIII levels
- D. Check factors VIII and XIII

8. How would you advise this patient?

- A. Avoid trauma such as IM injection, arterial punctures, contact sports and regular use of antiplatelet agents (e.g. aspirin, clopidogrel)
- B. Assess the response to DDAVP electively
- C. Use tranexamic acid for menorrhagia
- D. All of the above



9. She is now 25 years old and is 30 weeks gestation. She should have a CBC and iron indices to ensure she is iron replete. Which of the following applies to her vWF: Ag, vWF: Activity, FVIII levels?

- A. If levels are more than 0.50-80 IU/mL you advise that she can proceed with regional anesthesia and vaginal delivery or Cesarean section.
- B. If levels are 1.00 IU/mL or more you advise that she can proceed with regional anesthesia and vaginal delivery or Cesarean section.
- C. If levels are 0.5-0.8 IU/mL you advise to avoid regional anesthesia but she can have vaginal delivery or Cesarean section.
- D. If levels are 0.50-80 IU/mL you would advise to avoid regional anesthesia and vaginal delivery.

#### **Additional Questions for Hematology/Hematopathology Residents:**

What if this 17 year old patient instead was presenting to a peripheral hospital 4 weeks postpartum, with 3 weeks of profuse vaginal bleeding and extensive bruising?

She was found to have the following labs:

- Hb 68, PLT 256
- INR 1.0, aPTT 75 sec (22-35 sec)
- 1:1 immediate aPTT mix 48 sec (22-35 sec).

A) What is the differential diagnosis and what additional investigations would you send?

B) What is the immediate and long-term management for this patient?

#### **Case 4**

75 year old male with diabetes, dyslipidemia and hypertension was seen in ER for a left cerebral hemorrhagic stroke with no intraventricular extension. He had been taking insulin, a statin, metoprolol and ASA 81 mg daily. The ICH was not preceded by a traumatic event and he is awake, alert to person, place and time and 2+ power in his right arm and leg.

10. Which of the following should you do next?

- A. Administer tranexamic acid 30 mg/kg intravenously
- B. Check CBC, coagulation parameters
- C. Check CBC, coagulation parameters and while waiting results administer 4 units of plasma
- D. Reverse the anti-platelet effect of ASA with platelet transfusion

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