

Please start by reviewing any questions that trainees may have from the preceding lectures.

**Case 1**

A 65 year old male is in the preoperative clinic in preparation for surgery for a radical prostatectomy. He had an unprovoked 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 umol/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 his 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. Give 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 on day 1 post-op, then resume Rivaroxaban at usual therapeutic dose (20 mg) on day 2
  - C. Give 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 that a medical error has occurred. Your patient has received Rivaroxaban 20 mg BID for two days, 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) 2000 units IV or according to hospital policy.
  - B. Andexanet alfa
  - C. Fresh frozen plasma
  - D. Hemodialysis to remove rivaroxaban

**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 a 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
Control aPTT:	28 s	RI: 22 - 35 s
Thrombin Time:	22 s	RI: 20 - 30 s
Fibrinogen (Clauss):	3.1 g/L	RI: 1.6 - 4.2 g/L

7. Which one of the following represents an appropriate initial 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 0.50-0.80 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) [control aPTT: 28 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

#### **REMINDER:**

**Please remind participants to complete their evaluation forms using the link that was sent to them.**