V3: ANESTHESIOLOGY BLOOD BANK ROTATION: COMPACT SCHEDULE

- All residents attend 2 sessions per week as a big group (labeled ALL residents) each Wednesday & Thursday 11a-12p x3 weeks for a total 6 big group sessions.
- Also, each small group travels together for 4 sessions. All 4 of these are during one week.

SMALL GROUP 1	SMALL GROUP 2	SMALL GROUP 3
Resident 1	Resident 5	Resident 9
Resident 2	Resident 6	Resident 10
Resident 3	Resident 7	Resident 11
Resident 4	Resident 8	Resident 12

	MON	TUE	WED	THU	FRI
	12-Nov	13-Nov	14-Nov	15-Nov	16-Nov
11a	BB TOUR & ISSUE BLOOD	SIGNOUT (BB conference room)	**ALL residents session 1 (MFCB 3156)**	**ALL residents session 2 (MFCB 3114)**	SIGNOUT (BB conference room)
12p					
1p		RED CROSS @ 1:30 (4860 Sheboygan)			

nothing planned Monday 11/19 through Friday 11/23

	26-Nov	27-Nov	28-Nov	29-Nov	30-Nov
11a	BB TOUR & ISSUE BLOOD	SIGNOUT (BB conference room)	**ALL residents session 3 (MFCB 4156)**	**ALL residents session 4 (MFCB 3114)**	SIGNOUT (BB conference room)
12p					
1p		RED CROSS @ 1:30 (4860 Sheboygan)			

	3-Dec	4-Dec	5-Dec	6-Dec	7-Dec
11a	BB TOUR & ISSUE BLOOD	SIGNOUT (BB conference room)	**ALL residents session 5 (MFCB 3156)**	**ALL residents session 6 (MFCB 3114)**	SIGNOUT (BB conference room)
12p					
1p		RED CROSS @ 1:30 (4860 Sheboygan)			

Tour & Issue Products: What's where in the blood bank. Issue RBCs, plasma, platelets.
Signout: Pathology resident & attending write & review antibody, reaction, & SOP deviation reports.
Red Cross: Intro to donor screening & testing and product processing.

Anesthesiology Blood Bank Rotation

Welcome to the blood bank rotation! Detailed learning objectives are listed in the context of each session below. The main learning objectives are to learn and apply the essentials of:

- blood products (composition, preparation, indications, donation)
- pretransfusion compatibility testing
- transfusion reactions

This rotation should be seen as introductory rather than comprehensive.

References

1. All chapter references are from the ebook: ***Transfusion Medicine & Hemostasis, 1st edition***
2. Choosing Wisely guidelines
http://www.choosingwisely.org/wp-content/uploads/2015/02/AABB-Choosing-Wisely-List.pdf
3. ASA Guidelines
http://www.asahq.org/~/media/sites/asahq/files/public/resources/standards-guidelines/practice-guidelines-for-perioperative-blood-management.pdf
4. Other resources on specific topics are listed in context below

Sessions with All Residents

These sessions are group discussion format. Prepare in advance by answering all the questions for that day's session. Feel free to use the computer or marker board to explain concepts and points to your peers. A computer and projector/screen will be in the room. You are free to bring food, drinks, laptop, etc.

To minimize wasted time, we should do our best to adhere to these norms:

1. Start on time.
2. Finish on time or early.
3. Do not engage in potentially distracting activities (e.g. texting, extracurricular internet/conversations).

2 different residents will lead the discussion each session. Exceptions will be made if there are more or fewer than 12 residents. **The resident group will decide among themselves which residents will lead which sessions**. The session leaders' main duties are:
1) start on time and end on time or early
2) prepare the computer & projector/screen (e.g. open the question document on the computer)
3) create a constructive, collaborative, and positive learning environment
4) involve everyone / minimize passengers; make sure resident answers at least one question per session
5) keep the group on track and engaged
6) end the session with a feedback checkout (i.e. "What went well? What can we do better next time?")

Session 1: Chapter 78: Overview of the Coagulation System

Leads:

1. Motivating Question: What do you want to get out of this blood bank rotation?
2. What are the initial physiologic responses to bleeding?
3. What is primary hemostasis?
4. What is secondary hemostasis?
5. How does primary hemostasis begin?
6. How do platelets adhere?
7. How do platelets aggregate?
8. How does the coagulation cascade begin in vivo?
9. Where does tissue factor come from?
10. How is factor 7 activated?
11. What are two ways the TF-7a complex can lead to thrombin formation?
12. What is the main hemostatic function of thrombin?
13. What is the main regulation of coagulation (i.e. anticoagulant) function of thrombin?
14. What are the main sources of phospholipid? That is, where does fibrin formation physically occur?

Session 1: Chapter 28: Red Blood Cells, Chapters 36-38: Irradiation, Leukoreduction, & CMV-Safe Products

Leads:

1. Motivating Question: Have you heard about a "target hemoglobin or hematocrit"? What do you recall?
2. Based on Table 28.2 & the text below it, what are the general indications for RBCs?
3. Based on Table 28.2 & p157, what are the general contraindications for RBCs?
4. What is more clinically useful than a hemoglobin/hematocrit "trigger"?
5. Why not just use a strict hemoglobin/hematocrit "trigger" for all transfusion decisions?
6. While there is a lot to say about the decision to transfuse in particular patient populations, why might it matter if you use a restrictive or liberal RBC transfusion strategy?
7. All other factors being equal, why might a more liberally transfused patient do worse than a restrictively transfused patient?
8. As a dosing guide in adults, how much does one unit of RBCs raise the hemoglobin? Hematocrit?
9. For kids, what is the usual weight-based dosing calculation?
10. What is the main purpose of irradiating blood?
11. What are some common indications for irradiated cellular blood products? What do they have in common?
12. What are some patient populations that, perhaps surprisingly, do not benefit from irradiated blood?
13. What are the three main benefits of leukoreduction?
14. What is the best way to minimize the risk of CMV-transmission from blood products?

Session 2: Chapter 29: Plasma & Chapter 31: Cryoprecipitate

Leads:

1. Motivating Question: Have you heard about a "target INR"? What do you recall?
2. What is the composition of plasma?
3. How long does it take to thaw plasma? At what temperature?
4. Based on Table 29.1, what are the general indications for plasma?
5. Based on Table 29.1, what are the general contraindications for plasma?
6. Among patients who are not bleeding and not at risk of bleeding, who should receive plasma?
7. Is plasma generally indicated to correct the INR before minor surgical procedures?
8. In patients on warfarin with active bleeding or requiring urgent surgery, what should be done?
9. Based on Table 29.2, what are the general principles for non-urgent warfarin reversal?
10. What weight-based dosing is usually used for plasma? What is the typical factor activity increment?
11. What is the usual volume of one unit of plasma?
12. How many units of plasma are given in common practice? What change in INR is typical?
13. How is cryoprecipitate made?
14. What is the composition of cryo? How does it differ from plasma?
15. Based on Table 31.1 & the paragraph above it, what are the primary indications for cryo?
16. Based on Table 31.1 & the paragraph above it, what are the common misuses of cryo?

Session 2: Chapter 30: Platelets

Leads: McAfee and Larson

1. Motivating Question: Have you heard about a "target platelet count"? What do you recall?
2. What are the differences between: an apheresis platelet, a random donor platelet, & a pooled platelet?
3. What are the general guidelines for *prophylactic* platelet transfusions?
4. What are the general guidelines for *therapeutic* platelet transfusions?
5. What are relative contraindications for platelets?
6. At what temperature are platelets stored?
7. What is the shelf life of platelets?
8. How is storage bag material for platelets different from that used for RBCs, plasma, & cryo?
9. When do bacteria in platelets enter the exponential growth phase?
10. How much does one apheresis platelet typically raise the platelet count?
11. How can response to platelet transfusion be assessed?
12. Must platelets be ABO compatible? Why or why not?

Session 3: Chapter 50: Massive Transfusion

Leads:

1. Motivating Question: What have you experienced or heard about MTPs (massive transfusion protocols)?
2. What are some definitions of a massive transfusion?
3. When blood loss is excessive and time does not permit timely completion of ABO typing before issuing units, what ABO type of RBCs should be issued initially?
4. What ABO type of plasma?
5. What percentage of the population is type AB?
6. What are two advantages of sending a patient sample for ABO typing as soon as possible?
7. What is meant by a "component based therapy" approach?
8. What are three disadvantages of such an approach compared to an MTP? Hints: labs, clerical, ratios.
9. What is encompassed by the term MTP?
10. What causes massive transfusion-related hypothermia?
11. What causes massive transfusion-related acidosis?
12. What are the consequences of massive transfusion-related hypothermia & acidosis?
13. What is the main principle behind the ratios of blood products in current MTPs?
14. Using uconnect: What is the difference between emergency release blood and the MTP?
15. Using uconnect: If you want 2 units of RBCs ASAP for a patient with no/incomplete pre-transfusion testing, is it faster to obtain 2 units by ordering 2 units of emergency release RBCs or by activating the MTP?
16. Using uconnect: What is the composition and sequence of products in UW's current MTP?
17. After activating the MTP, what blood product orders are required?

Session 3: Chapter 51: Perioperative Blood Management

Leads:

1. Motivating Question: What experiences have you had with any of the following: reversing anticoagulants, reversing antiplatelets, correcting preoperative anemia, anti-hemorrhagic drugs, and cell saver?
2. What is blood management? What are the four main tenets of blood management?
3. What is the strongest predictor of a patient requiring blood during an elective surgery?
4. How is heparin reversed?
5. Why would plasma transfusion be a bad way to reverse heparin?
6. How is warfarin reversed?
7. How is a direct thrombin inhibitor reversed?
8. What are two possible treatments for preoperative anemia?
9. What are the indications for erythropoietin?
10. How long does erythropoietin usually take to stimulate adequate RBC production?
11. What is the mechanism of DDAVP in promoting hemostasis?
12. What are the indications for DDAVP in promoting hemostasis?
13. What is the mechanism of aminocaproic acid (Amicar)?
14. What is intraoperative autologous transfusion?
15. What are two general contraindications to intraoperative autologous transfusion?

Session 4: Ch 53: Febrile Transfusion Reactions; Ch 54: Allergic & Anaphylactic Transfusion Reactions

Leads:

1. Motivating Question: What experiences have you had with patients who had a transfusion reaction (or a suspected transfusion reaction)?
2. What is a febrile non-hemolytic transfusion reaction (FNHTR)?
3. Fever can accompany which three types of serious transfusion reactions?
4. What are two potential mechanisms of FNHTRs?
5. What is the management of a FNHTR?
6. What is the pathophysiology of an allergic transfusion reaction?
7. What are the typical signs and symptoms of a mild allergic transfusion reaction?
8. What is the management of a mild allergic transfusion reaction?
9. What are the signs and symptoms of an anaphylactic transfusion reaction?
10. What is the most common cause of an anaphylactic transfusion reaction in the US?
11. What is the immediate management of an anaphylactic transfusion reaction?
12. What products are given to a patient who had an anaphylactic transfusion reaction due to IgA deficiency?

Session 4: Ch 55: Acute Hemolytic Transfusion Reactions; Ch 56: Delayed Hemolytic Transfusion Reactions

Leads:

1. Motivating Question: What stories or advice have you heard from colleagues about transfusion reactions (or suspected transfusion reactions)?
2. What is the most common immune cause of an acute hemolytic transfusion reaction (AHTR)?
3. What is the pathophysiology of an AHTR? What causes RBC destruction?
4. What are the main products of brisk hemolysis? Why are these harmful?
5. What are the signs and symptoms of an AHTR?
6. What are some other causes of a brisk hemolysis that can look like an AHTR?
7. What is the management of an AHTR?
8. What is the most common error leading to ABO-incompatible transfusions?
9. What is the second most common?
10. How can AHTRs be prevented?
11. What is a delayed hemolytic transfusion reaction (DHTR)?
12. What is a delayed serologic transfusion reaction (DSTR)?
13. What is the pathophysiology of a DHTR?
14. What are the typical clinical & laboratory findings in a DHTR?
15. What is the management of a DHTR?

Session 5: Chapter 57: TACO; Chapter 58: TRALI

Leads:

1. Motivating Question: What experiences have you had with patients with suspected TRALI? What have you heard colleagues talk about or seen them write in notes about TRALI as a possible diagnosis?
2. What is TACO?
3. What is the pathophysiology of TACO?
4. What are the clinical manifestations of TACO?
5. How is TACO diagnosed?
6. What is the management of TACO?
7. What is TRALI?
8. What is the pathophysiology of TRALI?
9. What are the clinical manifestations of TRALI?
10. How is TRALI diagnosed?
11. What antibody findings are useful in the *diagnosis* of TRALI? Trick question!
12. What is the management of TRALI?
13. When do most patients with TRALI improve?
14. What are some strategies for preventing TRALI?
15. What do TACO and TRALI have in common?
16. How can TACO and TRALI be distinguished?

Session 5: Chapter 59: Septic Transfusion Reactions; Chapter 60: Metabolic Complications

Leads:

1. Motivating Question: What experiences have you had with patients with sepsis of any etiology?
2. What are the clinical manifestations of septic transfusion reactions?
3. How is a septic transfusion reaction diagnosed?
4. How can you distinguish a FNHTR from a septic transfusion reaction?
5. What is the management of a septic transfusion reaction?
6. What is the most common bug in RBC-associated sepsis?
7. What is the most common type of bug in platelet-associated sepsis?
8. How is bacterial contamination prevented?
9. What causes hypothermia from transfusions? What are the 5 most important effects?
10. What causes hypocalcemia from transfusions?
11. What populations are more at risk of hypocalcemia from transfusions?
12. What are some possible clinical manifestations of hypocalcemia?
13. Checkout: For next year's BB rotation, what should be increased/added? Decreased/eliminated? Done differently? Done the same?

Session 6: Hands-On OR Session. See Questions on the Cover sheet in attached email
Leads:

Small Group Activities Reading Assignments

BB Tour & Issuing Blood Products
Chapter 9: Component Preparation and Manufacturing p45-50
Motivating Question: How would you explain to a patient in layman's terms how each blood product (i.e. RBCs, platelet, plasma, cryo) is made?

Signout 1
Chapter 19: Pretransfusion Testing p93-100 (stop before “Causes of Unexpected Test Results”)
Understand and be able to apply Tables 19.1-4
Motivating Question: How would you explain ABO typing & ABO compatibility to a med student?

Chapter 20: Antibody Identification p103-106 (stop before “RBC Phenotype”), p109 “Blood Component Selection,” & p110 “Crossmatch”
Motivating Questions: How would you explain an antibody screen to a med student? How the results are used to determine find suitable RBC units? How would you explain a crossmatch to a medical student?

Red Cross visit (arrive 1:30 at main entrance desk)
Chapter 6: Apheresis Blood Component Collections p33-35
Chapter 11: Overview of Infectious Disease Testing p55-57
Motivating Question: How would you explain blood donation & donor screening to patient in layman's terms?

Signout 2
Emergency Release Blood
http://gomerblog.com/2013/10/patient-bleeds-death-blood-bank-paperwork-completed-without-errors/
https://www.pathology.med.umich.edu/blood-bank/procedure-for-transfusing-blood-during-an-emergency
Motivating Question: When is emergency release blood indicated? What are the pros and cons?

Gunner Reading:
Chapter 44: Autoimmune Hemolytic Anemia
Chapter 49: Platelet Refractoriness