

Platelet Transfusion

Transfusion Medicine Boot Camp for Nurses

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Disclosures

- No commercial product conflicts of interest to declare
- Member of Transfusion Transmitted Injuries Surveillance System Education Committee
- Using Blood Wisely initiative, member nursing education development



Objectives

After this session participants will be able to:

- Describe platelet basics and manufacturing processes for platelets
- Understand platelet transfusion and compatibility
- Define nursing care specific to administering platelet transfusion
- Recognize signs & symptoms and management of a serious reaction particular to platelet transfusion



Platelet Basics

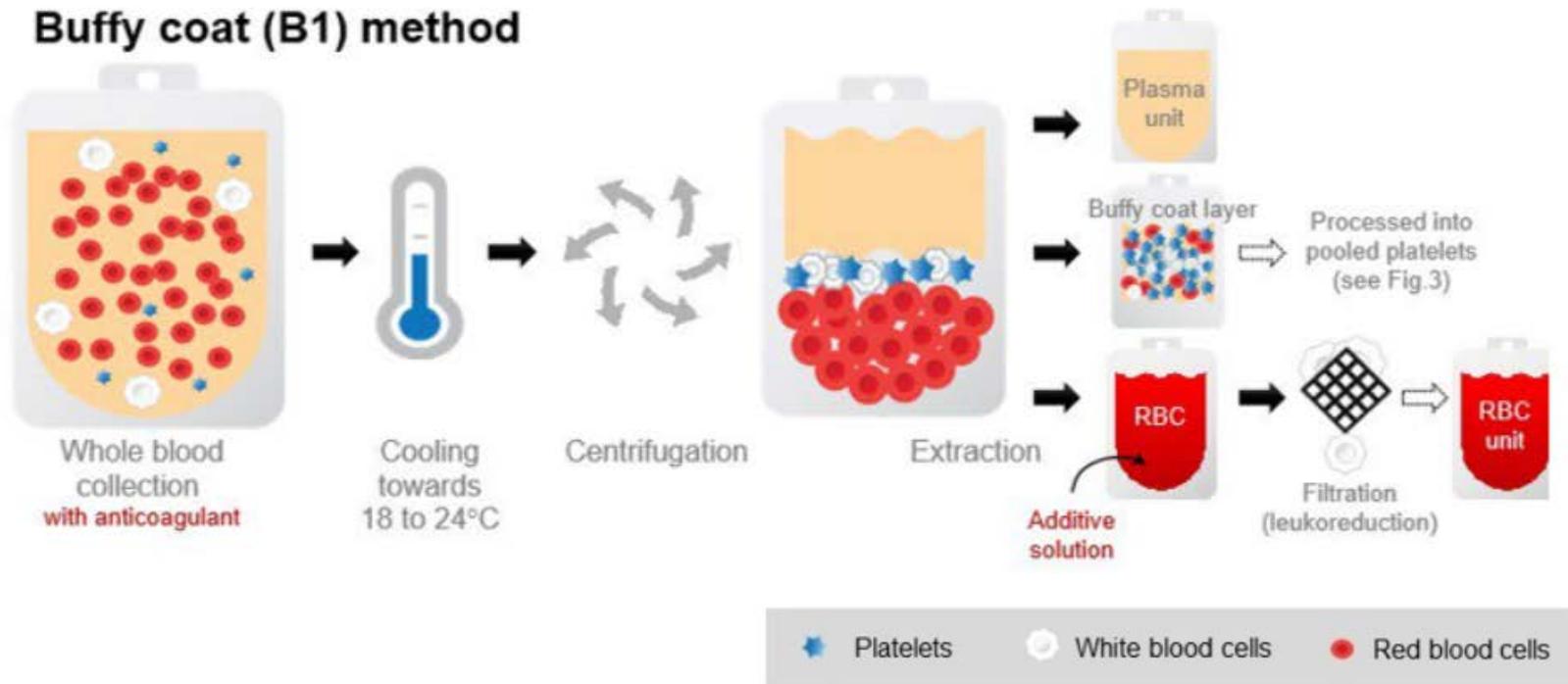
Platelets:

- Smallest of the blood cells; sticky cells, first responders in the clotting process
- Main function is to bind to the site of blood vessel injury and bind to each other to form the platelet plug
- This initiates activation of the plasma clotting factors to stop bleeding
- Also, role in primary immunity, tumour progression and inflammation
- Platelet life cycle is about 10 days
- Normal platelet count is 150–400 x10⁹/L



Platelet Manufacturing (1)

Whole blood manufacturing

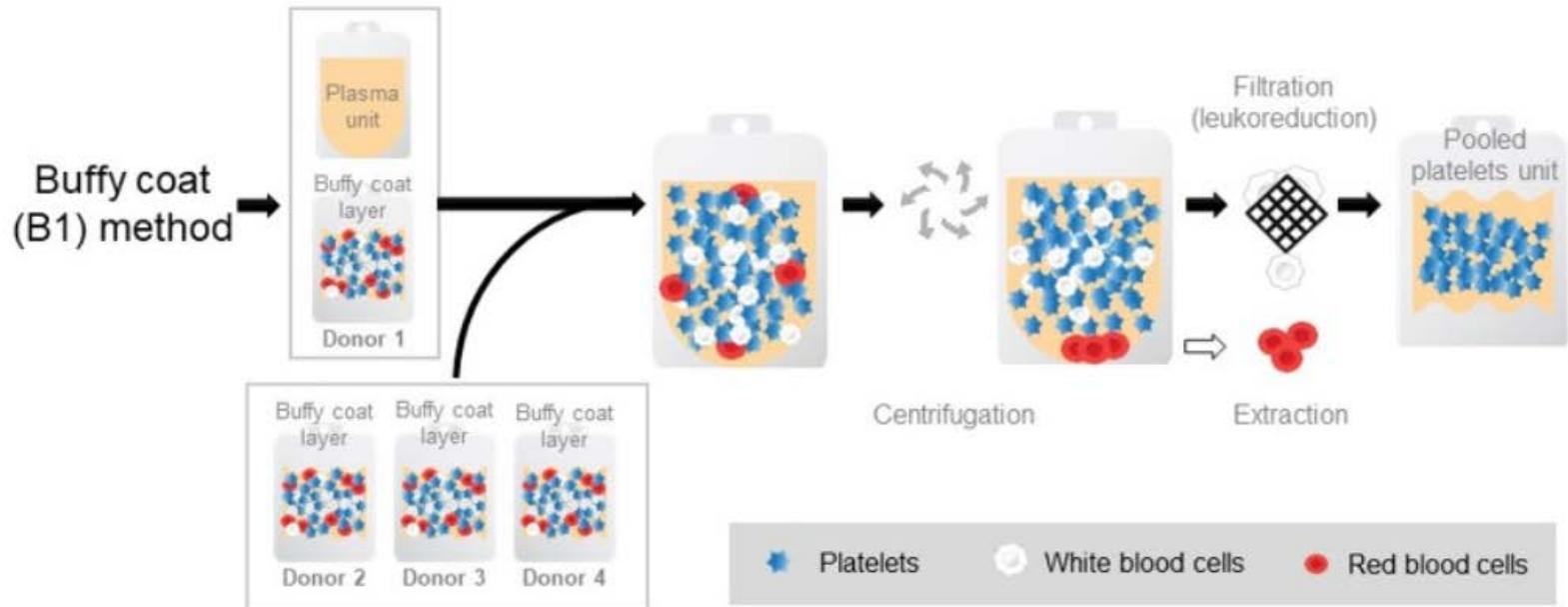


Canadian Blood Services <https://professionaleducation.blood.ca/en/transfusion/clinical-guide/blood-components>



Platelet Manufacturing (2)

Producing pooled platelets



Canadian Blood Services <https://professionaleducation.blood.ca/en/transfusion/clinical-guide/blood-components>

Canadian Blood Services (CBS) also produces apheresis platelets (apheresis machine separates & removes platelets from 1 donor; platelets are suspended in that donor's plasma)



Patient Case

- Flo is a 62-year-old female, receiving a course of chemotherapy for acute leukemia
- She has received transfusions [both RBC (red blood cell) and platelet] uneventfully previously
- Unfortunately, she slipped on a patch of ice and has fractured her hip
- She is admitted to hospital, awaiting surgery
- Flo's hemoglobin is 92 g/L; platelet count is $15 \times 10^9/L$



Patient Case, Question 1

Pre-operatively, 1 dose platelet transfusion is ordered
Flo's group & screen result: blood group A, Rh negative
antibody screen negative

The blood group of platelets of greatest benefit for Flo is:

- a) Group O, Rh negative
- b) Group AB, Rh positive
- c) Group A, Rh negative
- d) Group A, Rh positive



Platelet Transfusion & Compatibility (1)

- Platelets have A and B antigens on their cell surface but do not express Rh antigens
- Platelet products:
 - Are suspended in plasma
 - Contain small amounts of red blood cells
- Ideally, transfuse ABO & Rh blood group identical platelets
- Often not possible due to limited supply (platelets shelf-life is 7 days; only 15 % of population is Rh negative)
- If transfusion is non-urgent, Transfusion Medicine Lab (TML) will check with CBS for availability of group identical platelets (CBS to TML delivery time is also a consideration)



Platelet Transfusion & Compatibility (2)

- If patient is Rh negative & Rh negative platelets are not available, TML will issue Rh positive platelets for transfusion
 - Immunization risk (formation of anti-D antibody) from platelets is low ($\approx 1\%$)
 - For Rh negative females, age 45 years and under with childbearing potential, if transfused Rh positive platelets require Rh immunoglobulin (RhIG) to avoid formation of anti-D antibody
- If ABO group identical platelets are not available, TML will issue ABO plasma compatible platelets
- If ABO plasma compatible platelets are not available, ABO plasma incompatible platelets may be transfused. TML will notify prescriber to ensure patient is monitored for hemolysis.
- [ORBCoN Platelet Transfusion Toolkit](#)



Patient Case, Question 2

Flo is scheduled for surgery at 1800 hours today

Flo's platelet transfusion should be administered at

- a) 0600 hours today
- b) 1630 hours today
- c) In the operating room, at the time of skin incision
- d) Anytime (maximum within 7 days prior to surgery)



Patient Case, Question 3

Flo's surgeon has ordered a platelet count re-check post-transfusion, prior to surgery

Flo's re-check CBC (complete blood count) should be drawn

- a) 15 minutes post-transfusion
- b) 2 hours post-transfusion
- c) 6 hours post-transfusion
- d) is not indicated



Patient Case, Question 4

Best practice to administer Flo's platelet transfusion includes use new/fresh blood tubing/filter and

- a) Prime tubing with 0.9% sodium chloride, infuse as quickly as possible (over 5 to 10 minutes)
- b) Prime tubing with 5% dextrose in water, infuse as quickly as possible (over 5 to 10 minutes)
- c) Prime tubing with 5% dextrose in water, infuse at 50 mL/hour for first 15 minutes, re-assess patient, if stable then infuse platelets over 45 to 60 minutes
- d) Prime tubing with 0.9% sodium chloride, infuse at 50 mL/hour for first 15 minutes, re-assess patient, if stable then infuse platelets over 45 to 60 minutes



Platelet Transfusion Summary (1)

- If pre-procedure transfusion, transfuse platelets just prior to procedure (within 6 hours of procedure)
- Re-check platelet count 10 to 60 minutes post transfusion
- 1 dose = 15-25 $\times 10^9$ /L increase in platelet count at 10 to 60 minutes post transfusion
- Transfuse over 60 minutes, slower if Transfusion Associated Circulatory Overload (TACO) risk [maximum 4 hours from issue]
- Rate of Infusion:
 - For the first 15 minutes, suggested rate is 50 mL/hour
 - Assess patient & re-check vital signs after 15 minutes of infusion
 - If no signs/symptoms of adverse reaction, increase to rate ordered



Platelet Transfusion Summary (2)

Tubing/Filter

- Transfuse with new/fresh blood tubing/filter (170-260 micron)
- If filter was previously used, the platelets will adhere to fibrin that has been captured in the filter

IV Fluid

- Compatible with 0.9% sodium chloride

IV Access

- Any gauge IV is appropriate

Infusion Devices

- May use infusion pumps that are Health Canada Medical Device Regulations approved
- Do NOT use blood warmers/rapid infusers for platelet transfusion



Patient Case Postoperatively (1)

- Flo's hip surgery procedure was uneventful
- Twelve hours post-op, her hemoglobin is 78 g/L and platelet count is $8 \times 10^9/L$
- Her hip dressing is oozing serosanguinous fluid and has been reinforced twice
- Order for 1 dose platelet transfusion, to be infused over 60 minutes



Patient Case Postoperatively (2)

After 15 minutes, Flo is experiencing rigors

Flo's vital signs	Temperature (°C)	BP (mmHg, millimeters of mercury)	Pulse (per minute)	Respirations (per minute)	Oxygen Saturation (%)
Pre-transfusion	36.8	110/68	80	20	96
After 15 minutes	38.9	94/60	96	24	92

Flo's nurse:

- Stops the platelet transfusion
- Infuses 0.9% sodium chloride TKVO
- Verifies patient identifiers on Flo's armband & platelet bag transfusion label match
- Calls the prescriber
- Calls TML



Patient Case Question 5

Patient care orders should include:

- a) Administer 500 mL 0.9% sodium chloride IV; Draw patient blood culture, administer broad spectrum antibiotic IV STAT
- b) Administer epinephrine 1:1000 0.5 mL IM
- c) Additional tests: group & screen, direct antiglobulin test (DAT), hemolysis work up, urinalysis (first void post reaction) and return remainder of the platelets to TML for culture
- d) Both a) and c)



Platelet Transfusion Adverse Reactions

- Potential for range of adverse transfusion reactions
- [TTISS-ON Acute Transfusion Reaction Chart](#) (p. 124-131)
- Platelets are stored at room temperature (20-24°C) – increases risk for possible bacterial contamination and patient bacterial sepsis

Event:	Symptomatic bacterial sepsis	Death from bacterial sepsis
Per pool of platelets	1 in 10,000	1 in 200,000
Per unit of RBCs	1 in 250,000	1 in 500,000

- Reaction confirmed by same organism cultured from patient & platelet
- Closely monitor patients receiving platelets for fever, chills & rigors, hypotension (signs/symptoms of transfusion reaction)
- Platelets are cultured during the CBS manufacturing process, however with platelets 7-day shelf-life, delivery of platelets to hospitals occurs when the preliminary culture is negative, with final culture result pending
- 2022: CBS will introduce pathogen-reduced platelets



Platelet Transfusion

Transfusion Knowledge Questions Post



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Questions



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