

FRESH WHOLE BLOOD TRANSFUSION “FAQ’s” IN PROLONGED FIELD CARE (December, 2014)

Executive Summary: Use Fresh Whole Blood (FWB) in remote, prolonged field care settings for resuscitation of the hemorrhagic shock patient. Use the “Type A for A, Type O for everyone else” model for blood typing in emergency situations to expedite available donor options. Rh (+/-) is not an immediate consideration in the critical trauma patient. Use only approved CPD blood collection bags and a filtered line for administration. Closely monitor your patient upon initiation of transfusion, and stop transfusing immediately for degradation of vital signs or evidence of incompatibility (transfusion graft vs. host disease). In general, keep donated FWB less than 24 hours, and make every effort to screen donated blood or use known donors to minimize risk of blood-borne pathogen transmission. Reference the Tactical Medic Emergency Protocols (TMEPs) for technique and considerations.

FRESH WHOLE BLOOD FAQ’S

Questions compiled by LTC Jamie Riesberg, MD, through iterations of training SOF medics. Answers provided by:

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QUESTIONS:

(“--“ denotes clarifying discussion by Dr. Cap)

1. *What is the incidence of transfusion reactions (mild to severe) with FWB that is properly ABO-matched?*

BLUF: There has been only one fatal transfusion-associated graft-versus host disease case in approx. 10,000 FWB transfusions to US personnel in OIF/OEF. Less severe reaction incidence is unknown.

-- This has never been defined in any well-controlled study and probably never will be (no one uses FWB in settings amenable to careful study). Bottom line: there is a low (1:10000???) risk of tGVHD (not well defined in other transfusion settings either) and a similar low risk of viral disease transmission. Documenting minor transfusion reactions in trauma patients is difficult if not impossible (flushing and pruritus in an exsanguinating/intubated patient?). The risk-benefit calculation is not about possible acute fatal hemolytic reaction (worst case transfusion AE) vs. perfect health or even clinical stability. It is about some transfusion AE vs. likely or certain death due to hemorrhagic shock. In other words, we don't know, probably will never know and probably don't need to know. We do need to know the rate of tGVHD and infection transmission rate in surviving patients. We should continue to perform hemovigilance reviews and PI studies to document AEs and ensure that we are reducing risks as efficiently as possible (e.g., adequate testing of donor pools, use of rapid tests, etc.).

2. *Why the "A for A, and O for everyone else" method? I thought we wanted to exactly match blood types?*

BLUF: In an emergency PFC setting, use "A for A, and O for everyone else." This captures approximately 80% of your blood types (A's are about 40% and O's another 40%) and minimizes the risk of clerical errors. The lower prevalence of type B and type ABs could result in an unacceptable delay while trying to find an exact type-match.

-- Given the luxury of time and a large walking donor pool, donor FWB should be an ABO type-specific match to the casualty, however, if someone is bleeding to death AND you have an O (+ or -) available, what do you have to lose? Just give the O FWB and give it immediately. The odds that they have high anti-A or anti-B titers is low, and in any case, the risk is immediate exsanguination or maybe a hemolytic reaction. Transfuse. A mismatch in the Rhesus (D) antigen is not a problem for immediate hemolysis so this is irrelevant in the prehospital, emergency setting. Please see listed references for further information. If you have time and Eldon cards (or newer Micronics cards or other) and can type, and have appropriate donors, type match. That said, in a MASCAL setting, you run the risk of clerical errors.

3. *What is the optimal rate of infusion of a 450ml unit of FWB?*

BLUF: The rate of gravity flow with the bag suspended above the patient (this is highly dependent on the clinical scenario, in other words, do you have a surgical abdomen with ongoing bleeding and no potential surgeon for at least 2-3 hours, or has the patient suffered hemorrhage from an isolated extremity wound where the bleeding is now definitively controlled??)

-- How fast should blood be infused? We assume you should slam it in ASAP for a bleeding patient. There are pretty convincing animal data that suggest this is sometimes a bad idea. In fact, we are doing a study at ISR right now to model the effects of different infusion rates. It seems reasonable that if you are making interventions that may result in CV collapse (intubation, thoracotomy, etc.) acutely, rapid infusion of blood products might be helpful to maintain circulation. On the other hand, in the pre-hospital uncontrolled bleeding scenario, the available data suggest that giving more, faster is counterproductive. Stay tuned. In the meantime, I would just let gravity be your friend and infuse no faster than gravity.

4. *Should our teams that are "high-risk" for remote operations and thus potential FWB resuscitation have each team member ABO typed and obtain Anti-A/B titres for their Type O individuals?*

BLUF: Yes. More to follow as we refine how to enroll our guys into the WBB Program. After laboratory confirmation of blood type, the team medic will maintain a roster of blood types and anti-A/B titres for each Type O individual on his team.

5. *Pre-treatment recommendations - are acetaminophen and/or diphenhydramine appropriate?*

BLUF: No, these medications are NOT indicated in the trauma or prolonged field care transfusion patient.

6. *Can we use local nationals or non-team members (or non-US personnel) for donors?*

BLUF: No. Coalition Forces will not be utilized routinely as donors, only by exception. Foreign Nationals should be used as a last resort. But remember, hemorrhagic shock kills immediately. If it comes down to risk of a blood-borne disease vs. imminent death, most would opt for surviving hemorrhage, even if it means exposure to blood-borne pathogens. Approved rapid infection disease tests (e.g., HIV, HCV, and HBV) should be performed on donor blood to the greatest extent possible. All blood transfusion components (collection bag, lines, Eldon cards, etc.) should be sent along with the patient for testing at higher level of care.

7. *When should I consider FWB for a casualty?*

BLUF: Look at the patient (MOI, extent of injuries, VS), your tactical situation (likely delay to evac and resources available) and if you see signs of severe injury with physiological decompensation (dropping BP, rising HR, loss of MS, weak pulses, hypothermia) you need to realize that only FWB delivers O₂, coag factors and stays in the vascular space. If you had stored WB or components, you could use these; otherwise, it's FWB. See the latest TCCC Guidelines.

8. *Why not just carry Freeze Dried Plasma (FDP) and not worry about FWB transfusion?*

BLUF: FDP will help, but not replace FWB.

SOF medics are not traditionally carrying the recommended 1-1-1 ratio of PRBCs, Plasma, and Platelets. Plasma is an improvement over crystalloid and colloid in that it does not cause dilution of coag factors and it offers some buffering and colloidal capacity. It does not carry O₂. No RCT data exist, but in WWII, the US, which based resuscitation on FDP, found that our outcomes improved significantly when we adopted the UK FWB approach in addition to FDP.

9. *Can I use a normal IV line and Saline bag instead of the filtered line and special blood donor bag to collect and then transfuse?*

BLUF: No, use only an approved blood collection bag that contains an appropriate amount of CPD anti-coagulant (citrate, phosphate, dextrose). The filter line is to prevent infusion of clotted blood (macroaggregates).

10. *What if I don't immediately transfuse the donor blood?*

BLUF: FWB can be stored at room temperature for 8-hours, and refrigerated thereafter.

--In general, if you keep it >24 hours, it's no longer an emergency and therefore you should toss it. PFC Considerations: Where are you? What is the tactical situation? How valuable is that resource? WB can be kept in CPD for 21 days. If you are in a remote situation and have access to refrigeration, consider keeping WB up to 21 days depending on operational needs. Be aware that it tends to clump in refrigeration and will need to be extensively massaged to resolubilize everything (and/or agitate it

during storage). If you keep at room temperature (22C), hemostatic function will drop off fast and hemolysis will begin to pick up dramatically after 1-2 days.

11. *If I do not have an Eldon card and haven't previously typed a donor and/or patient, can I perform a "tile test" or equivalent to ensure compatibility?*

BLUF: Best is to use approved cross-matching; next is Eldon cards; next dog tags or just pick from type O donors.

All this presumes emergency, far forward, delayed evac settings with no support.

Agglutination tests require use of the lab components (test tubes, slides, centrifuge) in the SFMS (SF Medical Sergeant) Tac Set. This may be performed if time allows, recognizing that it may result in significant delay to emergency blood transfusion.

References:

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