Fresh Whole Blood Transfusion

What's being done in the 2dMarDiv

by CDR Joseph G. Kotora, MC, USN

Combat produces human casualties. This tenant is as old as warfare itself. Throughout history, military medical providers have invested entire careers in search of training, education, and technology to reduce combat morbidity and mortality to the lowest extent possible. Combat mortality is largely a factor of logistics and resources. The most capable militaries deploy the best-trained, most experienced healthcare providers into austere settings. Equipped with the latest surgical and resuscitative technology, these field hospitals are capable of delivering unprecedented survival rates. Casualties that make it to a Role 2 facility alive have a ninety percent chance of survival.[1]

Making it to a Role 2 alive is the major challenge and the biggest area of interest among tactical commanders. Ninety percent of combat trauma patients die in the pre-hospital arena, and the overwhelming majority succumb to exsanguinating hemorrhage.[2] Hence, the military needs a resuscitation asset that is safe, effective, and capable of deploying in the pre-hospital setting to bridge the gap between care at the point of injury and forward surgical care: enter the practice of fresh whole blood transfusion (FWBT).

Fresh whole blood is not a novel concept and has been utilized in warfare for centuries. However, it has recently become an *en vogue* practice among combat arms medical communities. Recently, the 2dMarDiv deployed to Marine Corps Air-Ground Combat Center, Twentynine Palms, to conduct the largest Marine Corps exercise in 30 years—the MAGTF Warfighting Exercise (MWX). MWX pitted the 8,700

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2dMarDiv force against a peer adversary composed of U.S. and British forces for 6-plus weeks. The goal of the exercise was to sharpen the basic combat skills required against peer adversaries in a displaced environment and without the sophisticated technology and communications systems on which the Marine Corps has previously relied heavily. A large portion of the medical footprint of MWX centered on the practice of FWBT.

The medical planning for MWX quickly exposed the gaps and risks involved in such an evolution. The casualty count exceeded the surgical facilities' ability to deliver timely, effective surgical resuscitation. Moreover, the lack of air superiority prevented air casevac transport off the battlefield to waiting Role 2 facilities. There were simply too many casualties and no effective way to move them. Faced with the grim possibility of a mass fatality event, rather than a mass casualty event, the Division began training general medical officers and hospital corpsmen in collection and transfusion of FWB. FWBT could serve as a temporizing measure to resuscitate bleeding casualties, restore perfusion, and potentially afford seriously injured warfighters the time required to reach a Role 2.

Although it may seem complex on the surface, the practice of FWBT is relatively simple and extremely safe—so long as the protocol is strictly adhered to. Both the Joint Trauma System and the Committee on Tactical Combat Casualty Care have clinical practice guidelines for the collection and transfusion of FWB.[3] The process begins with identification and designation of a blood-donor pool within a unit. A blood drive is conducted with heavy emphasis on service members with Type O blood. After blood is collected for donation, it is tested and confirmed to ensure it is truly Type O and free of infectious disease. A list of eligible donors is sent to the unit medical officer, and the list is reviewed with the Division Surgeon and the FWBT Program Director. At the conclusion of this meeting, the unit's FWBT-approved roster is generated and certified. Personnel on the roster are identified as potential donors and

A large part of the medical footprint centered on FWBT practice. *(Photo by GySgt Leon Branchaud, 2d MarDiv COMSTRAT.)*

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are given a donor card to carry with them in combat. In the event FWBT is required, the unit medical officer or hospital corpsmen requests support from the unit's operational leadership. A designated donor from the list is called up, and a unit of blood is collected from the donor after a brief donation questionnaire is completed. The collected unit is then transfused to the casualty to restore blood volume and perfusion. The empty blood bag and donor card are sent with the casualty to the next echelon of care to facilitate testing of donor blood, identification of any transfusion reactions, and documentation of the actual transfusion.

Some have questioned the safety of this practice and have cited concerns of transfusion reactions or transmission of infectious disease. These risks are offset by meticulous adherence to

FWBT is the preferred resuscitation fluid. *(Photo by GySgt Leon Branchaud, 2d MarDiv COMSTRAT.)*

FWBT offers a sense of reassurance. *(Photo by GySgt Leon Branchaud, 2d MarDiv COMSTRAT.)*

the protocol and the pre-deployment testing and certification of the unit-donor roster. While it is impossible to completely prevent the possibility of transmission of recently acquired diseases, it is important to understand the gravity of the situation and the reason this practice exists. FWBT constitutes a "last option" for casualties who have a reasonable chance at survival, are in hemorrhagic shock, and lack access to surgical resuscitation inside a field hospital. Many have asked, "Does it work?" Army Ranger medics within the 75th Ranger Regiment in Wardak Province, Afghanistan, demonstrated the practice's efficacy in the summer of 2019. The medics activated the Ranger O Low-Titer Whole-Blood Program during intense combat operations, saving the lives of two critically wounded Soldiers with FWBT. This case is the first documented transfusion of FWB in combat.[4]

As long as armed conflict continues to be an instrument of national power, human beings will be at risk of combat trauma. The options to treat the wounded are a matter of logistical proficiency. Getting the right resources to the right casualty at the right time yields the desired results of surviving to hospital discharge. Casualties at the point of wounding need resuscitation more than any other intervention, and FWB is the preferred resuscitation fluid. This practice has tremendous merit and affords battlefield casualties the best chance at survival. Some may consider FWBT taboo or dangerous; however, the same argument was previously made for the use of limb arterial tourniquets. The work of the 2dMarDiv demonstrated how a Division-sized force can effectively manage serious combat trauma while awaiting transfer to the next echelon of care. Most important, the Division's FWBT program offered its warfighters a sense of reassurance and perhaps encouraged them to fight harder. Knowing that their brothers-in-arms were equipped with this capability offered them a sense of solace and allowed them unbridled access to the warrior ethos.

Notes

1. Matthew Goldberg, "Updated Death and Injury Rates of U.S. Military Personnel During the Conflicts in Iraq and Afghanistan," *Working Papers Series*, (Washington, DC: Congressional Budget Office, 2014).

2. Russ Kotwal, "Eliminating Preventable Death on the Battlefield," *Archives of Surgery*, (August 2011), available at www.east.org.

3. Staff, "Joint Trauma System Clinical Practice Guideline (CPG ID: 21)," *Joint Trauma Center*, (May 2018), available at https://jts.amedd.army.mil; and Frank Butler, "Committee on Tactical Combat Casualty Care Meeting Minutes," (San Antonio, TX: Joint Trauma System, February 2019).

4. Philip Walter Wellman, "Ranger Medics Save Lives in Afghanistan with Blood Transfusions While under Fire," *Star and Stripes,* (January 2020), available at https://www.stripes.com.