FROZEN AND DEGLYCEROLIZED RED BLOOD CELLS

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Supersedes:	Deglycerolized Frozen Red Blood Cells, 25 Jun 2008			

1. Goal. To provide guidance for the use of frozen and deglycerolized red blood cells (pRBCs) in the combat theater.

2. Background

a. Frozen and deglycerolized RBCs are initially derived from 450 ml of blood collected in citrate/phosphate/dextrose/adenine (CPDA-1) collection bags. The RBCs are stored for 3 - 6 days at 1 – 6°C before being frozen in a cryoprotectant (40% m/v glycerol), and stored in the frozen state at minus 65°C or colder. Once it is determined there is a need to transfuse, the frozen RBCs are thawed. They are then deglycerolized by sequential washing with hypertonic (12%) saline followed by normal (0.9%) saline mixed with 0.2% glucose. Following deglycerolization, they are re-suspended with an AS-3 additive solution and stored at 1 – 6°C, until ready for transfusion. Deglycerolized RBCs with the AS-3 additive are Food and Drug Administration (FDA)-approved for transfusion up to 14 days when processed on the Haemonetics Automated Cell Processor ACP215, an FDA 510(k)-cleared, closed processing system device.

b. The first operational frozen blood bank was established in 1956 at Chelsea Naval Hospital (Boston), in part to determine the practicality of frozen blood usage aboard Navy ships. In 1966, under Department of Defense direction (DoD), the Navy Bureau of Medicine and Surgery established the first frozen blood bank in a combat zone at Navy Station Hospital, DaNang, Republic of South Vietnam. Over a seven-month period, 465 previously frozen pRBC units were transfused to severely injured casualties, both solo and in combination with liquid pRBCs. In 1985, the DoD, under each branch Surgeon's General FDA license, froze 68,000 pRBC units. Those units were pre-positioned throughout several geographic Combatant Commands (COCOMs) in direct support of current and future military medical expeditionary/contingency operations. FDA-approved frozen and deglycerolized red blood cells may be used at Level III/IV Medical Treatment Facilities within a COCOM theater of operation.

3. Clinical Indications for Use. Each unit of frozen and deglycerolized RBCs:

- Contains more than 80% of the RBCs present in the original unit of blood;
- Provides the same physiologic benefits as liquid RBCs; and
- Carries the same post-transfusion survival expectations as liquid PRBCs.

The primary indication for use of frozen and deglycerolized RBCs is as a supplement to liquid RBCs during surge periods of increased transfusion requirements in order to decrease casualty hemorrhagic morbidity and mortality. Frozen and deglycerolized RBCs may be used in lieu of liquid RBCs for all RBC transfusion requirements.

a. Frozen and deglycerolized RBCs are NOT used for:

1) Emergency blood release.

2) Massive transfusion, UNLESS adequate RBCs or Fresh Whole Blood are unavailable.

3) Transfusion of more than four units within a 24-hour period, UNLESS adequate RBCs or Fresh Whole Blood are not available to meet the individual casualty's transfusion requirement.

b. Transfusion monitoring:

1) Clinical: **Treat as a routine liquid RBC transfusion before, during, and after transfusion, and for a suspected/actual adverse event.**

2) Laboratory: Obtain pre- and post-transfusion Hgb/Hct and Base Excess/Deficit.

4. Documentation. Clinical documentation for a frozen and deglycerolized transfusion is the same as for a liquid transfusion. In addition:

a. The physician order should specify use of previously frozen and deglycerolized RBCs.

b. The Laboratory will establish/maintain a process to document previously frozen and deglycerolized RBC transfusions in a manner that will facilitate future evaluation of recipients, including but not limited to:

1) Blood component identifiers

2) Date of blood component receipt in frozen state

3) Date of thaw/deglycerolization/additive process and resulting expiration date

4) Casualty indentifiers (including nationality and ABO/Rh categorization)

5) Date of transfusion

6) Transfusion indication

7) Transfusion reaction, nature and outcome

8) Final casualty disposition.

5. Responsibility. It is the combined responsibility of the trauma team leader and blood bank officer to ensure compliance with this CPG.

6. References.

[1] *Emergency War Surgery Handbook*

Approved by CENTCOM JTTS Director, JTS Director and Deputy Director and CENTCOM SG