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Award Number: W81XWH-11-2-0084

TITLE: Optimization of Lyophilized Plasma for Use in Combat Casualties

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REPORT DATE: January 2012

TYPE OF REPORT: Annual

PREPARED FOR: U.S. Army Medical Research and Materiel Command
Fort Detrick, Maryland 21702-5012

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*	2. REPORT TYPE	3. DATES COVERED *(From - To)*
01-01-2012	Annual	29 DEC 2010 - 28 DEC 2011

4. TITLE AND SUBTITLE

Optimization of Lyophilized Plasma for Use in Combat Casualties

5a. CONTRACT NUMBER

5b. GRANT NUMBER
W81XWH-11-2-0084

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

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5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

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Portland, OR 97201

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

U.S. Army Medical Research and Materiel Command
Fort Detrick, Maryland 21702-5012

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT

Approved for Public Release; Distribution Unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

Abstract on next page.

15. SUBJECT TERMS

Lyophilized, Uncontrolled Hemorrhage, resuscitation, animal model, coagulopathy, swine

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			USAMRMC
U	U	U	UU	6	19b. TELEPHONE NUMBER *(include area code)*

14. ABSTRACT: Due to the project still be in the initial stages of Aim 1, Attached is a summary of the projects overall Abstract Goal.

Hypothesis: It is our hypothesis that by minimizing the volume of the reconstitution fluid and optimizing its constituents, we can create lyophilized that is superior to the currently available product. We also hypothesize that this new lyophilized plasma will be superior to FFP with respect to hemo changes, coagulopathy, blood loss, and inflammatory changes in our established polytrauma model in swine.
Specific Aims: Two specific aims will be proposed to evaluate the efficacy and safety of optimized lyophilized plasma. Specific Aim 1 will establish minimum amount of fluid necessary to successfully reconstitute lyophilized plasma without reducing its efficacy. Specific Aim 2 will determine the fluid in which to reconstitute lyophilized plasma while maximizing the physiologic effects.
Study Design: The specific aims will be evaluated using a severe multiple injury trauma model in swine. Animals will undergo a standardized femur fracture, followed by controlled hemorrhage, dilutional resuscitation, and induction of hypothermia, reproducing the lethal triad. After stabilization, a will undergo a grade V liver injury. The optimal volume and constitution of the reconstitution fluid for the lyophilized plasma will be determined. En will include physiology, mortality, correction of coagulopathy, and inflammatory markers.
Relevance: Lyophilized plasma is a light weight powder that remains stable for a prolonged period of time and in a broad range of temperatures. The is rapidly reconstituted into a product that preserves coagulation factor activity and suppresses harmful inflammation. By being available on the battl and all echelons of casualty care, optimized lyophilized plasma could save countless lives.

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Introduction:

It is our hypothesis that by minimizing the volume of the reconstitution fluid and optimizing its constituents, we can create lyophilized plasma that is superior to the currently available product. We also hypothesize that this new lyophilized plasma will be superior to FFP with respect to hemodynamic changes, coagulopathy, blood loss, and inflammatory changes in our established polytrauma model in swine. Two specific aims will be proposed to evaluate the efficacy and safety of optimized lyophilized plasma. Specific Aim 1 will establish the minimum amount of fluid necessary to successfully reconstitute lyophilized plasma without reducing its efficacy. Specific Aim 2 will determine the optimal fluid in which to reconstitute lyophilized plasma while maximizing the physiologic effects. The specific aims will be evaluated using a severe multiple injury trauma model in swine. Animals will undergo a standardized femur fracture, followed by controlled hemorrhage, dilutional resuscitation, and induction of hypothermia, reproducing the lethal triad. After stabilization, animals will undergo a grade V liver injury. The optimal volume and constitution of the reconstitution fluid for the lyophilized plasma will be determined. Endpoints will include physiology, mortality, correction of coagulopathy, and inflammatory markers. Lyophilized plasma is a lightweight powder that remains stable for a prolonged period of time and in a broad range of temperatures. The powder is rapidly reconstituted into a product that preserves coagulation factor activity and suppresses harmful inflammation. By being available on the battlefield and all echelons of casualty care, optimized lyophilized plasma could save countless lives.

Body:

This project got off to a slow start for a couple of reasons. First, getting the study through the ACURO process took slightly longer than anticipated. Once the project received approval, it was hit with another snag in which the company (HemCon) whom was supposed to supply us with the lyophilized plasma notified us that due to increased production of the product, the availability of them to be able to produce the product for us was no longer available at no charge. We had to create a subcontract with them and that process took approximately six months to get both HemCon's approval as well as the military funding source.

Finally, in September all pieces were in order and initiation of the project took place. Initial donors were utilized to create the lyophilized plasma for the in vitro work needed to come up with the appropriate minimal fluid reconstitution as designed in Specific Aim 1. Model development has been completed and Aim 1 has been underway for a little over a month. There has been no unforeseen issues with the first specific aims design to this point. However, since we are still in the midst of the data collection, no findings can be reported at this time.

Key Research Accomplishments:

1. In vitro work completed to establish safe minimal fluid reconstitution
2. Established 50% as the comparable fluid
3. Model Development completed
4. Initiation of randomized study

Reportable Outcomes:

To date, 56 female Yorkshire crossbred swine have been utilized. This includes donors, model development and study animals.

Conclusions:

We have been able to show that the lyophilized plasma can be reconstituted with as little as 50% of the original fluid volume to allow for a consistency that transfuses without causing harm to the animals during model development. Initial observations during model development do not seem to portray a difference in hemodynamic variables between the fully reconstituted and minimally reconstituted volumes.

If this is true and we are able to show there is no difference in blood loss, coagulation, physiology or inflammatory markers between the minimal fluid and fully reconstituted, this will be a great leap forward in regards to production and reconstitution of the lyophilized plasma.

References

None currently

Appendices

None currently

Supporting Data

None currently