Hemafuse Autologous Transfusion Device to Mitigate Battlefield Deaths

By: Katherine Kirsch, Sisu Global Health

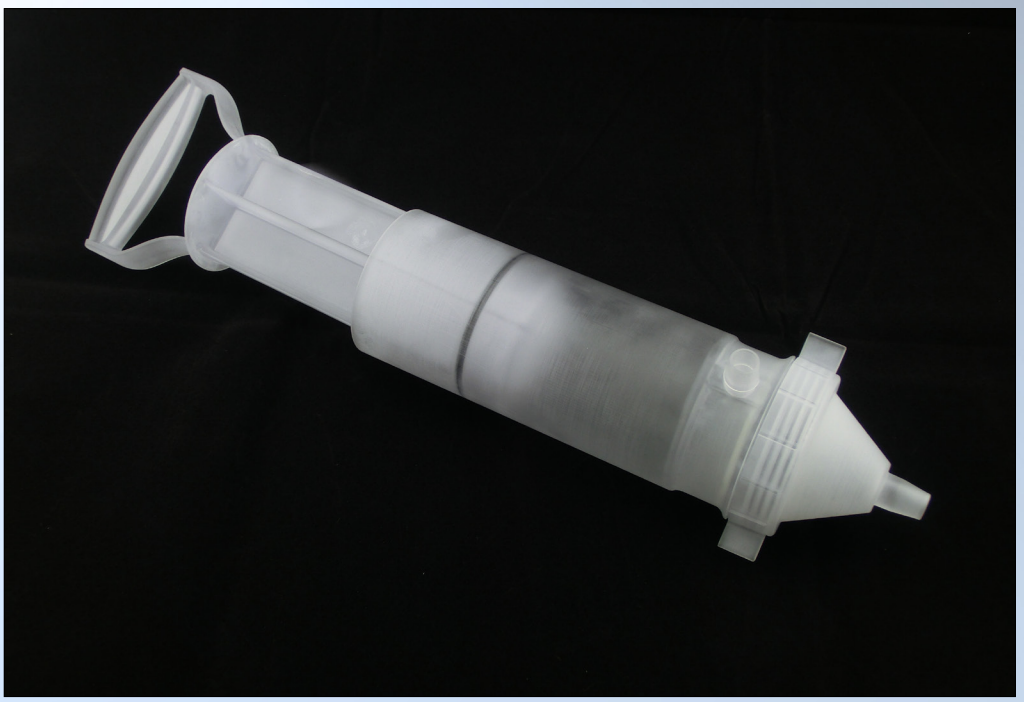
Hemorrhage remains the leading cause of death in both civilian and military settings, and is responsible for 50-80 percent of combat casualty deaths. [1,2] Researchers with Sisu Global Health designed an intraoperative autologous blood transfusion device, which could help mitigate battlefield deaths due to blood loss.

The device, Hemafuse, collects blood from internal hemorrhage in order to replace or augment donor blood in emergencies. Hemafuse has the potential for use in most gunshot wound cases, particularly where projectiles enter the abdomen or thorax.

Hemafuse works by suctioning blood out of a cavity, through a filter, which removes clots and other impurities. Then the blood is pushed through tubing and into a blood storage bag. This bagged blood is then connected to the patient for gravity-fed transfusion.

The device's quick setup and minimal training could allow military surgeons to reach wounded soldiers faster, creating better patient outcomes, especially in austere environments where infrastructure such as electricity or refrigeration are limited. Hemafuse is also lightweight, semi-reusable and can be carried conveniently.

Hemafuse can be used up to 50 times with one-time-use, disposable filters. Between uses, the body of the device is sterilized. Autologous blood transfusions are known to eliminate issues of incompatibility and disease transfer as compared to donor blood. [3] Fresh whole blood transfusions are the ideal technique during incidence of trauma to re-supply both red blood cells and fluid components. Additionally, cases that are viable for intraoperative autologous transfusion via Hemafuse help retain scarce blood sources for other cases. Reducing the need for donor blood would also reduce the need for "buddy transfusions;" allowing soldiers to better maintain alertness in military settings.



Sisu Global Health's intraoperative autologous blood transfusion device, pictured above, could allow military surgeons to better serve wounded soldiers and create better patient outcomes. (Image courtesy of Sisu Global Health)

A proposed pilot study is set for East Africa. The pilot will have a sample size of 12 patients to demonstrate the feasibility of the device intraoperatively for patients with massive hemorrhage. The initial use case for testing will be ruptured ectopic pregnancies with later studies testing other abdominal and thorax hemorrhage from blunt trauma.

For more information on Sisu Global Health or the Hemafuse device:

http://www.sisuglobalhealth.com/
https://www.facebook.com/sisu-globalhealth/
https://twitter.com/sisuglobal

References:

1. Carr, ME Jr. (2004). Monitoring of hemostasis in combat trauma patients. Mil Med. 169(12 Suppl):11-5.
2. Eastridge, BJ, et al (2006). Trauma system development in a theater of war: experiences from Operation Iraqi Freedom and Operation Enduring Freedom. J. Trauma, 61(6):1366-73. DOI: 10.1097/01.ta.0000245894.78941.90.
3. Lin, E.S., Kaye, A.D., Baluch, A.R. (2012). Preanesthetic assessment of the Jehovah's Witness patient. The Ochsner Journal. 12:61-69.