Hemorrhage Control and Resuscitation

Wound Stasis System (WSS) for Acute Treatment of Blast Injuries

To date, no effective battlefield treatment exists for hemorrhage-inducing wounds that are not accessible by combat medics for traditional treatments, like direct compression. As a result, rapid and uncontrolled blood loss often leads to death before transport from the battlefield to a surgical setting can occur. Working with Arsenal Medical, Inc., DARPA created the WSS program to pursue a stabilizing, non-compressible, intra-abdominal hemorrhage treatment that would keep injured Service Members alive until they could be transported to a surgical setting for definitive treatment. The program has developed a self-expanding, polyurethane-based foam technology to address this prehospital treatment challenge. DARPA examined the dose dependence of survival using a lethal, closed-cavity, swine liver injury model. An optimum dose of 100 mL (based on efficacy and safety), plus fluid resuscitation, resulted in a survival rate of 72% at three hours versus 8% for controls that received fluid resuscitation only. To translate this swine dose to a human dose, DARPA conducted a novel, multi-center, translational research study that demonstrated an optimal foam dose of 65 mL in humans. The WSS addresses the critical need to mitigate uncontrolled blood loss and has the potential to improve Service Member survivability.