Comparison of a Novel Hemostatic Agent to Currently Available Agents in a Swine Model of Lethal Arterial Extremity Hemorrhage

Xu Wang MD, Violeta Yordanova DVM, Jeffrey Li BS, Michael Tupper MD, John Younger MD, Susan Stern MD. University of Michigan, Department of Emergency Medicine, Ann Arbor, MI 48109

INTRODUCTION

Uncontrolled hemorrhage is a significant cause of morbidity and mortality in both civilian1 and battlefield trauma2. On the battlefield, large vascular injuries of the extremity are the most common cause of preventable death3. The standard immediate treatment for these injuries is the application of direct pressure via manual compression and external dressings. This method however, is often ineffective and impractical in the battlefield setting4. The use of tourniquets, while effective if applied properly, is controversial except as a method of last resort due to the associated risks of reperfusion, limb ischemia, and neurological injury5.

Animal model – Anesthetized porcine model of uncontrolled hemorrhage via punch biopsy. The experimental timeline is as follows:

1. Animals are randomly assigned to one of 5 treatment groups
2. All animals were allowed to bleed freely for 1 minute, after which they were randomized to 1 of 5 treatment groups: Group I – Super QR (N=8); Group II – HemCon® Bandage (N=8); Group III – QuikClot Powder (N=8); Group IV – QuikClot ACS+™ Bandage (N=8); Group V – Army Field Bandage (N=8).

RESULTS

Cumulative hemorrhage volume was significantly less in the Super QR treated group compared to other hemostatic agents tested in this study. Additionally, Super QR did not cause thermal injury.

LIMITATIONS

• This study included only short-term mortality.
• This model included only arterial injury. Therefore the data cannot be generalized to other types and mechanisms of injury.

CONCLUSIONS

In a clinically relevant model of lethal arterial hemorrhage, the application of the new hemostatic agent, Super QR, significantly reduced mortality, hemorrhage volume, and resuscitation requirements as compared to all other hemostatic agents tested in this study. Additionally, Super QR did not result in the marked increase in tissue temperature characteristic of zeolite-based products.

REFERENCES


ABSTRACT-SWINE