BloodSTOP iX Trauma Matrix Improves Hemorrhage Control and Survival Compared to Combat Gauze in Anticoagulated Large-Animal Models

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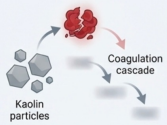
Introduction

QuikClot Combat Gauze (CG)

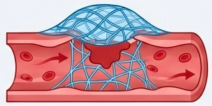


Mechanism: Relies on intact clotting factors.

Vulnerability: Ineffective in coagulopathy.

Outcome: Unstable clot, re-bleeding, high mortality.

BloodSTOP iX Trauma Matrix (TM)



Mechanism: Coagulation-independent **mechanical seal** + bioactive scaffolding.

Strength: Retains efficacy even when coagulation is impaired.

Outcome: Stable seal, durable hemostasis, 100% survival.

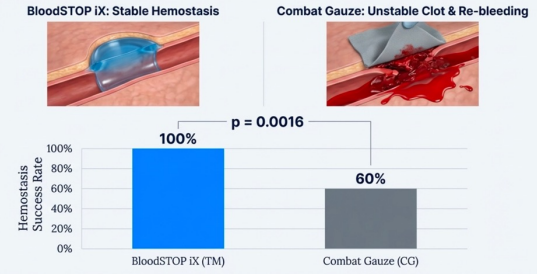
Materials & Methods

Group	Model Type	Animal Number	TM Size	Anticoagulant	Observation	Key Endpoint
A	Splenectomy	12	3×24 inch	None	3 h	Hemostasis and total blood loss
B	Splenectomy	12	2×12 inch	None	3 h	TM size comparison
C	Femoral artery hemorrhagic shock	12	2×12 inch	Plavix	3 h / 16 h	Controlled blood withdrawal, anticoagulated hemostasis
D	Femoral artery hemorrhagic shock	4	3×24 inch	Heparin	3 h / 16 h	Severe anticoagulated bleeding

A total 40 pigs were randomly into two cohorts: TM and CG

Results

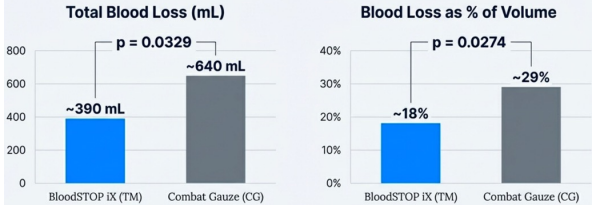
BloodSTOP iX Achieved 100% Hemostasis Success, Significantly Outperforming Combat Gauze



8 animals in the CG group failed to achieve hemostasis and required rescue, versus zero failures for TM.

Superior Hemostasis with TM Translated Directly to Significantly Reduced Blood Loss

TM's effective seal preserves critical blood volume, a key factor in preventing hemorrhagic shock.



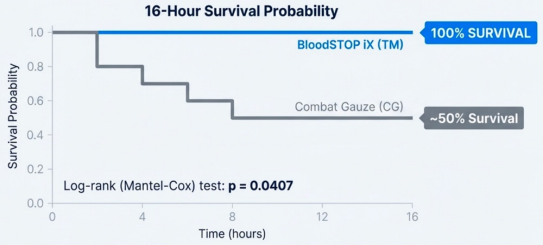
TM Maintains 100% Efficacy in Anticoagulated Models, While CG Fails Catastrophically

Data from femoral artery hemorrhage model with platelet inhibition (Plavix) and systemic anticoagulation (Heparin).

Metric (3-hr Anticoagulated Model)	BloodSTOP iX	Combat Gauze
Hemostasis Success	100% ✓	25%
Continuous Bleeding	0% ✓	25%
Mortality	0% ✓	50% ☠

Conclusion: TM's coagulation-independent mechanism provides reliable hemorrhage control when conventional clotting is impaired. Cumulative blood loss was also significantly lower in the TM group (**p = 0.0419**).

The Survival Benefit is Sustained: 100% of TM-Treated Animals Survived at 16 Hours



TM provides superior, sustained hemorrhage control that translates directly into long-term survival.

Conclusion

TM demonstrated **higher hemostasis success rate** compared to CG and resulted in **reduced total blood loss** in both, absolute and percentage of estimated blood volume (TM ~18% vs. CG ~29%)

TM maintained **higher and more stable mean arterial pressures** compared to CG, indicating **better preservation of hemodynamic function**

TM achieved **100% survival at 3 hours and 16 hours post-injury,** whereas CG-treated animals experienced increased mortality, stabilizing at approximately 50% by 16 hours

Thank you & Questions

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Abstract
Introduction: Hemorrhage is a leading cause of preventable death in trauma and combat. While QuikClot Combat Gauze (CG) is widely used, its kaolin-mediated activation requires intact clotting pathways, limiting efficacy in coagulopathic patients. BloodSTOP iX Trauma Matrix (TM) is a bioactive carboxymethyl cellulose-based gel that forms a mechanical seal and scaffolding for fibrin deposition independent of intrinsic coagulation activity. This study aimed to evaluate the hemostatic efficacy of TM versus CG across clinically relevant models.Materials and Methods: This study compared hemostatic agents using porcine models to represent four hemorrhage groups (A-D), including two splenectomy models and two anticoagulated femoral artery models. Group A involved a splenectomy model without anticoagulation using a large, 3×24-inch dressing. Group B also used a non-anticoagulated splenectomy model, but with a smaller 2×12-inch dressing. Group C involved a femoral artery bleeding model anticoagulated with Plavix, comparing small, 2×12-inch dressings. While Group D used a femoral artery model anticoagulated with heparin, employing large, 3×24-inch dressings. Hemostatic success rate, total blood loss, blood loss percentage, fluid resuscitation, mean arterial pressure (MAP), angiography, and survival were assessed at three and 16 hours. Data analysis included an unpaired t-test, Fisher's exact test, and Kaplan–Meier survival curves, performed using GraphPad Prism (version 10.1).Results: TM achieved higher hemostasis rates (100% vs. 60%), reduced total blood loss (390 vs. 640 mL), and lower relative blood loss (18% vs. 29%) compared with CG; $p<0.05$. TM showed improved survival at three (100% vs. 70%) and 16 hours (100% vs. 50%); $p<0.05$. TM remained effective under platelet and heparin inhibition, whereas CG showed increased hemorrhage and mortality. TM required less fluid resuscitation and maintained more stable MAPs. Angiography demonstrated preservation of distal flow beyond the arteriotomy site when using TM. No evidence of thromboembolism was observed for either group.Conclusions: Trauma Matrix provides coagulation-independent hemostasis, superior hemorrhage control, improved physiologic stabilization, and enhanced survival compared to Combat Gauze in a porcine model. These findings support TM as a promising hemostatic agent for combat and trauma, where coagulopathy may be present.