

High-Pressure Fibrin Sealant Foam: An Effective Hemostatic Agent for Treating Severe Parenchymal Hemorrhage.

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Abstract:

Background: The majority of early trauma deaths are related to uncontrolled, noncompressible, parenchymal hemorrhage from truncal injuries. The purpose of this study was to formulate a fibrin sealant foam (FSF) able to control severe parenchymal bleeding without compression or vascular control. **Materials and methods:** FSF with high fibrinogen concentration (20 mg/mL) and low thrombin activity (5 U/mL) was prepared and pressurized by addition of liquid gas propellant. The efficacy of this foam was tested against a severe parenchymal hemorrhage, created by partial resection of liver lobes in anticoagulated rabbits (n = 7) and compared to untreated injury (n = 8) and placebo treatment (n = 7). The hemostatic efficacy of pressurized FSF (n = 8) was also compared to a commercially available liquid fibrin sealant (n = 8) and a developing dry powdered fibrin sealant product (n = 8) in the same model. **Results:** The liver injury resulted in 122 +/- 11.5 mL blood loss and death of 75% of untreated rabbits (3.2-3.4 kg) within 1 h. Treatment with placebo foam had no effect on blood loss or mortality rate. Pressurized FSF significantly reduced bleeding, resulting in 56% (P < 0.05) and 66% (P < 0.01) reduction in blood loss as compared to untreated or placebo-treated animals, respectively, and 100% survival (P = 0.008). When pressurized FSF was compared with liquid and powdered forms of fibrin sealant, only foam significantly reduced blood loss (49%, P < 0.05) and mortality rate (54%, P < 0.05) of rabbits as compared to untreated control animals (n = 9). **Conclusion:** Biological nature, rapid preparation, coverage of large wound areas, and effective hemostatic properties make pressurized FSF an ideal candidate for treating nonoperable parenchymal injuries in damage control procedures. © 2008 Elsevier Inc. All rights

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