Comparison of the thrombogenicity of internationally available fibrin sealants in an established microsurgical model.

Authors: Frost-Arner L., Spotniz W.D., Rodeheaver G.T., Drake D.B.

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Abstract:

Previous studies comparing the thrombotic complications of cryoprecipitated fibrin sealant containing bovine thrombin on microvascular venous anastomoses in a rat epigastric free flap model revealed deleterious outcomes regarding flap survival with higher concentrations of topical bovine thrombin. This study was designed to compare three internationally available fibrin sealants, one experimental fibrin monomer sealant that does not require thrombin, and human thrombin alone as to their effects on the survival of an established rat epigastric free flap model. Ninety, Sprague-Dawley rats (400 to 600 g) were prepared for abdominal surgery, and ah epigastric-based skin flap was raised. The single vein draining the flap was clamped, divided, and reconnected using standard microvascular suturing techniques. Before release of the clamps, the chosen additive was applied precisely to the anastomosis. Additional material was then added to the raw surface of the flap. The animals were divided into seven treatment groups, each receiving 1 ml of commercial or investigational fibrin sealant or human thrombin alone: one control group receiving no additive treatment, four fibrin sealant groups receiving treatment with commercial or investigational fibrin sealant preparations, and two groups receiving different concentrations (500 IU/ml and 1000 IU/ml) of human thrombin applied to the anastomoses and the surrounding tissue. Flap survival was assessed at 7 days postoperatively. This study supports the contention that microvascular free flap survival based on microvascular venous anastomotic patency was adversely effected by high concentrations of thrombin. Lower concentrations (500 IU/ml and less) of thrombin did not seem to affect flap survival. One test product was composed of a fibrin monomer sealant, which obviates the

need for the thrombin additive. This group's survival rate was not statistically different from that of the control group. Thus, for microvascular anastomoses, lower concentrations of thrombin or a sealant devoid of thrombin seem to be best for microvascular anastomotic patency.