Effects of Tisseel and FloSeal on primary ischemic time in a rat fasciocutaneous free flap model.

Authors: Partsafas AW, Bascom DA, Jorgensen SA, Wax MK

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Abstract:

OBJECTIVES: Free flaps are the technique of choice for reconstruction of defects resulting from extirpation of tumors of the head and neck. Advances in microsurgical technique have resulted in success rates of greater than 95%. Numerous intraoperative factors, ranging from technical issues to topically applied agents, can complicate the outcome of microsurgical free tissue transfer. Synthetic tissue adhesives and hemostatic agents are playing an ever-increasing role in reconstructive surgery. The safety of these factors in free flap surgery has not been ascertained.

STUDY DESIGN: Animal Care Committee live rat model.

METHODS: Male Sprague-Dawley rats were divided into three groups: group I, Control; group 2, FloSeal; group 3, Tisseel. In each group, a 3 x 6 cm ventral fasciocutaneous groin flap based on the left superficial epigastric artery was elevated and the experimental material applied beneath the flap and around the flap pedicle prior to suturing of the flap back to the wound bed. The experimental materials consisted of 0.2 mL saline in the control group, 0.5 mL FloSeal, and 0.2 mL Tisseel. In phase I of this study, the effect of each treatment on flap survival was assessed by survival at postoperative day 4. In phase II of the study, the effects of these agents on ischemic tolerance was investigated. Five rats in each treatment group were exposed to ischemic times of 6, 8, 10, and 12 hours. Survival of the flap was assessed 7 days after reversal of the ischemia. Probit curves and the critical ischemic time (CIT50) were calculated.

RESULTS: All flaps survived the 2-hour period of ischemia and were viable at postoperative day 4. Flap survival from group 1 (Control), group 2 (FloSeal), and group 3 (Tisseel) at the various ischemic times was as follows: at 6 hours, 80%, 80%, and 80%, respectively; at 8 hours, 80%, 80%, 60%; at 10 hours, 60%, 33%, 40%; at 12 hours, 20%, 20%, 0%. The CIT50 for the Control, FloSeal, and Tisseel groups was 9.4, 9.0, and 7.0 hours, respectively.CONCLUSIONS FloSeal, a thrombin-based hemostatic agent, and Tisseel, a fibrin glue, displayed no adverse effect on flap survival in this model.