The effect of fibrin on the survival of ischemic skin flaps in rats.

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Abstract:

BACKGROUND: Skin flap necrosis is one of the hazards encountered in plastic and reconstructive surgery. Angiogenic agents may be useful for treating it by increasing blood flow. The angiogenic effect of fibrin in vitro has been demonstrated, but little is known about its in vivo effect. Te authors tested the hypothesis that local application of fibrin can improve the survival of ischemic skin flaps. METHODS: A cranially based dorsal skin flap (3 x 7 cm) was made in each rat. Fibrin (8 mg suspended in 400 mul of phosphate-buffered saline) was applied to the subcutaneous side of elevated skin flaps in the experimental group (n = 15), and phosphate-buffered saline alone was delivered in the control group (n = 15). Tissue blood flow of the skin flaps was measured four times (before the operation and on days 1, 3, and 7) at 1, 3, and 5 cm distal to the baseline of the skin flap. The survival rate of the skin flaps was measured on day 7 and histologic assessments were performed. RESULTS: The blood flow change rate at 5 cm in the experimental group was significantly higher than that in the control group on day 7 (60.9 +/- 5.7 percent versus 13.7 +/- 4.8 percent, $p < 0.001$). The survival rate of skin flaps was also significantly improved in the experimental group (77.0 +/- 2.0 percent) in comparison with the control group (54.7 +/- 2.2 percent, $p < 0.01$). Histologic analysis showed many more blood vessels in the experimental group in comparison with the control group. CONCLUSION: The local application of fibrin could improve the blood flow and survival of ischemic skin flaps.