Improved flap viability with site-specific delivery of sildenafil citrate using fibrin glue.

Authors: Gurhan Ulusoy M., Uysal A., Kocer U., Karaaslan O., Sedat Cuzdan S., Ayyildiz A., Ustun H.

Publication Date: 2005

Abstract:

Sildenafil is a cyclic guanosine-specific phosphodiesterase type 5 (PD-5) inhibitor that is widely used for erectile dysfunction. Potent and competitive inhibition of PD-5 enhances levels of cyclic guanosine monophosphate (cGMP). Fibrin glue-apart from tissue fixation-has been used for slow release of drugs. In this study, local delivery of Sildenafil citrate with fibrin glue was accomplished to improve random flap survival. Fifty Wistar rats were randomized into 5 groups, and a standardized dorsal random-pattern skin flap was elevated in each rat. In Group I (n = 10), the base of the flap was divided, making it a "graft" control to study the graft effect. In Group II (n = 10), a thin Silastic sheet was used to separate the flap from the underlying vascular bed, and no pharmacologic treatment was given. In Group III (n = 10), only 0.5 mL of fibrin glue was applied to the flap donor site. In Group IV (n = 10). 2.5 mg of sildenafil citrate mixed in 0.5 mL of fibrin glue was applied to donor site of the flap, whereas 10 mg of sildenafil citrate mixed in 0.5 mL of fibrin glue was applied in Group V (n = 10). Area of flap survival was evaluated on postoperative seventh day. Total necrosis of all of the flaps was observed in "graft" control group (Group I). Sildenafil and fibrin glue groups (Group IV and V) resulted in a statistically significant decrease in flap necrosis compared with Groups II and III ($P < 0.0001$). A statistically significant difference could not be documented between Group II and Group III ($P > 0.0001$). The decrease in skin necrosis was statistically significant in Group V compared with Group IV ($P < 0.0001$). Histologic examination revealed significantly increased vascular density in Groups IV and V compared with Groups II and III ($P < 0.0001$),

whereas a significant difference could not be documented between Groups IV and V ($P > 0.0001$) and between Groups II and III ($P > 0.0001$). In view of these results, topical sildenafil application seems to improve flap survival in random-pattern skin flaps in dose-dependent manner. Copyright © 2005 by Lippincott Williams & Wilkins.