

Assessment of the thrombogenic effect of fibrin sealant dressing in a vascular surgery model in rabbits.

Authors: Kheirabadi B.S., Sieber J., Holcomb J.B.

Publication Date: 2006

Abstract:

This study's objective was to investigate the potential thrombogenic effects of thrombin-containing fibrin sealant dressings (FSD) in a vascular repair model. Oval-shaped pieces of the rabbit abdominal aorta and vena cava were excised, the injuries were repaired with FSD, and animals were allowed to recover. Thrombus formation was examined by (1) an infusion of indium-labeled platelets into the rabbits following FSD application and estimation of total number of platelets attached to the wounds at 2, 4, and 6 h later (short-term effect, $n = 12$); and by (2) morphological and histological examinations of the vessels and dressings on days 1, 3, and 7 after repair operation in another group of rabbits (long-term effect, $n = 12$). Application of FSD sealed the vascular injuries and produced immediate hemostasis that was stable up to 1 week. The highest numbers of platelets (both native and labeled) adhered to the arterial and venous repair sites were 6.5×10^6 and 4.4×10^7 , respectively, 6 h after operation. The adhered platelets, however, did not form a visible and clinically significant thrombus. In long-term experiments, no evidence of thrombus was found in the lumens of the repaired vessels or on the dressings, and no microthrombi were detected histologically in other tissues at any time point. Although vena caval injuries showed signs of healing at day 7 postoperatively, the aortic wounds expanded progressively (pseudoaneurysm) and were prone to rupture at later times. Thus, direct exposure of FSD does not cause intravascular thrombosis or thrombotic events in rabbits. The dressing appears to be safe and effective for short-term repair of vascular injuries. It may also allow healing of minor venous defects, but cannot replace conventional surgical techniques (suturing) for permanent repair of arterial

damages.