

# **The effect of sealing with a fixed combination of collagen matrix-bound coagulation factors on the healing of colonic anastomoses in experimental high-risk mice models.**

Authors: Pantelis D, Beissel A, Kahl P, Wehner S, Vilz TO, Kalff JC

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## **Abstract:**

**PURPOSE:** Experimental and clinical studies on the sealing of colorectal anastomoses in order to reduce the rate of leakage have previously been performed with divergent results. However, comparatively few studies have been performed on anastomotic healing using a fibrin glue-coated patch. The aim of this experimental basic scientific study in mice was to investigate the effect of fibrin glue-coated collagen patches on the healing process of colonic anastomoses in situations of adverse healing process (technical deficiency and peritonitis).

**METHODS:** Colonic anastomoses were carried out in 206 mice and randomized into six groups (I: complete anastomoses, II: sealed complete anastomoses, III: incomplete anastomoses, IV: sealed incomplete anastomoses, V: complete anastomoses in the presence of bacterial peritonitis, VI: sealed complete anastomoses in the presence of bacterial peritonitis). Tissues from the anastomoses were removed and used for functional, histochemical, molecular, and biochemical investigations.

**RESULTS:** The evaluation of postoperative course data revealed the beneficial effect of additional sealing with a fixed combination of collagen matrix-bound coagulation factors I and IIa (Tachosil(), Nycomed Austria, Linz) in high-risk experimental anastomotic healing. Sealing incomplete anastomoses resulted in significantly lower lethality and leakage rates, as well as significantly higher

bursting pressure values and histopathologic scores. Collagen 1 and 3 expressions and hydroxyproline concentrations are greatly increased with additional sealing in all high-risk anastomoses.

**CONCLUSIONS:** In our current model, we demonstrate that additionally sealing high-risk experimental colonic anastomoses provides a positive effect on the healing process. The effect on the molecular level in particular seems to be essential and requires further experimental studies to evaluate the mechanism.