

Suture-free small bowel anastomoses using collagen fleece covered with fibrin glue in pigs.

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Abstract:

BACKGROUND: Several studies investigating anastomotic healing could objectify that the regularly used suture material leads to an impairment of wound healing due to ischemia at the anastomotic line. This study was initiated to test a hypothesis that a reduction of suture material leading to suture-free glued intestinal anastomoses is feasible and enables an improved wound healing.

MATERIALS AND METHODS: Three different types of anastomoses were carried out at the small bowel of 16 pigs. Standard hand-sewn anastomoses, anastomoses with loose-fitting skin staples, and suture-free glued anastomoses using a fibrin covered collagen fleece. When the animals were killed, both gross inspection of the parietes, bursting pressure and tissue for histological study became the basis for evaluation. Analyses were also made regarding the collagen I/III ratio and the expression of MMP 1 and 13. **RESULTS:** Four leakages at the stapled, one at the sutured, and one at the glued anastomoses occurred. All other anastomoses healed without complications. The bursting pressure did not differ significantly between the groups. The macroscopic inspection and the microscopic examination both showed an improved healing pattern for the material reduced techniques without onset of a deep ulcer at the anastomotic line as seen at the conventional sutured anastomoses. These findings were supported by the immunohistochemical studies. **CONCLUSIONS:** These observations suggest that a suture-free bowel anastomoses using collagen fleece covered with fibrin glue is technically feasible. Obviously, a reduction of foreign body material at the anastomotic line avoids unnecessary ischemia and thus supports a physiological improved wound healing process.