Circular anastomotic experimental fibrin sealant protection in deep colorectal anastomosis in pigs in a randomized 9-day survival study.

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Publication Date: 2015

Abstract:

Purpose: The reported rate of clinically apparent anastomotic leakage (AL) in a low anterior resection of the rectum (LAR) (<=7 cm from the anal verge) using a circular double-stapled anastomosis (CDSA) without defunctioning stoma is up to 37.5 %. Since AL may result in life-threatening peritonitis, sepsis, and multiple organ failure, LAR and CDSA are regularly combined with defunctioning stoma. Accordingly, we now evaluated whether LAR and CDSA without defunctioning stoma but with extraluminal anastomotic application of an experimental fibrin sealant reduce the AL rate. This might prevent humans from defunctioning stoma increasing quality of life and decreasing surgical costs. Methods: Forty 8-week-old pigs underwent LAR and CDSA in an end-to-end technique (descendo-rectostomy). Animals were randomized into a therapy and control group (gr.). The therapy gr. (n = 20) received an additional extraluminal circular application of an experimental fibrin sealant to the anastomosis. The objective was to assess the incidence of clinically apparent and non-clinically apparent leakage through the ninth postoperative day. Double-contrast barium CT radiographs of the colorectal region were performed on the ninth postoperative day or earlier, in case there were clinical signs of AL. All remaining animals were sacrificed on the ninth postoperative day and the anastomotic region was histopathologically analyzed. In case of earlier diagnosed AL, animals were sacrificed immediately. Blood samples were taken for complete blood count, chemistry, and coagulation profile prior to surgery and on the first, third, fifth, seventh, and ninth postoperative day. Results: A circular extraluminal anastomotic application of an experimental fibrin protection decreased the rate of clinically and non-clinically

apparent AL from 20 % (n = 4) in the control group to 5 % (n = 1) in the treatment group. Ulcerations were also observed in both gr. (control gr.-5 animals, therapy gr. -3 animals). All animals with AL showed necrosis surrounding the hole at the anastomoses. Three additional animals had a full wall defect at the anastomotic region that was blocked by the experimental fibrin sealant. The fibrin sealant was present at necropsy in all treated animals. Conclusion: Circular anastomotic protection with the experimental fibrin sealant blocked anastomotic full wall defects, preventing peritonitis and significantly reducing the AL rate from 25 to 5 %.