Establishment and analysis of a murine model of diversion colitis

A. Kleinwort[1], P. Döring[2], C. Hackbarth[1], C. Heidecke[1], T. Schulze[1]

[1] Division of General Surgery, Visceral, Thoracic and Vascular Surgery, Department of Surgery, University Medicine Greifswald, Greifswald, Germany
[2] Institute of Pathology, University Medicine Greifswald, Greifswald, Germany

Background: Diversion colitis is an inflammation of colonic segments excluded from the faecal stream after surgery. Its exact aetiology and its impact on systemic immune homeostasis is largely unknown. The aim of this study was the development of a murine model of diversion colitis in order to investigate mechanisms of disrupted self-tolerance in the pathogenesis of diversion colitis.
Methods: A diverting colostomy was created 0,6 cm after the ileocecal valve in C57BL/6-mice. In the Sham-group, colostomy in the colon ascendens was performed and closed immediately. The mice were euthanatized 60 days after operation. The colon was stained with HE and the secondary lymphatic organs were analysed by flow cytometry.
Results: After an initially high weight loss colostomy mice began to recover one week postoperatively. After 60 days, HE-staining showed lymphoid follicular hyperplasia, degenerated crypts and increased apoptosis in the colostomy group. In the colostomy group, the percentage of T_H2, and T_H17 T cells were significantly increased in the mesenteric lymph node. There was no change in the T_H1 population. Numbers of dendritic cells and macrophages were decreased in the colostomy group.
Conclusion: The established murine colostomy operation is a good model for human diversion colitis providing a very useful tool for the analysis of the impact of faecal stream diversion on mucosal immunity and systemic immune homeostasis. First results indicate that exclusion of colonic segments from the faecal stream favours the development of T_H2 and T_H17 T helper cells. Further detailed immunological analysis is required.