and severe degree of rejection). It became evident that biopsies of the mucosa alone are inadequate for a solely histologic diagnosis of early bowel allograft rejection, as no lesion other than lymphocytic infiltration could be detected in the mucosa in phases I and II. To gain diagnostic certainty, biopsies comprising all layers, including the lamina muscularis are mandatory. Full thickness biopsies, however, bear a certain risk of perforation. Therefore, mucosa-associated markers, such as the expression of MHC class II antigens (Ia) on enterocytes and the appearance of intraepithelial lymphocytes (IEL) were investigated with regard to their reliability of monitoring allograft rejection. Ia induction was investigated on enterocytes of heterotopic rat small bowel allografts in the Lewis-Brown Norway strain combination and on its grafts in the Lewis-Lewis strain combination. Ia antigens were detected with monoclonal antibodies using an immunoperoxidase technique. Generally, MHC class II antigens were not exhibited in the isografted group, while native small bowel showed a patchy distribution predominantly in the villi and only very few enterocytes stained positive in Lieberkühn's crypts. Allografted rats showed a typical pattern of Ia expression on the enterocytes during the rejection course. The initial expression was confined to the crypts, indicating a very early stage of rejection when compared to histological findings. More advanced stages of rejection were accompanied by increasing Ia biosynthesis in the crypts and Ia expression by the epithelium lining the villi. Cyclosporin (CSA) was not able to fully inhibit MHC class II antigen expression; however, the appearance of Ia was delayed. IEL were analyzed quantitatively and with monoclonal antibody staining. The number of IEL was increased during early phases of rejection. While native small bowel contained 4.5 IEL/100 epithelial cells (EC), the corresponding counts in rejected small bowel allografts were 15.8/100 EC. IEL in heterotopic isograft were comparable with those of normal small bowel. The CD8+ type of IEL constituted a large proportion (84%) of the total IEL in native small bowel. On average only 13.5% of IEL expressed the CD4+ antigen. During rejection the percentage of CD8+ IEL decreased (46%), and 8% were CD4+. On day 10, however, 30% of IEL expressed the CD8 marker and 11% the CD4 antigen. From these findings it is concluded that enhanced expression of Ia antigens on enterocytes and elevated numbers of IEL are highly indicative of small bowel allograft rejection.

89 Immunosuppressant and Antioxidant Therapies in the Prophylaxis of Intestinal Reperfusion Injury

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A lot of evidence about the role of free radicals in the genesis of the reperfusion injury has been provided by the administration of antioxidants prior to the ischemia. The aim of this study is to test the ability of these drugs to decrease the intestinal reperfusion injury once the ischemia has been induced in order to parallel clinic situations.

Material and Methods. Under Nembutal anesthesia, ischemia was performed in female Sprague-Dawley rats (200 g) by clamping the superior mesenteric artery for 120 min. The different drugs were administered diluted in physiologic serum (2 cc) at a low perfusion rate through the femoral vein, 15 min prior to removing the clamps. Seven groups of 20 animals have been considered: (I) control (ischemia alone); (II) serum; (III) superoxide-dismutase (SOD) (7 mg/kg); (IV) vitamin E (20 mg/kg); (V) allopurinol (ALLO) (50 mg/kg); (VI) folic acid (0.1 mg/kg); (VII) cyclosporin A (CsA) (5 mg/kg, s.c.). The mortality rate (MR), the length of damaged intestine (LDI) and the mucosal damage index (MDI) were assessed.

Results. Mortality Rate: (I) 75.5%; (II) 57.7%; (III) 40%; (IV) 55%; (V) 40%; (VI) 25%; (VII) 60%. Length of damaged intestine: (I) 30.9%; (II) 46.5%; (III) 24.7%; (IV) 39.5%; (V) 23.8%; (VI) 20.3%; (VII) 29%. Mucosal damage index: (I) 12.54; (II) 9.76; (III) 8.4; (IV) 10.15; (V) 11.54; (VI) 8.54; (VII) 10.54. Serum treatment slightly decreased the MR and the MDI, while frankly increasing the LDI ($p<0.01$). SOD, ALLO and folic acid significantly decreased the MR, the LDI and the MDI. Vit. E did not modify the MR but it decreased the LDI and the MDI. CsA did not improve the MR nor the MDI, but it prevented the increase of the LDI induced by serum ($p<0.005$).

Conclusion. The clinical trial of antioxidant drugs for the prevention of intestinal reperfusion injury may be justified.

90 Immunologic Findings After Multivisceral Transplantation in Dogs

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The purpose of the present study was to assess the immunologic aspects in the multivisceral transplantation using a canine model.

After removal of upper abdominal organs en bloc, visceral organ clusters including the pancreas, liver, spleen, and duodenum were orthotopically transplanted in 27 dogs. In this study no immunosuppressive agent was administered. After grafting histological and functional examination of each transplanted organ was performed.

All animals died within 14 days after grafting without immunosuppression due to liver failure or other complication. The glucose tolerance test (0.5 g/kg, i.v.) gave normal response 3 days after transplantation, and thereafter blood glucose, plasma insulin and amylase levels were within normal range until death. Hepatic function, which was assessed