Arterialisation of the portal vein as a model for the induction of hepatic fibrosis: description of microsurgical models in the rat.

Abstract:

Within the framework of liver transplantation, arterialisation of the portal vein in the case of non-recanalisable thrombosis has been reactivated. However, one of the consequences of this vascular reconstruction is the development of hepatic fibrosis. Clinical experience has shown that the development of fibrosis can be avoided by reducing portal inflow. We present, as a model for the induction of hepatic fibrosis, techniques of PVA, including transplantation. For PVA, several different techniques were used: the first with reduction of the portal inflow over a stent inserted in the right renal artery (PVA-B), the second with unrestricted flow using an aortic-portal segment (PVA-APS). The third technique was orthotopic liver transplantation with unrestricted portal arterialisation (OLTx-APS). Portal blood flow was measured with an ultrasonic flow probe. To determine the degree of hepatic fibrosis the amount of hydroxyproline was measured. Quantification of relative transcript levels of procollagen I was effected with real-time PCR using the TaqMan technology on a lightcycler instrument. The extracellular matrix was visualised with picro-sirius staining. Measurements with the ultrasonic probe showed a significant increase in flow rates, both with reduced (PVA-B) and unrestricted inflow (PVA-APS; OLTx-APS). The lowest survival rate (58%) was found
in the group with unrestricted portal inflow. The reason for this was a high rate of thrombosis in the in the portal vascular tree (4 out of 12). In the OLTx-APS group four animals died within the first 3 postoperative days (69%), as a result of protracted postoperative shock. The overall survival rate was the highest (85%) in the group undergoing PVA with reduction of the portal inflow. PVA with unrestricted inflow was followed by a significant increase in extracellular collagen, which showed a clear correlation with the increase in the amount of hydroxyproline, the level of the mRNA for procollagen I and picro-sirius staining. With the operative PVA techniques presented herein, different arterial flow rates in the portal vein can be investigated. In our opinion these techniques represent an excellent animal model for studying the genesis of fibrosis and antifibrotic substances. By regulating the blood flow in the arterialised portal vein hepatic fibrosis can be reduced or even avoided. After a brief period of learning the microsurgical techniques, the surgeon can limit clamping times and achieve good results with these techniques.

Zeitschriftentitel / Abkürzung:
Transpl Int

Jahr: 2005
Band: 17
Heft / Issue: 12
Seiten: 822-33
Sprache: eng
Print-ISSN: 0934-0874
TUM Einrichtung:
ther experimentelle Onkologie und Therapieforschung

Occurences:
· Einrichtungen > Fakultäten > Fakultät für Medizin > Kliniken und Institute > Institut für Experimentelle Onkologie und Therapieforschung > 2005