Portal vein arterialisation as a technical option in liver transplantation: impact on function, regeneration, and morphology of the liver following hemihepatectomy in pigs.

BACKGROUND: Arterialisation of the portal vein has been propagated as a technical variant in liver transplantation. However, the consequences of this unphysiological vascular supply are insufficiently known. METHODS: Twenty-seven healthy pigs were subjected to a left hemihepatectomy and divided into three groups. The first group received complete arterialisation of the portal vein (PVA). In the second group hepatic artery blood flow was also interrupted by dividing the artery (PVA/DHA). Nine animals served as controls (Group C). RESULTS: Early mortality in the PVA/DHA group (6/9) was significantly increased in comparison with the PVA (2/9) and control (2/9) groups (P< 0.05). In the surviving animals, arterialisation (PVA and PVA/DHA) led to significantly faster hepatic regeneration in comparison with control animals, with comparable liver function and with liver size increasing to 278% and 293% vs 134% (P = 0.002) after 3 weeks, in liver ... weeks. This was accompanied by enhanced hepatic expression of the proliferation markers MIB-1 (22.4% and 16.7% vs 5.9%, P = 0.002) and PCNA (86% and 68% vs 66%, P = 0.002) one week postopereration. At the same time, the number of apoptotic hepatocytes increased from 1.6% to 2.5% and
2.3% (P = 0.002). No significant difference was found in the collagen content of the liver after 3
weeks. CONCLUSIONS: Arterialisation of the portal vein promotes early and enhanced hepatic
regeneration without impairing liver function. This technique may therefore be useful in split-graft liver
transplantation, where this aspect would be of particular importance.