Medical Xpress

Ischemic preconditioning alters hepatic blood supply

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Liver surgery has become a safe procedure in the past years and is mainly done because of malignant tumors. A common strategy to reduce blood loss during surgery is to temporarily shut down the blood supply to the liver [pringle maneuver (PM)], which, however may be associated with severe hepatocellular injury and consequent enhanced morbidity. Many efforts were undertaken to overcome the deleterious effects of ischemia-reperfusion (I/R) injury of the liver caused by the PM. A new method of hepatocellular protection comprises ischemic preconditioning (IP), i.e. an additional short ischemia and reperfusion period prior to sustained ischemia, as set by the PM. However, mechanisms of protection by IP are still largely unknown. Also, no data were available which comment on hepatic macroperfusion under different conditions, such as IP.

A research article to be published on April 21, 2010 in the World Journal of Gastroenterology addresses this question. The research team from Switzerland and Germany investigated whether IP may also improve the blood flow in the hepatic artery (HA) and the portal vein (PV), i.e., the macrocirculation during liver resections in humans.

In this randomized study, the researchers could demonstrate a significant impact of IP on the blood flows of HA and PV when compared to a control group subjected to liver resection with the PM, but without IP. For the first time the authors could show in a human study that IP significantly enhanced the arterial blood flow on reperfusion of ischemic livers whereas the portal blood flow remained unaffected in this group.

When compared to liver resections without IP (PM only), the total blood flow was markedly increased by IP, in particular because a severe decrease in the PV perfusion was not adequately compensated by the HA blood flow in the control group. Furthermore, an inverse correlation between the HA flow and the amount of hepatocellular damage could be demonstrated, suggesting the quality of HA perfusion was a distinct prerequisite for the maintenance of liver function during ischemia and reperfusion.

Because PV flows showed no correlation with hepatocellular injury, the authors suggest that during liver surgery temporary occlusion of the portal vein, but not of the hepatic artery (partial PM) may help to avoid I/R-related complications in liver surgery. In further studies, the impact of macrohemodynamic changes on the hepatic microcirculation should be elucidated because, at this time, no data are available concerning this important issue.

More information: Heizmann O, Meimarakis G, Volk A, Matz D, Oertli D, Schauer RJ. Ischemic preconditioning-induced hyperperfusion correlates with hepatoprotection after liver resection. World J Gastroenterol 2010; 16(15): 1871-1878. www.wjgnet.com/1007-9327/full/v16/i15/1871.htm

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