Preservation technique for marginal livers prevents biliary stricture

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New research shows that a preservation technique known as sequential subnormothermic ex vivo liver perfusion (SNEVLP) prevents ischemic type biliary stricture following liver transplantation using grafts from donations after cardiac death (DCD). Findings published in *Liver Transplantation*, a journal of the American Association for the Study of Liver Diseases and the International Liver Transplantation Society, indicate that the preservation of DCD grafts using SNEVLP versus cold storage reduces bile duct and endothelial cell injury post transplantation.

The shortage of organs for liver transplantation continues to pose a challenge for the transplant community, with up to 30% of patients on the liver transplant waiting list that die or are delisted due to disease progression. One solution to increase available organs is the use of marginal grafts, which include organs from older donors, steatotic grafts, and livers obtained after cardiac death. However, previous research reports that cold storage used to preserve DCD livers are linked to 20% to 40% ischemic type biliary strictures rate.

"While the use of marginal livers for transplantation has increased the donor pool, it is not without issue," explains lead author Dr. Markus Selzner from Toronto General Hospital in Canada. "Preservation techniques, such as cold storage, are not well tolerated by marginal livers and can cause reperfusion or graft dysfunction. This has prompted our investigation of preservation methods that avoid the negative effects of cooling."

For the present animal model study the research team compared SNEVLP to cold storage of organs taken from pigs. Liver grafts were stored for 10 hours at 4°C at 7 hours of cold storage and 3 hours of SNEVLP at 33°C. Liver tissue (hepatocyte), endothelial cell and biliary injury and function were measured.

Following transplantation the 7-day survival of the animals was 60% in the SNEVLP and 40% in the cold storage groups. There was no difference in the international normalized ration (INR), factor V and aspartate aminotransaminase (AST) levels between the two groups.

"Our findings suggest that cold storage followed by SNEVLP protects the liver from bile duct injury and reduces endothelial cell death," concludes Dr. Selzner. "This preservation method increases the donor pool by allowing better use of DCD liver grafts." The authors note that further investigation of this preservation method is needed to understand the full impact on human livers used in transplantation.

This study is published in *Liver Transplantation*.

More information: "Subnormothermic Ex Vivo Liver Perfusion Reduces Endothelial Cell and Bile Duct Injury after DCD Pig Liver Transplantation." Jan M. Knaak, Vinzent N. Spetzler, Nicolas Goldaracena, Markus U. Boehnert, Fateh Bazerbachi, Kristine S. Louis, Oyedele A. Adeyi, Leonid Minkovich, Paul M. Yip, Shaf Keshavjee, Gary A. Levy, David R. Grant, Nazia Selzner and Markus Selzner. *Liver Transplantation*; DOI: 10.1002/lt.23986

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