

Machine Perfusion

Ischemia-free liver transplantation

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Background & Aims: Ischemia-reperfusion injury (IRI) has thus far been considered as an inevitable component of organ transplantation, compromising outcomes, and limiting organ availability. Ischemia-free organ transplantation is a novel approach designed to avoid IRI, with the potential to improve outcomes.

Methods: In this randomized, controlled clinical trial, recipients of livers from donors after brain death were randomly assigned to receive either an ischemia-free or a 'conventional' transplant. Primary end point was the incidence of early allograft dysfunction. Secondary end points included complications related to graft IRI.

Results: 65 out of 68 randomized patients underwent transplants and were included in the analysis (median age, 52 years; n=9 women [14%]). Early allograft dysfunction occurred in 2 (6%) randomized to ischemia-free liver transplantation and in 8 (24%) randomized to conventional liver transplantation (difference, -18%; 95% CI, -35% to -1%; P=.044). Post-reperfusion syndrome occurred in 3 (9%) randomized to ischemia-free liver transplantation and in 21 (64%) randomized to conventional liver transplantation (difference, -54%; 95% CI, -74% to -35%; P<.001). Non-anastomotic biliary strictures diagnosed with protocol magnetic resonance cholangiopancreatography by 12 months were observed in 2 recipients (8%) randomized to ischemia-free liver transplantation and in 9 recipients (36%) randomized to conventional liver transplantation (difference, -28%; 95% CI, -50% to -7%; P = .014). The comprehensive complication index by one year after transplantation was 30.48 (95% CI, 23.25-37.71) in the ischemia-free liver transplantation group vs 42.14 (95% CI, 35.01-49.26) in the conventional liver transplantation group (difference, -11.66; 95% CI, -21.81 to -1.51; P = .025).

Conclusion: Among patients with end-stage liver disease, ischemia-free liver transplantation, compared with conventional approach, significantly reduced complications related to ischemia reperfusion injury.