The fate of donor-type ABO blood group antigen expression in the liver grafts of ABO incompatible adult living donor liver transplantation

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Background: Despite the promising survival outcomes of ABO incompatible adult living donor liver transplantation (ABOi ALDLT) on the effective desensitization protocol of isoagglutinin titer, concerns for antibody-mediated rejection (AMR) leading to fatal intrahepatic biliary necrosis still remain. Donor-type ABO blood group antigens (dABOAg) have been identified in liver graft specimens. However, their fates and roles for AMR in ABOi ALDLT is yet uncertain.

Methods: Thirty ABOi ALDLT recipients who underwent serial liver biopsy were retrospectively reviewed. dABOAg was stained in day 0, 1-week, and 1-year post-transplantation liver graft biopsies. The expression of dABOAg was quantitatively and serially measured by the mean number of stained structures (sS) and the percentage of the stained area (sA, %) in the portal tracts in 90 liver graft biopsies. sS was defined as manually counted positively stained vascular (endothelium of the capillaries, arteries, hepatic veins, and portal veins) and bile duct (epithelium of the bile ducts) structures within the portal tract. sA was automatically measured using the ImageJ software.

Results: On day 0, 1-week, 1-year liver graft biopsies, the overall sS count (32.3 ± 21.7 vs. 20.8 ± 10.8 vs. 20.6 ± 13.2 ; $P=0.001$) and sA (%) (2.9 ± 2.2 vs. 1.8 ± 1.1 vs. 1.7 ± 1.5 ; $P<0.001$) significantly decreased over time. Early rejection on 1-week biopsy was seen in nine out of 30 recipients (30.0%); five (16.7%) with acute cellular rejection and four (13.3%) with AMR. The sS count in the grafts with early rejection and in grafts with AMR showed a rebound trend, with minimal change from day 0 to 1 week, but increasing at 1-year after transplantation. However, these trends were not definitely shown in the sA analysis.

Conclusions: The expression of dABOAg in the liver graft decreases over time after ABOi ALDLT. However, sustained dABOAg expression on the graft were shown in recipients with early rejection, especially in AMR grafts.

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