# In-depth Clinical, Haemodynamic and Volumetric Assessment of the RAPID-type Auxiliary Liver Transplantation in Non-cirrhotic Setting; are we Simply Dealing with a Transplant Model of ALPPS?

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## Abstract

**Background:** The RAPID (Resection And Partial Liver Transplantation with Delayed total hepatectomy) procedure involves left hepatectomy with orthotopic implantation of a left lobe and right portal vein ligation. This technique induces volumetric graft increase, allowing for a right completion hepatectomy within 15 days. Notably, there is a lack of data on the hemodynamics of Small-for-Size (SFS) grafts exposed to portal overflow without triggering SFS syndrome.

**Methods:** A prospective single-center protocol included eight living donors and eight RAPID non-cirrhotic recipients. Comprehensive clinical and biological data were collected, accompanied by intraoperative arterial and portal flow and pressure measurements. Early kinetic growth rate (eKGR%) and graft function were assessed using CT and 99Tc-mebrofenin scintigraphy on postoperative days 7 and 14. Findings were compared with retrospective data from13 left Living Donor Liver Transplantation (LDLT) recipients.

**Results:** The median Graft-body weight ratio was 0.41% (IQR, 0.34 to 0.49), markedly lower than in LDLT. However, there was no significant difference in eKGR between RAPID and LDLT grafts. Sequential analysis revealed variable eKGR per day: 10.6% (7.8-13.2) in the first week and 7.6% (6-9.1) in the second week post-transplantation. Indexed portal flow (iQpv) was significantly higher in RAPID compared to left LDLT (P=0.01). No hemodynamic parameters were found to correlate with regeneration speed. We modulated portal flow in 2 out of 8 cases.

**Conclusions:** This study presents the first report of hemodynamic and volumetric data for the RAPID technique. Despite initial graft volumes falling below conventional LDLT recommendations, the study highlights acceptable clinical outcomes.