

## Functional Elements Associated With Hepatic Regeneration in Living Donors After Right Hepatic Lobectomy

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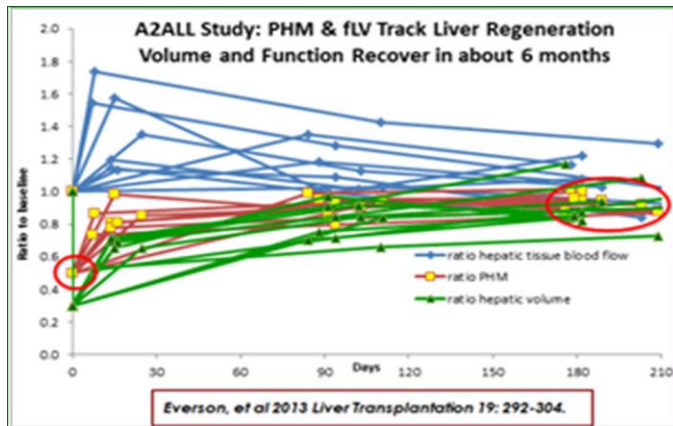
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### ABSTRACT

We quantified the rates of hepatic regeneration and functional recovery for 6 months after right hepatic lobectomy in living donors for liver transplantation. Twelve donors were studied pre-donation (baseline); 8 were retested at a mean  $\pm$  SD of  $11 \pm 3$  days after donation (T1), 10 were retested at a mean of  $91 \pm 9$  days after donation (T2), and 10 were retested at a mean of  $185 \pm 17$  days after donation (T3).

Liver and spleen volumes were measured with computed tomography (CT) and single-photon emission computed tomography (SPECT). Hepatic metabolism was assessed with caffeine and erythromycin, and **hepatic blood flow (HBF)** was assessed with cholates, galactose, and the **perfused hepatic mass (PHM)** by SPECT.

The regeneration rates ( $\text{mL kg}^{-1}$  of body weight  $\text{day}^{-1}$ ) by CT were  $0.60 \pm 0.22$  mL from the baseline to T1,  $0.05 \pm 0.02$  mL from T1 to T2, and  $0.01 \pm 0.01$  from T2 to T3; by SPECT they were  $0.54 \pm 0.20$ ,  $0.04 \pm 0.01$ , and  $0.01 \pm 0.02$ , respectively. At T3, the liver volumes were  $84\% \pm 7\%$  of the baseline according to CT and  **$92\% \pm 13\%$  of the baseline according to SPECT**.



**PHM and fLV measure hepatic blood flow and volume changes including the rapid regeneration in the first two weeks after right lobe donation.**

Changes in the hepatic metabolism did not achieve statistical significance. At T1, the unadjusted clearance ratios with respect to the baseline were  $0.75 \pm 0.07$  for intravenous cholate ( $P < 0.001$ ),  $0.88 \pm 0.15$  for galactose ( $P = 0.07$ ),  $0.84 \pm 0.08$  for PHM ( $P = 0.002$ ), and  $0.83 \pm 0.19$  for the estimated HBF ( $P = 0.06$ ).

At T1, these ratios adjusted per liter of liver were up to 50% greater than the baseline values, suggesting recruitment of HBF by the regenerating liver. Increased cholate shunt, increased spleen volume, and decreased platelet count, were consistent with an altered portal circulation.

In conclusion, initial hepatic regeneration is rapid, accounts for nearly two-thirds of total regeneration, and is **associated with increases in HBF** and cholate uptake. Right lobe donation alters the portal circulation of living donors, but the long-term clinical consequences, if there are any, are unknown.