ABST-0608

Correlation Between Cross-sectional Area Ratio Of Right-to-left Portal Vein And Future Remnant Liver Proportion Change After Right Portal Vein Embolization

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Background : Several reports have been published on the issue of portal vein embolization (PVE) before major hepatectomy. Many positive and negative factors for FRL were discussed, but few studies dealt with the correlation between portal vein (PV) size and FRL. The aim of the present study is to evaluate the effect of cross-sectional area ratio of right-to-left PV (RPVA/LPVA) on FRL% change following right PVE.

Methods : A total of 75 patients who underwent right PVE in an attempt to increase FRL volume from November 2004 to August 2021 were retrospectively included. We measured total liver volume (TLV), FRL, RPVA/LPVA based on computed tomography (CT) scans twice, right before PVE and two or three weeks after PVE, and analyzed the correlation of them and risk factors for insufficient FRL% increase.

Results : Mean age was 63.75 years old, and 12 patients (16.2%) were infected with hepatitis B virus. The most common disease was perihilar cholangiocarcinoma (36, 48.0%) followed by hepatocellular carcinoma (HCC; 19, 25.3%), and 58 patients (77.3%) were able to undergo major hepatectomy. Throughout maximal chi-square method, we figured out cut-off value of RPVA/LPVA (1.20), and we divided the patients into two groups according to the value (35, ≤ 1.20, smaller group; 40, > 1.20, larger group). Between the two groups, pre-embolization right hemiliver proportion (pre-RHL%; 57.22 vs 63.69%, P = 0.001), FRL% increase (9.93 vs 14.72%, P < 0.001) were significantly higher in the larger group. In surgical outcomes of the patients who underwent major hepatectomy, R0 rate was higher in the larger group (66.7 vs 88.2%, P = 0.046), but the other results showed no significant difference. In multivariable analysis, international normalized ratio (INR; HR 0.001, P = 0.035), HCC (HR 0.105, P = 0.018), pre-RHL% (HR 1.171, P = 0.021) and RPVA/LPVA (HR 1.027, P = 0.020) were significant prognostic factors for FRL% increase ≥ 10%.

Conclusions : RPVA/LPVA is one of the meaningful factors for sufficient FRL% increase. This factor can be helpful to predict FRL% and operability for major hepatectomy after right PVE.

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