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DEFINING CLINICAL FACTORS PREDICTING A PATIENT'S LIVER REGENERATION VOLUME AFTER RIGHT HEMIHEPATECTOMY

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Background : This study was designed to develop a statistical model for predicting liver volume after right hemihepatectomy (RHH). Unlike previous study, this study used deep learning-based automatic liver volumetry tool which is well known for less variation and higher accuracy.

Methods : Patients who underwent right hemihepatectomy from January 2022 to March 2024 at Samsung Medical Center were included for analysis. Clinical data were collected, and pre- and post-RHH liver volume were evaluated by machine learning-based automatic liver volumetry tool. The study population was categorized into two subgroups based on the ratio of post-RHH to pre-RHH liver volume and the interaction effect between two subgroups on each clinical factor was analyzed. In total study population, multiple linear regression analysis was performed for developing the model predicting post-RHH liver volume.

Results : A total of 98 patients were included. There were 58 and 40 patients whose liver regeneration rates were less than 0.8 and 0.8 or more, respectively. There was no interaction effect between the subgroups. The prediction model included patient's sex ($P<0.05$), pre-RHH right liver lobe volume ($P<0.01$), pre-RHH left liver lobe volume ($P<0.001$), pre-RHH International Normalized Ratio (INR) ($P<0.05$), age ($P=0.14$) and weight ($P=0.11$). The model showed R^2 of 0.6 and correlation coefficient (r) of 0.77.

Conclusions : This study developed the linear prediction model for post-RHH liver volume and figured out which clinical factors can be used to predict the liver regeneration volume before right hemihepatectomy. The deep learning-based automatic liver volumetry tool could automate and accelerate the work process and therefore decrease clinicians' workload.

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