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Correlation of the virtually preserved renal cortical volume on CT with postoperative renal function in patients undergoing partial nephrectomy

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PURPOSE: The purpose of our study was to determine whether the postoperative renal function correlates with the virtual preserved renal cortical volume measured from preoperative CT in patients undergoing partial nephrectomy.

MATERIALS AND METHODS: A total of 29 patients (17 men, 12 women, aged 34 to 76 years) undergoing MDCT and partial nephrectomy for solitary renal mass were included in this study. The preoperative CT was assessed to measure the volume of both kidneys using the software that automatically contours the renal cortex. After manual extraction of the mass with predicted resection margin of the normal parenchyma (1 cm from the tumor margin), the virtual preserved renal cortical volume was calculated. Estimatedglomerular filtration rate (eGFR, ml/min) was measured by Cockcroft-Gault formula. Statistical analysis was done using the Pearson correlation and simple linear regression analysis.

RESULTS: Renal volume measurements yielded a mean preoperative bilateral renal cortical volume of 281.0 cm^3 $\pm$ 75.3 SD, mean virtual preserved renal cortical volume of 276.1 cm^3 $\pm$ 74.3SD. Mean preoperative eGFR was 76.6 ml/min $\pm$ 16.2SD and mean postoperative (3-month after operation) eGFR was 71.2 ml/min $\pm$ 16.4SD. The correlation between virtual preserved renal cortical volume and postoperative eGFR present $r = 0.492$ ($p = 0.007$). Simple linear regression showed that R square of the virtual preserved renal cortical volume for the postoperative eGFR was 24%.

CONCLUSION: The virtual preserved renal cortical volume measured on preoperative CT scan was correlated with postoperative eGFR. The volume calculations of renal cortex on CT scan may allow the prediction of postoperative renal function.

F/59 RCC in upper pole of Lt. kidney