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Use of Renal Scan in Patients With ADPKD

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Autosomal Dominant Polycystic Kidney Disease (ADPKD) is a progressive disorder characterized by the gradual expansion of bilateral renal cysts, leading to increased total kidney volume (TKV) and declining glomerular filtration rate (GFR). While TKV and eGFR are commonly used to monitor disease progression, they do not reflect disparities in function between the two kidneys. Dynamic renal scintigraphy enables separate quantification of each kidney's function and may help identify such asymmetries. This study aimed to assess the clinical utility of dynamic renal scintigraphy by evaluating GFR discrepancies between kidneys in patients with ADPKD. A total of 87 patients with ADPKD who underwent renal scintigraphy were retrospectively analyzed. Patients were divided into two groups based on the interrenal GFR difference: <10 mL/min and ≥ 10 mL/min. Among them, 41.4% (36/87) exhibited a GFR difference of ≥ 10 mL/min. Associations with eGFR, CKD stage, TKV, and Mayo Imaging Classification (MIC) were evaluated. The distribution of GFR differences varied significantly by MIC ($p = 0.0277$). A tendency toward slightly greater GFR differences was observed in MIC 1C and 1D. Standardized residuals suggested a lower-than-expected frequency of significant GFR difference in MIC 1B and a higher-than-expected trend in MIC 1D, although these were not statistically significant individually. Five patients showed GFR differences exceeding 30 mL/min. Among them, one had complete unilateral renal function loss due to hydronephrosis and was excluded from tolvaptan therapy. One patient had ureteropelvic junction stricture that was surgically corrected, and another had a large parapelvic cyst treated with sclerotherapy, resulting in restored renal function. Two patients with no structural abnormalities but GFR <30 mL/min in one kidney were started on tolvaptan and are under follow-up. In conclusion, 41.4% of patients with ADPKD exhibited a marked interrenal GFR difference of ≥ 10 mL/min, which showed a significant association with MIC. In patients with greater GFR disparities, underlying structural abnormalities were identified in some cases. Dynamic renal scintigraphy proved useful in quantifying functional differences between kidneys, highlighting its potential

role in predicting disease progression, informing treatment decisions—including tolvaptan eligibility, particularly in patients classified as MIC 1C or 1D—and detecting surgically correctable lesions.

Keywords: Polycystic Kidney, Autosomal Dominant, Radionuclide Imaging, Glomerular Filtration Rate, Disease Progression