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ESTIMATION OF RENAL KT/V FROM 24-HOUR URINE VOLUME AND UREA DISTRIBUTION VOLUME IN PERITONEAL DIALYSIS

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Background and Aims: Residual renal function is an important factor in peritoneal dialysis (PD) regarding technical survival and implementation of incremental therapy schemes. The aim of the retrospective study was to develop an estimation formula of renal Kt/V_{urea} in PD based on urine output and anthropometric data.

Method: In 235 adult PD patients (151 males, 84 females, median age 66 years, median BMI 26.0, diuresis >100 ml/day) urine output was registered together with anthropometric and lab data during the first peritoneal equilibration test. The dose of furosemide therapy was noted. Urea distribution volume calculated using the formula of DuBois. Measurement of urea in blood and urine was performed by a standard kinetic test with urease.

Results: 24-hour urine volume ranged from 100 to 3800 ml (median 1150 ml), similar in both sexes. Renal Kt_{urea} showed a significant linear correlation to daily urine volume ($r=0.78$, $p<0.01$) independent from sex and diuretic dose: renal $Kt_{urea} = 5.116 + 0.0221$ x 24-hour urine volume (renal Kt_{urea} in liters/week, 24-hour urine volume in ml). Urea distribution volume varied between 24 and 60 liters (median 36.4 liters), and calculated renal Kt/V ranged from 0.05 to 2.57 (median 0.84). Estimated renal Kt/V, based on the before mentioned equation divided by urea distribution volume, correlated significantly to calculated renal Kt/V ($r=0.75$, $p<0.01$). The goodness of fit analysis showed a mean absolute error of 0.24. The Bland-Altman Plot confirmed a tendency of over-estimation for renal $Kt/V < 1.0$ and under-estimation for higher renal Kt/V. A restriction of the analysis to 24-hour urine volume up to 1500 ml (n=142 patients, median age 69 years, BMI 25) resulted in an improvement of renal Kt/V estimation (goodness of fit analysis: mean absolute error 0.20).

Conclusion: The estimation of renal Kt/V in PD patients seems to be feasible utilizing 24-hour urine volume and anthropometric data.

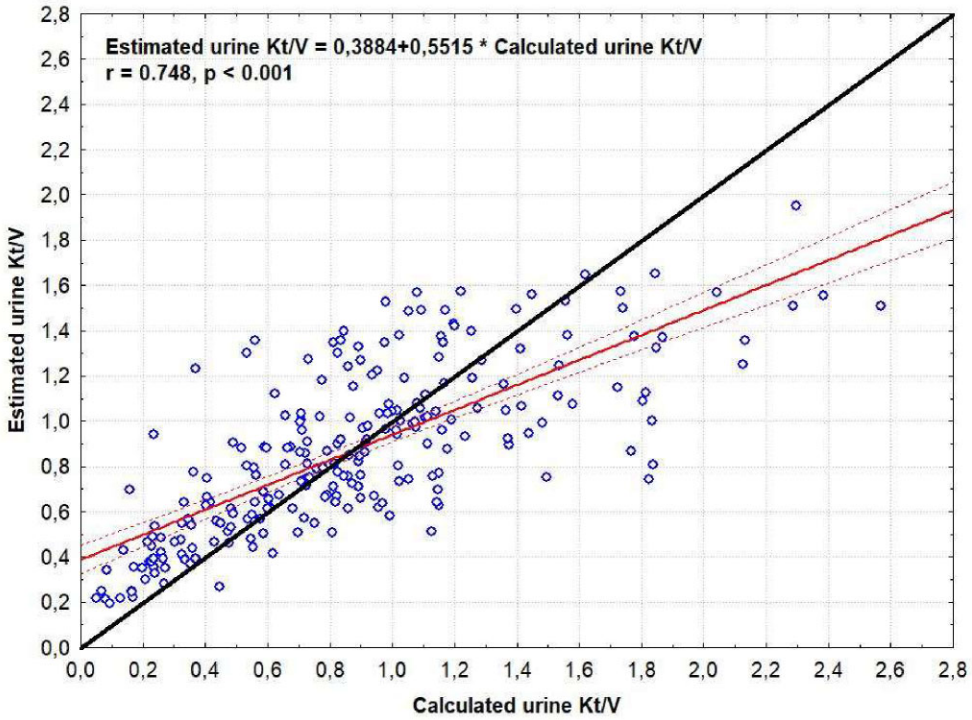

Figure 1: Estimated versus calculated renal Kt/V.