ESTIMATED GLOMERULAR FILTRATION RATE: DO WE MEASURE THE REAL RENAL FUNCTION OR ARE WE STILL GROPING IN THE DARK?

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INTRODUCTION AND AIMS: An accurate assessment of renal function is mandatory in the majority of urological and oncological patients to prevent renal impairment and cancer non-related deaths. Nowadays, the large part of clinicians apply CKD-EPI/MDRD formulas or 24h creatinine clearance to determine the glomerular filtration rate (GFR) before and after renal surgery (for cancer, donation, stones and pyeloureteral junction stenosis) and in metastatic patients for establish the right oncological treatment. Unfortunately, estimated GFR (eGFR) displays a wide error in reflecting real kidney function with measured GFR (mGFR) and this may lead to important consequences in the correct evaluation of patients.

METHODS: A retrospective and prospective study based on 1001 pts composed by 665 pts with uro-oncological cancer (444) or renal functional diseases (221), by 210 pts with non-urological cancer and by 126 pts with nephrological disease was performed in two different centers to compare eGFR formula with renal scintigraphy (N=1001). The agreement between eGFR and mGFR was evaluated using total deviation index (TDI) and concordance correlation coefficient (CCC).

RESULTS: The agreement between formulas and mGFR was poor. The TDI for MDRD was 80% and for CKD-EPI was 74%, indicating that 90% of the estimations for both formulas were included within a margin of error from mGFR of about ± 74 to 80%. CCC for MDRD was 0.73 and for CKD-EPI was 0.77, indicating poor concordance between eGFR and mGFR. The population, using eGFR formula (CKD-EPI/MDRD), was composed by 29%-22% of CKD stage I pts (eGFR > 90 ml/min), 33%-35% CKD stage II, 15%-19% CKD stage IIIa, 14%-15% CKD stage IIIb, 8%-8% CKD stage IV, 1%-1% CKD stage V. Using Renal Scintigraphy measurements, we revealed these different proportions: 33% CKD I, 30% CKD I, 19% CKD IIIa, 13% CKD IIIb, 5% CKD IV, 0% CKD V. Moreover, the discrepancy between mGFR with renal scintigraphy and eGFR with formulas was of 30% in CKD I, 54% in CKD II, 63% in CKD IIIa, 62% in CKD IIIb, 63% in CKD IV, 81% in CKD V stage.

CONCLUSIONS: CKD-EPI and MDRD formula may over or underestimate mGFR in pts, generating false evaluations in the clinical management and drug therapies for oncological, urological and kidney donor patients. We suggest to use mGFR with renal scintigraphy in selected cases when GFR is crucial to determine the surgical/therapeutic approach.