

Summary

Laboratory diagnostics of kidney function

The work deal with issue of glomerular filtration rate (GFR). GFR is the most important indicator of kidney function. Its decline is associated with increased morbidity and mortality. Chronic kidney disease (CKD) is defined as decrease of GFR bellow 1.0 ml/s/1.73m^2 for more than three months. Patients with CKD receive nephroprotective drugs and have reduced drugs excreted by kidneys if needed. Early detection of CKD is of clinical importance.

We compare GFR estimated from serum creatinine ($e\text{GFR}_{\text{creatinine}}$) and from serum cystatin C ($e\text{GFR}_{\text{cystatinC}}$) in four cohorts of patients: 101 MGUS patients, 13 methanol intoxicated patients, 1515 diabetics and 352 patients with CKD.

Creatinine was measured by enzymatic method traceable to international reference material NST SRM 967 in all patients. Cystatin C was determined by standardized immunoturbidimetric method traceable to DA ERM 471. This standardized method was not available only for MGUS patients.

$e\text{GFR}$ was always calculated according to the best available validated equation.

MGUS patients were calculated according to MDRD equation for $e\text{GFR}_{\text{creatinine}}$ and according to Grubb equation for $e\text{GFR}_{\text{cystatinC}}$.

Methanol intoxicated patients were estimated according to Lund-Malmö equation for $e\text{GFR}_{\text{creatinine}}$ and according to equation recommended by manufacturer for $e\text{GFR}_{\text{cystatinC}}$.

Diabetics and CKD patients were calculated according to Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) equations.

The important findings in diabetic and CKD patients are that at values of $\text{GFR} < 1.0 \text{ ml/s/1.73m}^2$, the GFR values estimated from cystatin C are lower than values estimated from creatinine. $e\text{GFR}_{\text{cystatinC}}$ gives higher values than $e\text{GFR}_{\text{creatinine}}$ at $e\text{GFR}$ over 1.0 ml/s/1.73m^2 in these two cohorts of patients.

The most important decision point of GFR is 1.0 ml/s/1.73m^2 . Patients with GFR bellow 1.0 ml/s/1.73m^2 are designated as having CKD. There are a significant number of patients who are identified only by one method.

Our results support the use of both $e\text{GFR}_{\text{cystatinC}}$ and $e\text{GFR}_{\text{creatinine+cystatinC}}$ in patients with diabetes mellitus without albuminuria or another marker of kidney damage at GFR stages 2 and 3a according to $e\text{GFR}_{\text{creatinine}}$.

The group of CKD patients had determined creatinine clearance (CrCl). CrCl gives higher values than all $e\text{GFR}$.

Cohorts of patients were presented in 5 original articles of peer reviewed or impact factor journals.