**Detection of decreased glomerular filtration rate in intensive care units: interest of cystatin C**

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**Introduction**

Estimation of glomerular filtration rate (GFR) in intensive care units (ICU) is a difficult challenge, especially because serum creatinine concentration is largely influenced by muscular mass. Cystatin C has been considered as a new renal biomarker which is less influenced by muscular mass. Its interest in ICU is thus potentially high and first studies in this setting are encouraging. However, none study has tested the performance of the cystatin C against a “true” GFR measurement.

**Methods**

Three University hospitals (two in France and one in Belgium) have been involved. The inclusion criteria are following: 18 to 75 y, mechanically ventilated, stable arterial pressure, urinary catheter, serum creatinine below 1.5 mg/dL and diuresis over 400 mL/day in the last 6 hours. GFR was measured by urinary clearances of iohexol (four successive one-hour collections). On the same day, serum creatinine (Enzymatic method, CreaPlus, Roche, Germany) and plasma cystatin C (nephelometric method, Siemens, Germany) were measured. We considered measured GFR below 60 mL/min/1.73 m² as the definition for kidney disease.

**Results**

Forty seven patients (22 men and 25 women) were included (mean age: 62±17 y, mean weight: 81±24 Kg, mean SOFA score: 8±8). Mean GFR was 96±54 mL/min. Among the patients, 28% had a measured GFR under 60 mL/min. Mean serum creatinine concentration was 0.71±0.33 mg/dL. Mean cystatin C concentration was 1.26±0.62 mg/L. Correlation between the inverse of cystatine C and GFR (r=0.67) was slightly better than between the inverse of creatinine and GFR (r=0.5). The performance of both biomarkers to detect GFR under 60 mL/min was compared with ROC curves analysis. The area under the curve (AUC) was significantly better (p=0.0139) for cystatin C compared to creatinine (AUC of 0.942 *versus* 0.799, respectively).

**Conclusion**

Cystatin C seems to be a better biomarker to detect GFR under 60 mL/min in ICU patients. Importantly, we have measured GFR by a reference method (iohexol).

