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Background and Importance

Estimating glomerular filtration rate in critically ill patients is challenging due to fluctuations in kidney function, and creatinine clearance computed from a 24-hour ($\text{CrCl}_{24\text{h}}$) urine collection cannot always be performed. Therefore, equations based on serum creatinine are commonly used to estimate glomerular filtration rate (GFR), but it is still questionable which formula performs the best in this setting.

Aim and Objectives

The aim of the study is to assess the performance of different serum creatinine-based equations to estimate GFR in critically ill patients admitted to intensive care units (ICUs).

Materials and Methods

- Observational retrospective study conducted in four ICUs of a tertiary hospital (January-September 2020).
- $\text{CrCl}_{24\text{h}}$ was compared to the most commonly used GFR estimating equations: Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI), Modification of Diet in Renal Disease (MDRD-4) and Cockcroft-Gault (CG).
- Pearson coefficients were estimated to evaluate the relationship between $\text{CrCl}_{24\text{h}}$ and CKD-EPI, MDRD-4 or CG. Bland and Altman plots, bias and precision were performed to contrast $\text{CrCl}_{24\text{h}}$ values with estimated GFR.
- Data was stratified into patients with $\text{CrCl}_{24\text{h}}$ between 0-129 mL/min/1.73m² (n=220) and patients with an augmented renal clearance (ARC), defined as a GFR ≥ 130 mL/min/1.73 m² (n=41).

Results

Table 1: Demographic and serum creatinine data of studied population

	GFR 0-129 mL/min	GFR ≥ 130 mL/min
Male sex (%)	59.5	63.4
Age (year)*	64.1 \pm 13.9	54.1 \pm 14.9
SCr (mg/dL)*	1.35 \pm 1.05	0.60 \pm 0.24

*Age and Serum creatinine (SCr) expressed as mean \pm standard deviation

Table 2: Pearson Coefficients

	GFR 0-129 mL/min	GFR ≥ 130 mL/min
CKD-EPI	0.729	0.312
CG	0.689	0.388
MDRD-4	0.637	0.329

Figure 1. Bland and Altman plots GFR 0-129 mL/min/1.73m²

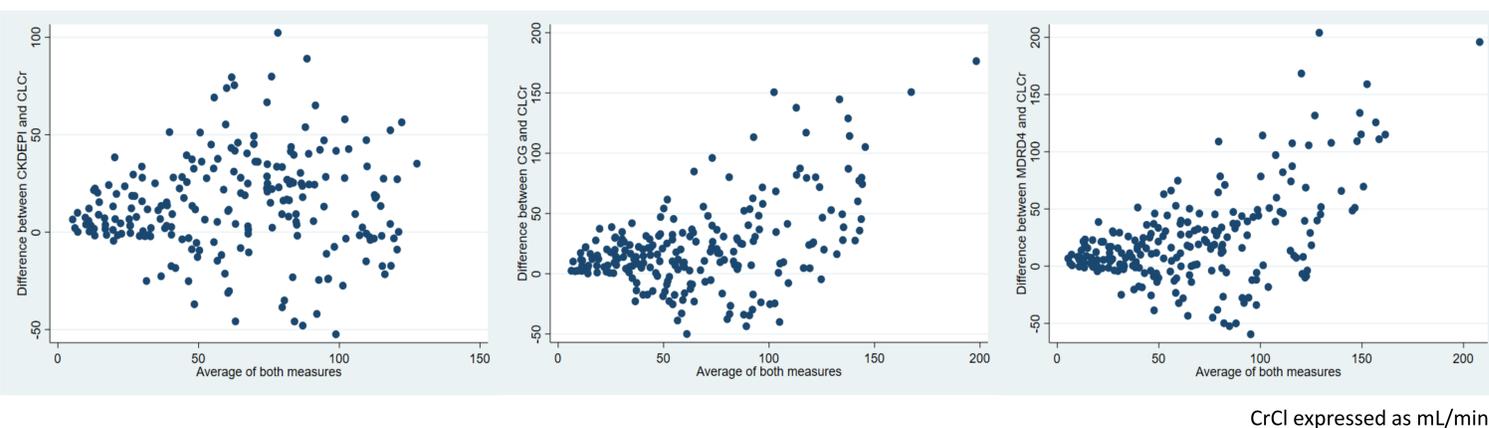


Figure 2. Bland and Altman plots GFR ≥ 130 mL/min/1.73m²

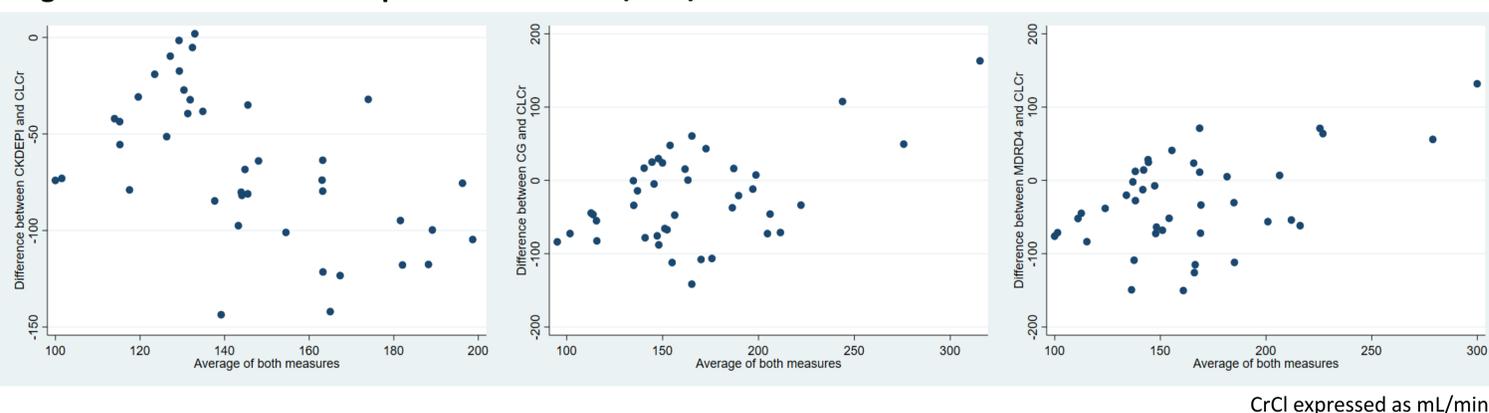
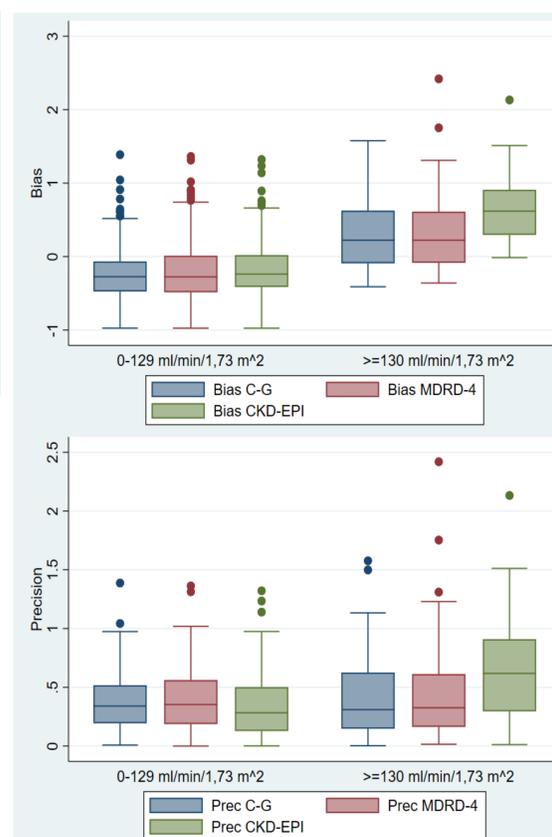


Figure 3. Bias and precision



Conclusion and Relevance

- According to data, no differences were found between formulas to estimate GFR for critically ill patients with a CrCL between 0-129 mL/min/1.73m² whereas for patients with ARC, CG and MDRD-4 seemed to be more appropriate to estimate GFR.