Intensive Care Medicine Experimental
a SpringerOpen Journal

Fractional excretion of sodium and fractional excretion of urea in differentiating prerenal from renal azotemia complicating circulatory shock

HM Sherif[*], AR Yassin, AY Mousa, A Esmat

Background

Fractional excretion of sodium (FENa) is used to differentiate renal from prerenal azotemia. However, many drugs and medical problems affect the sodium (Na^+) handling in the kidney. On the other hand, the fractional excretion of urea (FEurea) is mainly dependent on passive forces so that it is less influenced by the diuretic therapy.

Objective

Comparison between FENa and FEurea in differentiating renal from prerenal azotemia complicating circulatory shock, and the effect of diuretics on their handling.

Methods

Both serum FENa & FEurea were measured in 40 patients (pts) with acute kidney injury (AKI) complicating circulatory shock during their stay in ICU. All patients were divided into 26 pts (mean: 60.0 ± 15.15 years) with prerenal azotemia (group-1) and 14 pts (mean: 56.29 ± 19.5 years) with renal azotemia (group-2). Group-1 was subdivided into 12 pts (group-1a) who didn't receive diuretics 24 hours before the sampling process and 14 pts (group-1b) who received diuretics during their stay in ICU. Acute kidney injury was diagnosed according to the RIFLE-criteria (Risk, Injury, Failure, Loss and End-stage Kidney) in oliguric patients.

Results

Both FENa and EFurea showed significantly increased incremental values with higher RIFLE-criteria from mild to severe AKI. Compared to pts of group-2, pts of group-1 showed significantly lower FENa (0.99 ± 0.66 and 2.57 ± 1.73, $P < 0.05$), and significantly lower FEurea (29.7 ± 7.6 and 43.7 ± 15.4, $P < 0.001$), respectively. For differentiating renal from prerenal azotemia; compared to FENa, FEurea showed better sensitivity (78.1 % vs. 71.4%) and specificity (88.5% vs. 69.4%) respectively. Moreover, compared to pts of group-1a with those of group-1b, FEurea were not significantly affected by the use of diuretics; sensitivity (78% vs. 78%) and specificity (92% vs. 88%), respectively. As a predictor of differentiation, the cutoff value of FEurea was 34.12% ($P < 0.001$) and the cutoff value of FENa was 1.1% ($P < 0.05$).

Conclusions

FEurea is more sensitive, specific and less affected by the use of diuretics than FENa in differentiating renal from prerenal azotemia in patients with AKI complicating circulatory shock.

Faculty of Medicine, Cairo University, Critical Care Medicine, Cairo, Egypt

SpringerOpen