Determinants of Doppler-based renal resistive index in patients with septic shock: impact of hemodynamic parameters, acute kidney injury and predisposing factors

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Résumé en anglais	BACKGROUND: Increased renal resistive index (RI) measured by Doppler ultrasonography has been shown to be associated with acute kidney injury (AKI) in septic patients. However, its clinical use is limited by poor sensitivity and specificity which may be explained by its numerous determinants [in particular mean arterial pressure (MAP)]. We measured, in patients with septic shock, RI at different MAP levels over a short period of time on the admission day to ICU (D1) and every 3 days until day 10 (D10) to define the determinants of RI and study specifically the relationship between RI and MAP. RESULTS: Consecutive patients with septic shock without preexisting chronic renal dysfunction were included in this prospective cohort study in two ICUs. Sixty-five patients were included in the study. Thirty-three (50.8%) and 15 (23.1%) patients had a history of chronic hypertension or diabetes, respectively. At D3, 35 patients presented AKI with AKIN 2 or 3 criteria (severe AKI, AKIN2-3 group) and 30 presented no AKIN or AKIN 1 criteria (AKIN0-1 group). As previously described, RI at D1 was higher in the AKIN2-3 group than in the AKIN0-1 group (0.73 interquartile range [0.67; 0.78] vs. 0.67 [0.59; 0.72], p = 0.001). A linear mixed model for predicting RI from D1 to D10 showed that an increase in pulse pressure, presence of severe AKI and additional day of ICU hospitalization were associated with an increase in RI. An increase in MAP and recovery from severe AKI were associated with a decrease in RI. In the presence of chronic hypertension or diabetes, an increase in MAP resulted in a lower decrease in RI, than in the absence of such factors. Presence of AKI at D3 did not impact the relationship between MAP and RI. CONCLUSIONS: Severe AKI was associated with a reversible increase in RI without significant interaction with the relationship between MAP and RI. Conversely, the presence of chronic hypertension and/or diabetes interacted with this relationship.
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