

# Bioimpedance and duration of organ dysfunction in septic shock - a prospective observational study

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## Abstract

*Rationale:* Bioimpedance may be a useful tool to guide fluid treatment and avoid organ dysfunction related to fluid overload.

*Objective:* We examined the correlation between bioimpedance and organ dysfunction in patients with septic shock.

*Methods:* Prospective observational study of adult ICU patients fulfilling the sepsis-3 criteria. Bioimpedance was measured with Body Composition Monitor (BCM) and BioScan Touch i8 (MBS). We measured impedance at inclusion and after 24 hours and reported the impedance, change in impedance, bioimpedance-derived fluid balance, and changes in bioimpedance-derived fluid balance. Organ markers on respiratory, circulatory, and kidney function and overall disease severity were ascertained on days 1-7. The effect of bioimpedance on the change in organ function was assessed by mixed effects linear models. We considered  $P < 0.01$  as significant.

*Measurements and Main Results:* Forty-nine patients were included. None of the single baseline measurements or derived fluid balances were associated with the course of organ dysfunction. Changes in impedance were associated with the course of overall disease severity ( $P < 0.001$ ; with MBS), and with changes in noradrenaline dose ( $P < 0.001$ ; with MBS) and fluid balance ( $P < 0.001$ ; with BCM). The changes in bioimpedance-derived fluid balance were associated with changes in noradrenaline dose ( $P < 0.001$ ; with BCM), cumulative fluid balances ( $P < 0.001$ ; with MBS), and lactate concentrations ( $P < 0.001$ ; with BCM).

*Conclusions:* Changes in bioimpedance were correlated with the duration of overall organ failure, circulatory failure, and fluid status. Single measurements of bioimpedance were not associated with any changes in organ dysfunction.