ASSESSMENT OF MICROCIRCULATION USING REMOTE PHOTOPLETHYSMOGRAPHY AND AUTOMATED CAPILLARY REFILL TIME IN CRITICALLY ILL PATIENTS

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Objectives. Microcirculation assessment during fluid resuscitation of septic shock is challenging due to lack of objective clinical tests. New methods for evaluation of microcirculation monitoring have been developed-remote photoplethysmography (rPPG) and automated objective capillary refill time measurement technique (aCRT).

The aim: Assess rPPG and aCRT methods as an alternative method for microcirculation evaluation.

Materials and Methods. patients with positive passive leg raising test (PLRT) were initially resuscitated with crystalloid. Patients were divided into 2 groups: COVID-19 (n = 18) and bacterial septic shock (BSS) (n-16). Hemodynamic variables, *manual capillary refill time* (mCRT) and *aCRT parameters* (T90 – time when 90% of capillary refill is over, Tst – time when capillary refill is fully over), peripheral perfusion index (PPI) detected using rPPG were collected before and after PLRT and after volume expansion (VE).

Results. In COVID-19 mean PPI increased during PLRT by 7% (from 43 ± ± 27 to 46.5 ± 29.1), by 15% after VE (from 43.0 ± 27.8 to 49.5 ± 22.6),while in BSS PPI increased during PLRT by 18% (from 28.3 ± 20.9 to 33.6 ± 25.3), by 28% after VE (from 28.3 ± 20.0 to 36.3 ± 25.8). Mean mCRT in COVID-19 decreased by 22% during PLRT (2.57 ± 0.59 to 1.98 ± 0.68), by 22% after VE (from 2.57 ± 0.59 to 1.98 ± 0.78),while in BSS decreased by 31% during PLRT (from 1.85 ± 0.64 to1.29 ± 0.38), by 32% after VE(from 1.85 ± 0.64 to 1.26 ± 0.29). Mean aCRT T90 in COVID-19 decreased by 32% during PLRT (from 1.74 ± 1.16 to 1.17 ± 0.79), by 17% after VE (from 1.74 ± 1.16 to 1.45 ± 1.06),while in BSS decreased by 41% during PLRT (from 1.93 ± 1.03 to 1.38 ± 0.79), by 8% after VE (from 1.93 ± 1.03 to 1.78 ± 0.66). Mean Tst in COVID-19 decreased by 21% during PLRT (from 3.33 ± 1.59 to 2.63 ± 1.37), by 10% after VE (from 3.33 ± 1.59 to 3.03 ± 1.44) while in BSS decreased by 25% during PLRT (from 3.74 ± 1.24 to 2.81 ± 1.22) by 2% after VE (from 3.74 ± 1.24 to 3.69 ± 1.12).

Conclusions. This study results shows that rPPG and aCRT are potentially applicable to assess microcirculation in critically ill patients.