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Should we treat mild hypotension in septic patients in the absence of peripheral tissue hypoperfusion?

Jean-Rémi Lavillegrand¹, Guillaume Dumas¹, Naïke Bigé¹, Daniel Zafimahazo¹, Bertrand Guidet^{1,2,3}, Eric Maury^{1,2,3} and Hafid Ait-Oufella^{1,2,4*} 

Dear Editor,

In sepsis patients, international guidelines recommend to maintain a mean arterial blood pressure higher than 65 mmHg and in hypertensive patients higher than 75 mmHg [1]. In a recent issue of *Intensive Care Medicine*, Maheshwari et al. retrospectively analyzed a large database in the USA and reported that both mortality and acute kidney failure increased when mean arterial blood pressure (MAP) decreased [2]. The evidence for clearly defining mean blood targets to optimize tissue perfusion in septic patients remains controversial. During the last two decades, several groups have reported the strong predictive value of microcirculatory disorders and tissue hypoperfusion in septic shock patients [3]. Furthermore, variable impact of arterial hypotension on microcirculatory blood flow and tissue perfusion has been reported [4]. Indeed, in sepsis patients with comparable MAP, tissue perfusion could be altered or preserved, suggesting that a “universal MAP target” is probably not the right direction [5]. We believe that tissue perfusion analysis could be helpful to guide MAP target. Here, we report that mild arterial hypotension could be tolerated in septic patients in the absence of tissue hypoperfusion.

We conducted a retrospective observational study in our 18-bed ICU in a tertiary teaching hospital. All consecutive patients older than 18 years admitted for sepsis and MAP lower than 65 mmHg at admission were

included from January to December 2017. In total 124 septic patients were included during a 1-year period. Median SAPS II was 51 [40–70] and median age was 68 [58–81] years. The most frequent primary sites of infection were the lungs (23%) and the urinary tract (19%). After initial resuscitation including infection source control, antibiotic administration, and fluid infusion, MAP reached 65 mmHg in 24 patients but remained below this threshold in 100 patients. Next, norepinephrine was infused in 89 patients to maintain MAP higher than 65 mmHg but mild arterial hypotension was permitted in 11 patients because of the absence of peripheral hypoperfusion (Supplemental Table 1). MAP was below 65 mmHg after initial resuscitation but was higher than 50 mmHg (Supplemental Fig. 1). Despite mild hypotension, no mottling, no oliguria, and no consciousness impairment were observed, suggesting that the brain, kidney, and skin perfusions were preserved. Combining daily clinical evaluation, ECG, and troponin measurements, we did not detect myocardial ischemia during ICU stay. As described in Table 1, peripheral tissue perfusion was maintained over time; arterial hypotension and hyperlactatemia recovered within 24 h, and all patients were discharged alive from ICU. Only one patient with end-stage renal disease underwent one hemodialysis session.

Our results suggest that a mild arterial hypotension could be tolerated in septic patients in the absence of tissue hypoperfusion. However, this observation has to be analyzed with caution because severity (SAPS II and percentage of patients under mechanical ventilation) is lower in the permissive hypotension group when compared to the septic group receiving vasopressors to maintain

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Table 1 Description of clinical and biological parameters over time following initial resuscitation (H0) in the group of patients with permissive mild arterial hypotension

Variables	H0	H6	H12	H18	H24
Glasgow	15 [15–15]	15 [15–15]	15 [15–15]	15 [15–15]	15 [15–15]
Heart rate (min ⁻¹)	104 [92–106]	90 [79–119]	93 [85–109]	89 [82–98]	94 [75–110]
DAP (mmHg)	49 [44–53]	49 [44–52]	50 [48–53]	54 [50–57]	59 [56–63]
MAP (mmHg)	62 [57–62]	60 [57–63]	62 [60–64]	67 [59–69]	73 [69–76]
Diuresis (mL/kg/6 h)	–	6.9 [5.4–8.5]	7 [5.1–8.5]	7.3 [4.7–8]	6.9 [4.3–9.9]
Mottling score	0 [0–1]	0 [0–0]	0 [0–0]	0 [0–0]	0 [0–0]
Lactate arterial level (mmol/L)	1.8 [1.2–3.1]	–	1.1 [0.9–1.2]	–	1.1 [1.0–1.3]
SOFA score	4 [3–6]	–	–	–	2 [1–4]

Data are expressed as median [IQRs]

DAP diastolic arterial pressure, MAP mean arterial pressure, SOFA sequential organ failure assessment

a MAP higher than 65 mmHg. In addition, the primary site of the infection was different between groups with no lung infection and a majority of urinary tract infections in the permissive hypotension group. Such personalized management requires ICU admission and close monitoring but could limit the use of invasive devices and norepinephrine, both having potential side effects.

Electronic supplementary material

The online version of this article (<https://doi.org/10.1007/s00134-018-5315-5>) contains supplementary material, which is available to authorized users.

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Author contributions

Study concept and design, all authors. Acquisition of data, JRL, GD, NB, DZ, and HAO. Drafting of the manuscript, HAO, EM, and BG. Critical revision of manuscript, all authors. Statistical analysis, JRL and HAO.

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Compliance with ethical standards

Conflicts of interest

The authors declare that they have no competing interest.

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