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CORRESPONDENCE

Microcirculation information in clinical decision making: Rome wasn't built in a day

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We thank Edul and Dubin [1] and Damiani and colleagues [2] for their constructive criticism of our Direct Assessment of Microcirculation In Shock (DAMIS) trial [3]. DAMIS was a trial on the effect of integrating microcirculatory information into treatment considerations on mortality in patients with circulatory shock.

Direct visualization of the sublingual microcirculation using handheld video microscopy is used for research for more than 20 years. Recording and analyzing video sequences is still cumbersome, but time-consuming. To integrate sublingual microcirculation monitoring in clinical decision-making, it needs to be available at the bedside and provide microcirculatory variables in real time [4]. We, therefore, used the AVA 4.3C analysis software that allows automated, fast, and user-independent analysis of the sublingual microcirculation [5, 6]. Although the AVA 4.3C analysis software is not validated against manual gold standard analyses, we performed all measurements according to the manufacturer's instructions and current guideline recommendations [7].

We used the proportion of perfused small vessels (sPPV) as target variable because it is easy to interpret (also for clinicians not experienced with microcirculatory analyses) and has been shown to predict hospital mortality [8]. The sPPV risk categories were chosen based on the literature and the manufacturer's instructions.

The DAMIS trial indeed included patients with different types of circulatory shock. The finding that considering sublingual microcirculation monitoring during treatment decisions was consistent across patients with all types of shock. It is a limitation of the trial that we did not use specific treatment protocols for different types of shock, but there is insufficient evidence for specific algorithms including microcirculatory values. Additionally, using a strict treatment protocol based on the results of an experimental device was impossible.

Regarding the timing of microcirculatory assessments in DAMIS, we repeated the initial measurements after a 24-h interval. More frequent measurements might have been desirable, but our study design reflects a practical approach for daily clinical application.

There were no differences in microcirculatory variables—including capillary refill time—between survivors and non-survivors. One reason may be that all measurements were performed after the immediate initial resuscitation. Additionally, patients often died because life-sustaining care was withdrawn—and not from initial shock. In fact, limiting life-sustaining therapy was a significant predictor of mortality, albeit not remarkably higher than in other studies [9]. It is important to distinctively report withdrawal of life-sustaining therapy a cause of death.

We naturally agree that it is the treatment and not the monitoring that determines patient outcomes. Our trial suggests that considering microcirculatory variables using AVA 4.3C during clinical decision-making for treatment optimization does not improve outcomes in patients with shock. Future research needs to determine different strategies to employ bedside assessed microcirculation into clinical decision-making.

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Availability of data and material
The anonymized data can be requested from the authors if required.

Declarations

Conflicts of interest
The authors declare that they have no competing interests.

Ethics approval and consent to participate
The primary competent ethics committee was the Ethics Committee of the University of Duesseldorf, Germany. Institutional research ethic board approval was obtained from each study site.

Consent for publication
The manuscript does not contain any individual person's data in any form.

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