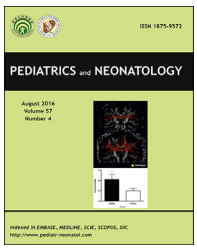
ARTICLE IN PRESS
+ MODEL
Pediatrics and Neonatology xxx (xxxx) xxx

Available online at www.sciencedirect.com
ScienceDirect
journal homepage: http://www.pediatr-neonatol.com



Letter to the Editor

Response to a Letter to the editor: Comparison of the predictive ability of lactate and central venous blood gas in pediatric venoarterial mode extracorporeal membrane oxygenation outcome

To the Editor:

We thank the authors of this letter for their insightful remarks on our study.[1,2] We wholeheartedly agree with regard to the hemodynamic importance of sampling location of the central venous gas. As we mentioned in the "Method," section the central venous gas was obtained from the extracorporeal membrane oxygenation venous catheter, which is located in the right atrium. The central venous O2 saturation (ScvO2) has traditionally been regarded as a reliable parameter to represent the status of tissue perfusion, although it still has limitations, including anesthesia and microthrombosis in disseminated intravascular coagulation.[3–5] The ScvO2 is also dynamically influenced by the flow setting of V-A mode ECMO. Indeed, the lactate concentration, lactate clearance, ScvO2, the pH value, the levels of carbon dioxide, bicarbonate, and base excess of arterial blood gas were highly correlated each other in such clinical scenarios.[3,6,7] In our study, we used binary logistic regression to determine the independent predictor(s) among variables (Table 4) by selecting the variables with $p < 0.05$ by univariate analysis. To achieve the organ demand, ScvO2 was maintained at least above 60% by flow adjustment of V-A mode ECMO, which might lead to the narrow range of ScvO2 value. Apparently, patients with favorable outcome had significantly lower levels of lactate concentrations at later time points when compared with patients with unfavorable outcome. There was no significant difference of ScvO2 between these two outcomes. Both a favorable and unfavorable outcome were independently associated with the lactate concentration at T2. This result suggested that lactate may represent microcirculation adequacy that is highly associated with favorable outcome and that ScvO2 may only represent macro-circulation in V-A mode ECMO patients. Therefore, we would like to remind clinicians that lactate is a reliable measure of microcirculation.

Compliance with ethical standards

Ethics approval Consent to participate The Institutional Review Board of Kaohsiung Chang Gung Memorial Hospital approved this study (Number: 201900797B0D001).

Declaration of competing interest

All authors have no conflicts of interest to declare.

References

1. Rohit S. Loomba, Enrique G. Villarreal, Juan S. Farias, Saul Flores, Association of central venous saturation and serum lactate with outcomes in veno-arterial extracorporeal membrane oxygenation. Pediatr Neonatol.*(Article in press)*.
2. Chen TY, Chang CH, Hsu JY, Sheu JJ, Kuo HC, Hsu MH, et al. Comparison of the predictive ability of lactate and central venous blood gas in pediatric venoarterial mode extracorporeal membrane oxygenation outcome. *Pediatr Neonatol* 2022;**63**:474–83.
3. Hasanin A, Mukhtar A, Nassar H. Perfusion indices revisited. *J Intensive Care* 2017;**5**:24.
4. Yeh YC, Chiu CT. Association and dissociation of microcirculation and macrocirculation in critically ill patients with shock. *J Emerg Crit Care Med* 2019;**3**:60.

https://doi.org/10.1016/j.pedneo.2022.09.010

Please cite this article as: T.-Y. Chen and Y.-J. Lin, Response to a Letter to the editor: Comparison of the predictive ability of lactate and central venous blood gas in pediatric venoarterial mode extracorporeal membrane oxygenation outcome, Pediatrics and Neonatology, https://doi.org/10.1016/j.pedneo.2022.09.010

5. Zante B, Kubik M, Reichenspurner H. Combination of high ScvO2 and hyperlactatemia as sign of microcirculation disorder in patient after cardiac surgery. *Thorac Cardiovasc Surg* 2012;**60**: P20.
6. Jouffroy R, Lamhaut L, Guyard A, Phillipe P, Deluze T, Jaffry M, et al. Base excess and lactate as prognostic indicators for patients treated by extra corporeal life support after out hospital cardiac arrest due to acute coronary syndrome. *Resuscitation* 2014;**85**:1764—8.
7. Ryoo SM, Lee J, Lee YS, Lee JH, Lim KS, Huh JW, et al. Lactate level versus lactate clearance for predicting mortality in patients with septic shock defined by sepsis-3. *Crit Care Med* 2018; **46**:e489—95.

Tsung-Yen Chen
Division of Critical Care, Department of Pediatrics, Kaohsiung Chang Gung Memorial Hospital and Chang Gung University College of Medicine, Kaohsiung, Taiwan
Department of Pediatrics, E-Da Hospital, I-Shou University, Kaohsiung, Taiwan

Ying-Jui Lin*
Division of Critical Care, Department of Pediatrics, Kaohsiung Chang Gung Memorial Hospital and Chang Gung University College of Medicine, Kaohsiung, Taiwan
Department of Respiratory Therapy, Kaohsiung Chang Gung Memorial Hospital and Chang Gung University College of Medicine, Kaohsiung, Taiwan
Division of Cardiology, Department of Pediatrics, Kaohsiung Chang Gung Memorial Hospital and Chang Gung University College of Medicine, Kaohsiung, Taiwan

*Corresponding author. Division of Critical Care, Department of Pediatrics, Kaohsiung Chang Gung Memorial Hospital and Chang Gung University College of Medicine, 123, Tapei Road, Niaosung District, Kaohsiung City, 833, Taiwan.
E-mail addresses: rayray@adm.cgmh.org.tw, linyingjui@gmail.com (Y.-J. Lin)

Aug 4, 2022