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Prehospital age-shock index and outcomes among patients with COVID-19 disease



Dear Editor:

We read with great interest an article by Jouffroy et al [1] for sharing their study "Association between prehospital shock index and mortality among patients with COVID-19 disease". The prehospital shock index was not associated with ICU admission and 30-day mortality in patients with covid-19. In many studies, the risk factors of severity of covid-19 patients include: age, body mass index, blood pressure, heart rate, pulse oximetry and comorbidity. In a tertiary medical center of northern Taiwan, we also found the age shock index at triage had a higher predictive rate of mortality in patients of covid-19. Age shock index (ASI) of triage can be used in conjunction with vital signs, oxygen saturation, and laboratory markers for early detection of COVID-19 patients at risk for outcomes at emergency department presentation. Doğanay et al [2] using a 0.9 value of shock index with age and SpO2 value may be useful for physician to early identification of covid-19 patients with higher mortality.

Recently, C-C Hsieh et al [3] created a new clinical assessment tool "hypoxia-age-shock index at triage to predict the outcomes of Covid-19 patients", we can use the hypoxia-age-shock index (HASI) to early predict the mortality rate, intubation rate and ICU admission rate of covid-19 patients. The area under the curve for receiver operating curve on mortality for shock index, age shock index, and hypoxia-age-shock index of triage were 0.546, 0.771, and 0.773, respectively. I supposed that the prehospital ASI or HASI can also predict the outcomes of Covid-19 patients, too. However, we need more research to verify the hypothesis.

Muengtawepongsa et al [4] suggests that not only the heart rate but also the heart rate variability should be important prognosticators in cardiac arrest. Because the heart rate was an element of our index. I also supposed that the variation of SI, ASI and HASI will be helpful than the value at one time. More research will be needed to verify the hypothesis. Furthermore, in the future we can use a program to calculate the value or the variation of the 3 indices of patients automatically. The artificial intelligence from triage to the observation room in our emergency department can early warn clinicians about the deterioration of patients. Not only the covid-19 patients, it may be applied to all patients in our emergency department.

CRediT authorship contribution statement

Chien-Chieh Hsieh: Data curation, Formal analysis, Investigation, Writing – original draft. **Fu-Shan Jaw:** Methodology. **Chia-Yin Hsieh:** Software, Visualization. **Ching-Juing Yu:** Validation, Writing – review & editing.

References

- [1] Jouffroy R, Brami E, Scannavino M, et al. Association between prehospital shock index and mortality among patients with COVID-19 disease. *Am J Emerg Med.* 2022;56: 133–6. <https://doi.org/10.1016/j.ajem.2022.03.059>.
- [2] Doğanay F, Elkonca F, Seyhan AU, et al. Shock index as a predictor of mortality among the Covid-19 patients. *Am J Emerg Med.* 2021;40:106–9. <https://doi.org/10.1016/j.ajem.2020.12.053>.
- [3] Hsieh CC, Liu CY, Tsai KC, et al. The hypoxia-age-shock index at triage to predict the outcomes of Covid-19 patients. *Am J Emerg Med.* 2022;22(65):65–70. <https://doi.org/10.1016/j.ajem.2022.12.034>.
- [4] Muengtawepongsa S, Jantanukul A, Suwanprasert K. Should the heart rate including the heart rate variability be important prognosticators in cardiac arrest? *Resuscitation.* 2016;98:e15. <https://doi.org/10.1016/j.resuscitation.2015.08.026>.

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