

Accepted Manuscript

Reply to the letter

Jieqiong Song, Ming Zhong



PII: S0883-9441(18)30780-9

DOI: doi:[10.1016/j.jcrc.2018.07.032](https://doi.org/10.1016/j.jcrc.2018.07.032)

Reference: YJCRC 52992

To appear in: *Journal of Critical Care*

Please cite this article as: Jieqiong Song, Ming Zhong , Reply to the letter. Yjcrc (2018), doi:[10.1016/j.jcrc.2018.07.032](https://doi.org/10.1016/j.jcrc.2018.07.032)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Title: Reply to the letter

Authors: Jieqiong Song, MD, Ming Zhong, MD*

Affiliations:

Department of Critical Care Medicine, Zhongshan Hospital Fudan University, 180
Fenglin Road, Shanghai, China.

***Corresponding author:** Ming Zhong, Department of Critical Care Medicine,
Zhongshan Hospital Fudan University, 180 Fenglin Road, Shanghai, China. Postal
code: 200032. Tel: +86-13817758167. E-mail: zhong.ming@zs-hospital.sh.cn

Dear editor,

We appreciate the comments from Hai-Jun Hou et al. concerning our recently published article entitled “Value of the combination of renal resistance index and central venous pressure in the early prediction of sepsis-induced acute kidney injury” [1]. The letter raised some questions about the methodology of our research, and we are very glad to discuss these problems.

First, the predictive ability of septic shock was not determined by the AUROC analysis in our research. Consistent with previous studies, our results confirmed septic shock as an independent risk factor for sepsis-induced shock. The main purpose of this study was to evaluate the clinical value of renal RI, CVP, and especially the combination of these two parameters in the early prediction of sepsis-induced AKI, so we analyzed the predictive ability of these three parameters, but not the predictive ability of septic shock. The C-statistic is a commonly used statistic to judge model performance, which measures the ability to discriminate between patients who experienced the event of interest against those who did not in binary outcomes [2]. However, it can be less informative and lead to overestimate or underestimate conclusions in certain circumstances [3,4]. So we used AUROC analysis rather than the C-statistic as the measure of the model performance, just like some other researches [5].

Second, positive / negative predictive value (PPV / NPV) refers to the ratio of true positive / negative in the total number of positive / negative cases detected by the screening test, which reflects the possibility that patients with positive / negative

screening test results really get / not get the target disease. These two parameters are as important as sensitivity and specificity in predictive value analysis. We reviewed the original data and got the results that the PPV and NPV of DPP, RI and CVP were 80% and 64%, 78% and 65%, 62% and 78%, respectively.

Third, Youden index, defined as the overall correct classification rate minus one at the optimal cut-off point, is an important parameter of the diagnostic accuracy at the optimal threshold. So it is suggested to be taken into consideration in addition to AUROC [6]. In our study, the optimal cut-off values of each risk factor for sepsis-induced AKI were calculated using the Youden index, and both the sensitivity and specificity of the risk factors were provided. Hence, the Youden index could be easily calculated (equal to sensitivity + specificity – 1). We did not list the Youden index separately in our research paper, but we will pay more attention to this problem and list the statistical results more completely in our future studies.

Finally, the letter pointed out that our study lacked assessment on the predictive value of a combination of more independent risk factors. We strongly agree with the viewpoint that the pathogenesis of sepsis-induced AKI is very complicated, and more combination of risk factors could better predict the occurrence of sepsis-induced AKI [7,8]. But as mentioned above, the main purpose of this study was to evaluate the value of the combination of CVP and RI in the early prediction of sepsis-induced AKI, so we did not analyze other risk factor combinations. According to the suggestion, we will assess more potential risk factors and try to find out the best combination for early prediction of sepsis-induced AKI in our future studies.

We would like to thank Hai-Jun Hou et al. again for your attention and valuable comments on our research.

ACCEPTED MANUSCRIPT

Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflicts of interest: None.

Financial disclosures: None.

ACCEPTED MANUSCRIPT

References

- [1] Song J, Wu W, He Y, et al. Value of the combination of renal resistance index and central venous pressure in the early prediction of sepsis-induced acute kidney injury. *J Crit Care* 2018; 45:204-208.
- [2] Caetano SJ, Sonpavde G, Pond GR. C-statistic: A brief explanation of its construction, interpretation and limitations. *Eur J Cancer* 2018; 90:130-132.
- [3] Romero-Brufau S, Huddleston JM, Escobar GJ, et al. Why the C-statistic is not informative to evaluate early warning scores and what metrics to use. *Crit Care* 2015; 19:285.
- [4] Merkow RP, Hall BL, Cohen ME, et al. Relevance of the c-statistic when evaluating risk-adjustment models in surgery. *J Am Coll Surg* 2012; 214:822-30.
- [5] Gatti G, Benussi B, Gripsi F, et al. A risk factor analysis for in-hospital mortality after surgery for infective endocarditis and a proposal of a new predictive scoring system. *Infection* 2017; 45:413-423.
- [6] Yin J, Tian L. Joint confidence region estimation for area under ROC curve and Youden index. *Stat Med* 2014; 33:985-1000.
- [7] Gomez H, Ince C, De Backer D, et al. A unified theory of sepsis-induced acute kidney injury: inflammation, microcirculatory dysfunction, bioenergetics, and the tubular cell adaptation to injury. *Shock* 2014; 41:3-11.
- [8] Lerolle N, Nochy D, Guérot E, et al. Histopathology of septic shock induced acute kidney injury: apoptosis and leukocytic infiltration. *Intensive Care Med* 2010;

36:471-478.

ACCEPTED MANUSCRIPT