Reply to the Letter to the Editor

Re: Kang JS, Moon KH, Youn YH, et al. Factors associated with postoperative acute kidney injury after hip fractures in elderly patients. J Orthop Surg (Hong Kong), 2020, 28. DOI: 10.1177/2309499019896237.

Dear Editor,

We would like to thank them for their great interest in our article. They raise four questions regarding our recent article.

First, we fully agree that preoperative chronic kidney disease (CKD) is the most potential factor in acute kidney injury (AKI). Patients with CKD have been demonstrated to be at high risk for AKI in the perioperative period in many studies. However, our study aimed to investigate risk factors that cause renal dysfunction in patients with normal kidney function after hip fracture, except for AKI on CKD, in which preoperative CKD patients have worsened renal function. Thus, we excluded a total of 12 patients from the analysis, excluding preexisting kidney dysfunction and already treated with chronic dialysis therapy. They were classified as patients with preexisting kidney dysfunction based on the case of less than 60 estimated glomerular filtration rate.

Second, AKI can be diagnosed when creatinine levels increase to 150% or more from baseline within 48 h according to the Acute Kidney Injury Network (AKIN) classification. In our study, all available serum creatinine data during hospitalization were retrospectively reviewed, the acute rise in serum creatinine within 48 h was used for the diagnosis of AKI. The Risk/Injury/Failure/Loss/End-stage classification depended directly on obtaining the baseline creatinine for each patient measured at hospitalization, which did not necessarily reflect the state of renal involvement. By contrast, AKIN classification is not using the individual’s baseline creatinine, that’s why we decided to use AKIN classification.

Third, we agree that hemodynamic changes during surgery and preexisting underlying diseases will increase the incidence of AKI. In our study, modifiable risk factors that did not significantly contribute to the univariate logistic regression were ruled out from the final multivariate selected one (exclusion threshold, \( p < 0.10 \)). Univariate analysis was performed on all risk factors, including anemia (preoperative hemoglobin), intraoperative systolic and diastolic blood pressure, and history of underlying diseases such as diabetes mellitus, hypertension, and cerebrovascular accident. However, many risk factors in our study did not show statistically significant results \( (p > 0.10) \) and were excluded from multivariate analysis.

Finally, the Youden index was specified in the graphs in Figures 1 and 2 (serum albumin, 0.66; estimated blood loss, 0.50). As they said, the positive predictive value (PPV) and negative predictive value (NPV) are important to verify the accuracy of the cutoff value. However, PPV and NPV are heavily influenced by the incidence of the disease in the studies. By contrast, sensitivity and specificity are usually not influenced by the incidence of disease in the studies. In fact, our study showed a low AKI incidence of 4.5%, PPV was high and NPV was low. So specificity and sensitivity were more important. Therefore, specificity and sensitivity were presented in the text, but PPV and NPV were not specified in the text. However, even if this value was not given, it could be calculated by the sensitivity, specificity, and incidence presented in the text. The calculated PPV and NPV are as follows:

Serum albumin: PPV 0.15, NPV 0.99;
Estimated blood loss: PPV 0.11, NPV 0.99.

Joon Soon Kang, Kyoung Ho Moon, Yung Hun Youn, Jun Sung Park, Sang Hyun Ko and Yoon Sang Jeon

Department of Orthopedic Surgery, Inha University Hospital, Incheon, Republic of Korea

Corresponding author: Yoon Sang Jeon, ysjeon80@hanmail.net

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.
ORCID ids
Yung Hun Youn https://orcid.org/0000-0003-1546-6092
Sang Hyun Ko https://orcid.org/0000-0002-0368-6605
Yoon Sang Jeon https://orcid.org/0000-0003-3994-9056

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