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The Prediction of Clinical Outcome in Diabetic Patietns with Continuous Renal Replacement Therapy: Focusing HbA1c

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Objectives : Diabetes mellitus has been considered as a predictor of patients' outcome in the context of various clinical conditions. To date, acute kidney injury (AKI) needing continuous renal replacement therapy (CRRT) is often fatal and the glucose control is fundamental strategy in critical care. Furthermore, AKI combined with diabetes mellitus could be more severe and needed the prolonged hospitalization. This study aimed to explore whether baseline characteristics of glucose control, such as HbA1c, at admission is related with patients' survival and renal recovery in the AKI patients needed CRRT.

Methods : This is a single center, retrospective study of diabetes patients who underwent CRRT from January 2013 to December 2015. Patients with end-stage renal disease, cancer, liver cirrhosis and multiple traumas at admission were excluded, which would be related with the prognosis. We classified patients into tertiles according to the HbA1c level and then conducted the analysis in the context of clinical features, in-hospital mortality rate and hemodialysis (HD) dependence rate after CRRT weaning. Binary logistic regression analyses were performed to evaluate the predictors associated with these clinical outcomes.

Results : A total of 91 patients were included in this study. The mean patients' age was 69.8±10.0 years old and 51.6 % of the patients were male. All patients had diabetes and HbA1c levels for each group were as follows: lowest tertile, 5.86±0.32%; 2nd tertile, 6.94±0.34%; the highest tertile 9.07±1.95%. The mean SOFA score was 8.69±3.69 and 14.3% of the patients had an old history of myocardial infarction. Both of these parameters were not different according to the HbA1 tertiles. During the mean time of 20.7±17.9 days of hospital stay, 29.7% of the patients were dead and it was not different according to the HbA1c tertile (p=0.064). When the binary regression analysis was adjusted, neither the HbA1c level nor the HbA1c tertile was associated with the increased in-hospital mortality rate and only increased SOFA score (HR 1.351, CI; 1.111-1.644, p=0.003) and the history of old myocardial infarction

(HR 5.269, CI; 1.030-26.953, p=0.046) were predictive for the increased in-hospital mortality rate. Among the survived patients, 8.8% of the patients needed conventional HD after CRRT at the time of discharge which was significantly high in the lowest HbA1c tertile (23.3%, p=0.002). However, when we evaluated predictors of HD dependence, increased SOFA score (HR 1.321, CI; 1.080-1.615, p=0.007) and the history of old myocardial infarction (HR 6.170, CI;1.173-32.441, p=0.032) were related with the renal survival.

Conclusions : HbA1c at admission was not associated with the in-hospital mortality and the renal survival in diabetic patient underwent CRRT in intensive care unit. The prognosis would be ascribed to the severity of illness itself or other factor such as nutrition. Further investigation using larger cohorts is needed to delineate the diabetic effect on AKI with CRRT.

Keywords : CRRT, Diabetes, HbA1c, AKI