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Heart rate is associated with mortality in continuous renal replacement therapy

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Objectives : Heart rate (HR) is an essential vital sign based on the fact that HR beyond its normal range is associated with several conditions or diseases including high mortality in several clinical settings. Nevertheless, the clinical implication of HR remains unresolved in patients undergoing continuous renal replacement therapy (CRRT).

Methods : This retrospective cohort study included 828 patients who underwent CRRT due to acute kidney injury between 2010 and 2014. HR and other baseline parameters during CRRT initiation were retrieved. The odds ratio (OR) of the 30-day mortality was calculated using multivariate logistic model.

Results : CRRT significantly lowered HR of patients such that the pre- and post-CRRT HR (average 6 hours) were 107/min and 103/min, respectively (P <0.001). When we explored the relationship with 30-day mortality, only HR at the time of CRRT initiation, but not pre- and post-CRRT HR, had a significant relationship with mortality outcome. Adjusted mortality OR in the high HR group was 1.5 (1.05-2.08) compared with the low HR group. When the patients were divided into quartiles of HR, the 4th quartile group (ranged from 124/min to 186/min) had a higher adjusted OR [1.8, (1.11-2.78)] than the 1st quartile group (ranged from 48/min to 86/min). However, HR was not associated with the weaning rate from CRRT. The referential APACHE II scoring system indicates that both high and low HRs are related with a high mortality, like as a U-shaped relationship. However, the present CRRT cohort revealed that low HR did not increase a mortality risk compared with the normal HR [Figure].

Conclusions : High HR value at the time of CRRT initiation is related with a high mortality. This result will confer a basis for future predictive model of CRRT-related mortality.

Keywords : acute kidney injury, APACHE II, continuous renal replacement therapy, heart rate, mortality