KSN 2019
Seoul, Korea · May 23 - 26

Abstract Type : Poster
Abstract Submission No. : PO-1343

The Interactive Effects of Input and Output on Managing Fluid Balance in Patients with Acute Kidney Injury Requiring Continuous Renal Replacement Therapy

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Objectives: The interactive effect of cumulative input and output on achieving optimal fluid balance has not been well elucidated in patients with acute kidney injury (AKI) requiring continuous renal replacement therapy (CRRT). This study evaluated the interrelation of fluid components with mortality in patients with AKI requiring CRRT.

Methods: A total of 258 patients who were treated with CRRT due to AKI between 2016 and 2018 in the intensive care unit of Ewha Womans University Mokdong Hospital were enrolled. The amounts of fluid input and output were assessed at 24-hr and 72-hr from the initiation of CRRT. The study endpoints were 7- and 28-day all-cause mortality.

Results: The mean patient age was 64.7±15.8 years, and 165 (64.0%) patients were male. During the follow-up, 7- and 28-day mortalities were observed in 120 (46.5%) and 157 (60.9%) cases. The patients were stratified into two groups (28-day survivors vs. non-survivors), and the CFBs at 24-hr and 72-hr were significantly higher in the 28-day non-survivors compared with the survivors. The increase in 24-hr and 72-hr CFB was significantly associated with an increase in 7- and 28-day mortality risks. To examine the interactive effect of cumulative input or output on the impact of CFB on mortality, we also stratified patients into three groups based on the tertile of 24-hr and 72-hr cumulative input or output. The increases in 24-hr and 72-hr CFBs were still significantly related to the increases in 7-day and 28-day mortality, irrespective of the cumulative input. However, we did not find significant associations between increase in 24-hr and 72-hr CFB and increase in mortality risk in the groups according to cumulative output tertile.

Conclusions: The impact of CFB on mortality might be more dependent on cumulative output. The physicians need to decrease the CFB of CRRT patients as much as possible and consider increasing patient removal.