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Hubungan Balans Cairan Kumulatif Positif terhadap Kematian dan Lama Rawat pada Pasien Kritis di ICU
RSUP Dr. Sardjito Yogyakarta
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INTISARI

Latar Belakang: Balans cairan positif sering terjadi pada pasien kritis di Intensive Care Unit (ICU) akibat kebutuhan resusitasi cairan dan gangguan regulasi cairan tubuh. Meskipun terapi cairan diperlukan untuk mempertahankan perfusi jaringan dan stabilitas hemodinamik, pemberian cairan berlebihan dapat menyebabkan edema jaringan, disfungsi organ, dan memperburuk luaran klinis pasien. Sejumlah penelitian menunjukkan bahwa balans cairan positif berkaitan dengan peningkatan kematian dan lama rawat inap pada pasien kritis

Tujuan: Mengetahui hubungan balans cairan kumulatif positif dengan kematian dan lama rawat inap pada pasien kritis di ICU.

Metode: Penelitian ini merupakan penelitian observasional analitik dengan desain kohort retrospektif. Data diperoleh dari rekam medis pasien dewasa yang dirawat di ICU RSUP Dr. Sardjito Yogyakarta periode Januari 2025 hingga Februari 2026. Variabel independen penelitian adalah balans cairan kumulatif selama perawatan di ICU. Luaran penelitian meliputi kematian dan lama rawat inap di ICU dan RS. Variabel lain yang dianalisis meliputi usia, jenis kelamin, skor APACHE II, BMI, sepsis, komorbid dan penggunaan diuretik. Analisis bivariat dilakukan menggunakan uji Chi-square dan Mann–Whitney/Uji t tidak berpasangan sesuai distribusi data. Analisis multivariat dilakukan menggunakan regresi logistik dan regresi linear.

Hasil: Sebanyak 124 pasien kritis memenuhi kriteria inklusi penelitian. Balans cairan kumulatif positif ditemukan pada 61 pasien dan Balans cairan kumulatif negatif pada 63 pasien dengan rerata usia subjek adalah 54 tahun. Kematian ICU lebih tinggi pada kelompok dengan balans cairan kumulatif positif dibandingkan kelompok balans cairan kumulatif negatif (80.3% vs 30.2%; $p<0.01$). Lama rawat inap pasien penyintas di ICU juga lebih panjang pada kelompok dengan balans cairan kumulatif positif (46 hari vs 19 hari; $p<0.001$). Analisis multivariat menunjukkan bahwa balans cairan positif merupakan faktor independent terhadap kematian ICU (OR 4.087; CI95% [5.1-131.9]; $p<0.001$) serta lama rawat inap ICU.

Kesimpulan: Balans cairan positif berhubungan dengan kematian dan lama rawat inap pada pasien kritis di ICU.

Kata Kunci: balans cairan positif, kematian ICU, lama rawat inap, pasien kritis, intensive care unit

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ABSTRACT

Background: *Fluid management is a critical component of care for patients in the Intensive Care Unit (ICU). Excessive fluid administration can lead to a positive fluid balance, which may precipitate tissue edema, organ dysfunction, and adverse clinical outcomes. Several studies have demonstrated an association between positive fluid balance and increased mortality and length of stay; however, local data in Indonesia, particularly from tertiary referral ICUs, remain limited.*

Objective: *To evaluate the association between positive cumulative fluid balance and mortality as well as length of stay in critically ill patients in the Intensive Care Unit of Dr. Sardjito General Hospital, Yogyakarta.*

Methods: *This was a retrospective cohort observational study involving 124 critically ill patients admitted to the ICU of Dr. Sardjito General Hospital between January and December 2025. Subjects were selected by purposive sampling according to predefined inclusion and exclusion criteria. Cumulative fluid balance was calculated as total fluid intake minus total fluid output throughout the duration of ICU care, and was categorized as positive or negative. Data were analyzed using the Chi-square test, Mann–Whitney U test, as well as bivariate and multivariate logistic regression. A p value of <0.05 was considered statistically significant.*

Results: *Of the 124 subjects, 61 patients (49.2%) had a positive cumulative fluid balance and 63 patients (50.8%) had a negative cumulative fluid balance. Bivariate analysis demonstrated that positive cumulative fluid balance was significantly associated with ICU mortality (OR 9.46; 95% CI 4.13–21.67; p<0.001). Multivariate logistic regression confirmed that positive fluid balance remained an independent predictor of mortality after adjustment for confounders (p<0.001). Patients with a positive fluid balance exhibited a longer hospital length of stay than those with a negative fluid balance (median 12 vs 18 days; p=0.008). Kaplan–Meier analysis showed that the mean ICU length of stay among surviving patients was longer in the positive cumulative fluid balance group than in the negative group (46.6 vs 19.4 days; log-rank p=0.001).*

Conclusion: *Positive cumulative fluid balance is significantly associated with increased mortality and prolonged length of stay in critically ill survivor patients in the Intensive Care Unit of Dr. Sardjito General Hospital.*

Keywords: fluid balance, critically ill, ICU, mortality, length of stay