



Rasio Blood Urea Nitrogen Terhadap Albumin (Bar) Sebagai Prediktor Kematian Pasien Sepsis di Ruang Rawat Intensif RS Dr. Sardjito

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# RASIO BLOOD UREA NITROGEN TERHADAP ALBUMIN (BAR) SEBAGAI PREDIKTOR KEMATIAN PASIEN SEPSIS DI RUANG RAWAT INTENSIF RS Dr. SARDJITO

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## ABSTRAK

**Latar belakang:** Sepsis merupakan disfungsi organ yang mengancam jiwa akibat disregulasi sistem imun terhadap infeksi. Sepsis menjadi satu penyebab utama kematian di seluruh dunia dan masih menjadi tantangan besar dalam pelayanan kesehatan global, termasuk di negara berkembang. Identifikasi penanda klinis prognostik yang sederhana, terjangkau, dan mudah diakses sangat dibutuhkan untuk memperbaiki luaran klinis pasien. *Blood Urea Nitrogen* (BUN) dan albumin merupakan parameter laboratorium rutin telah menunjukkan hubungan dengan peningkatan kematian pasien sepsis. Rasio BUN terhadap albumin (BAR) merefleksikan kombinasi proses katabolisme, disfungsi organ, dan beratnya inflamasi, sehingga BAR berpotensi memprediksi risiko kematian sepsis lebih baik daripada BUN atau albumin saja.

**Tujuan:** Mengevaluasi peran rasio BUN terhadap albumin (BAR) > 8,0 sebagai prediktor kematian dalam 30 hari pasien sepsis di ruang intensif RS Dr. Sardjito.

**Metode:** Penelitian ini menggunakan data sekunder dengan pendekatan desain kohort retrospektif. Subjek penelitian adalah pasien sepsis di ruang intensif yang memenuhi kriteria inklusi, yaitu skor SOFA  $\geq 2$ , berusia  $\geq 18$  tahun, data BUN dan albumin serum tersedia pada 24 jam pertama perawatan ruang intensif, dan satu episode rawat inap dengan sepsis pertama dalam 1 tahun serta memenuhi kriteria eksklusi, yaitu pasien keluar dari RS atas permintaan sendiri. Analisis kesintasan menggunakan metode *Kaplan-Meier* dan regresi *Cox* dengan aplikasi SPSS versi 26.0. Batas kemaknaan statistik menggunakan nilai  $p < 0,05$ .

**Hasil:** Penelitian ini melibatkan 352 pasien sepsis dan syok septik, dengan median usia adalah 58,5 tahun dan proporsi usia  $\geq 60$  tahun sebesar 48,0%. Kematian dalam 30 hari ditemukan mencapai 62,78%. Faktor-faktor yang konsisten signifikan sebagai prediktor kematian dalam 30 hari pasien sepsis pada analisis multivariat adalah BAR > 8,0 (HR 2,235 (95% CI 1,241 – 4,027;  $p = 0,007$ ), usia  $\geq 60$  tahun (HR 1,829; 95%CI 1,270 – 2,633,  $p = 0,011$ ), syok septik (HR 1,880; 95% CI 1,318 – 2,683,  $p < 0,001$ ), serta kadar albumin  $\leq 2,72$  g/dL (HR 1,525; 95%CI 1,034 – 2,248,  $p = 0,033$ ), sementara itu pemberian antibiotik kombinasi dan ditemukan pertumbuhan kultur bakteri memiliki efek protektif terhadap kematian dalam 30 hari pasien sepsis (HR 0,569; 95%CI 0,397 – 0,814;  $p = 0,002$  dan HR 0,486; 95%CI 0,256 - 0,925;  $p = 0,028$ ).

**Simpulan:** Rasio *Blood Urea Nitrogen* terhadap albumin (BAR) > 8,0 merupakan prediktor independen terhadap risiko kematian dalam 30 hari pasien sepsis di ruang intensif dengan HR 2,235 (95% CI 1,241 – 4,027;  $p = 0,007$ ).

**Kata kunci:** BUN, albumin, sepsis, kematian, BAR

## BLOOD UREA NITROGEN TO ALBUMIN RATIO (BAR) AS A PREDICTOR OF MORTALITY AMONG SEPSIS PATIENTS IN THE INTENSIVE CARE UNIT OF DR. SARDJITO HOSPITAL

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### ABSTRACT

**Background:** Sepsis is a life-threatening organ dysfunction caused by a dysregulated host immune response to infection. It remains one of the leading causes of mortality worldwide and continues to be a major challenge in global healthcare, particularly in developing countries. The identification of simple, affordable, and easily accessible prognostic clinical markers is crucial to improving patient outcomes. Blood Urea Nitrogen (BUN) and albumin, as routine laboratory parameters, have been shown to be associated with increased mortality in patients with sepsis. The BUN-to-albumin ratio (BAR) reflects the combined effects of catabolic processes, organ dysfunction, and the severity of inflammation, making it a potentially better predictor of sepsis mortality than BUN or albumin alone.

**Objective:** To evaluate the role of a BUN-to-albumin ratio (BAR) > 8.0 as a predictor of 30-day mortality in sepsis patients treated in the intensive care unit of Dr. Sardjito Hospital.

**Methods:** This study used secondary data with a retrospective cohort design. The study population consisted of patients with sepsis admitted to the intensive care unit who met the inclusion criteria, namely a SOFA score  $\geq 2$ , age  $\geq 18$  years, availability of blood urea nitrogen (BUN) and serum albumin data within the first 24 hours of ICU admission, and a single episode of first sepsis-related hospitalization within one year. Patients who were discharged against medical advice were excluded. Survival analysis was performed using the Kaplan–Meier method and Cox proportional hazards regression with SPSS version 26.0. A p-value < 0.05 was considered statistically significant.

**Results:** A total of 352 patients with sepsis and septic shock were included. The median age was 58.5 years, with 48.0% aged  $\geq 60$  years. The 30-day mortality rate reached 62.78%. Factors that remained significant predictors of 30-day mortality in the multivariate analysis were BAR > 8.0 (HR 2.235; 95% CI 1.241–4.027;  $p = 0.007$ ), age  $\geq 60$  years (HR 1.829; 95% CI 1.270–2.633;  $p = 0.011$ ), septic shock (HR 1.880; 95% CI 1.318–2.683;  $p < 0.001$ ), and serum albumin  $\leq 2.72$  g/dL (HR 1.525; 95% CI 1.034–2.248;  $p = 0.033$ ). Conversely, combination antibiotic therapy and positive bacterial culture showed a protective effect against 30-day mortality (HR 0.569; 95% CI 0.397–0.814;  $p = 0.002$  and HR 0.486; 95% CI 0.256–0.925;  $p = 0.028$ , respectively).

**Conclusion:** A BUN-to-albumin ratio (BAR) > 8.0 is an independent predictor of 30-day mortality among sepsis patients in the intensive care unit, with an HR of 2.235 (95% CI 1.241–4.027;  $p = 0.007$ ).

**Keywords:** BUN, albumin, sepsis, mortality, BAR