



INTISARI

Latar belakang: Gagal ginjal akut (GGA) menyumbang mortalitas 32–77% pada pasien intensive care unit (ICU) di Indonesia dan meningkatkan risiko kematian hingga delapan kali lipat di RSUP Dr. Sardjito. Luaran pasien sangat dipengaruhi oleh deteksi dini, namun diagnosis masih bergantung pada kreatinin serum yang baru meningkat setelah kerusakan ginjal berat. Proteinuria berpotensi menjadi prediktor dini GGA dengan pemeriksaan yang sederhana, murah, dan jarang diteliti.

Tujuan: Menilai proteinuria sebagai prediktor GGA pada pasien ICU RSUP Dr. Sardjito, Yogyakarta.

Metode: Penelitian kohort prospektif ini melibatkan pasien ICU yang memenuhi kriteria inklusi-eksklusi dan dikelompokkan berdasarkan status proteinuria. Analisis data dilakukan secara univariat (tabel deskriptif), bivariat (uji Chi-square/Fisher's Exact dan Mann-Whitney), serta multivariat (regresi logistik) untuk variabel dengan $p < 0,25$ pada tahap bivariat. Validasi model dilakukan dengan analisis kurva ROC (*receiver operating characteristic*) untuk menilai kemampuan diskriminasi dan uji Hosmer–Lemeshow untuk kalibrasi model.

Hasil: Dari 187 pasien yang diseleksi, 151 pasien memenuhi kriteria (median usia 52 tahun; laki-laki 47,7%). Proteinuria ditemukan pada 51,7% pasien, dengan insidensi GGA sebesar 10,6%. Analisis bivariat menunjukkan hubungan signifikan antara proteinuria dan GGA (19,2% vs 1,4%; RR 14,04; $p < 0,001$). Selain itu, jenis kelamin laki-laki (18,1% vs 3,8%; RR 4,76; $p = 0,004$) dan riwayat penyakit jantung (33,3% vs 8,1%; RR 4,12; $p = 0,011$) juga berhubungan dengan kejadian GGA. Sebaliknya, skor APACHE II ≥ 17 hanya menunjukkan kecenderungan peningkatan kejadian GGA (19,2% vs 8,8%; $p = 0,155$), namun tidak signifikan secara statistik. Sedangkan usia, hipertensi, dan diabetes melitus tidak bermakna secara statistik. Analisis multivariat menegaskan proteinuria sebagai prediktor independen GGA (OR 20,02; 95% CI: 1,32–304,52; $p = 0,031$). Kurva ROC menghasilkan AUC 0,782 ($p = 0,001$) dengan sensitivitas 93,8% dan spesifisitas 53,3%, PPV 19,2%, serta NPV 98,6%. Uji Hosmer–Lemeshow menunjukkan kalibrasi model yang baik ($p = 0,225$). Selain itu, pasien dengan proteinuria lebih sering membutuhkan vasopressor (34,6% vs 12,3%; $p = 0,001$), sedangkan penggunaan diuretik lebih banyak dijumpai pada kelompok tanpa proteinuria (19,2% vs 5,1%; $p = 0,008$).

Kesimpulan: Proteinuria merupakan prediktor dengan kekuatan moderat terhadap kejadian gagal ginjal akut (GGA) pada pasien ICU di RSUP Dr. Sardjito. Ketiadaan proteinuria dapat menjadi indikator yang kuat untuk menyingkirkan risiko terjadinya GGA.

Kata kunci: gagal ginjal akut; proteinuria; prediktor; *intensive care unit*



ABSTRACT

Background: Acute kidney injury (AKI) accounts for 32–77% of mortality in intensive care unit (ICU) patients in Indonesia and increases the risk of death up to eightfold at Dr. Sardjito General Hospital. Patient outcomes are greatly influenced by early detection, but diagnosis still relies on serum creatinine, which only increases after severe kidney damage. Proteinuria has the potential to be an early predictor of AKI with simple, inexpensive, and rarely studied tests.

Objective: To assess proteinuria as a predictor of AKI in ICU patients at Dr. Sardjito General Hospital, Yogyakarta.

Methods: This prospective cohort study involved ICU patients who met the inclusion and exclusion criteria and were grouped based on proteinuria status. Data analysis was performed univariately (descriptive tables), bivariately (Chi-square/Fisher's Exact and Mann-Whitney tests), and multivariately (logistic regression) for variables with $p < 0.25$ at the bivariate stage. Model validation was performed using receiver operating characteristic (ROC) curve analysis to assess discriminatory ability and Hosmer–Lemeshow testing for model calibration.

Results: Of the 187 patients selected, 151 patients met the criteria (median age 52 years; 47.7% male). Proteinuria was found in 51.7% of patients, with a GGA incidence of 10.6%. Bivariate analysis showed a significant association between proteinuria and GGA (19.2% vs. 1.4%; RR 14.04; $p < 0.001$). In addition, male gender (18.1% vs. 3.8%; RR 4.76; $p = 0.004$) and a history of heart disease (33.3% vs. 8.1%; RR 4.12; $p = 0.011$) were also associated with the occurrence of GGA. Conversely, an APACHE II score ≥ 17 only showed a trend toward an increased incidence of GGA (19.2% vs. 8.8%; $p = 0.155$), but this was not statistically significant. Age, hypertension, and diabetes mellitus were not statistically significant. Multivariate analysis confirmed proteinuria as an independent predictor of GGA (OR 20.02; 95% CI: 1.32–304.52; $p = 0.031$). The ROC curve yielded an AUC of 0.782 ($p = 0.001$) with a sensitivity of 93.8% and specificity of 53.3%, PPV of 19.2% and NPV of 98.6%. The Hosmer–Lemeshow test indicated good model calibration ($p = 0.225$). In addition, patients with proteinuria more often required vasopressors (34.6% vs. 12.3%; $p = 0.001$), while diuretic use was more common in the group without proteinuria (19.2% vs. 5.1%; $p = 0.008$).

Conclusion: Proteinuria is a moderate predictor of acute kidney injury (AKI) in ICU patients at Dr. Sardjito General Hospital. Absence of proteinuria may serve as a strong indicator for ruling out the risk of AKI.

Keywords: acute kidney injury; proteinuria; predictor; intensive care unit