Rasio Albumin-Kreatinin Urin Sebagai Penanda Kebocoran Plasma Sistemik Sepsis Pada Anak: Kajian Terhadap Sindekan-1 = Urinary Albumin-Creatinine Ratio as a Marker of Systemic Plasma Leakage; A Study on Syndecan-1

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Abstrak

Kebocoran plasma sistemik pada sepsis dapat mengakibatkan berbagai komplikasi dari renjatan sampai kematian. Belum ada teknik andal untuk menilai kebocoran plasma sistemik pada anak. Degradasi glikokaliks, ditandai meningkatnya sindekan-1 dalam darah, menyebabkan perubahan permeabilitas vaskular sistemik. Pada glomerulus bermanifestasi sebagai albuminuria sehingga kenaikan rasio albumin-kreatinin (ACR) urin berpotensi menggambarkan kebocoran plasma sistemik. Sampai saat ini belum ada rujukan nilai sindekan-1 dan ACR urin sebagai penanda kebocoran plasma sistemik pada anak. Penelitian ini bertujuan untuk mengetahui peran ACR urin dan nilai rujukan ACR urin sebagai penanda kebocoran plasma sistemik pada anak sepsis dan mengkaji kaitannya dengan sindekan-1.
Penelitian ini terdiri atas studi deskriptif pada anak sehat dan penelitian longitudinal prospektif dengan rancangan potong lintang berulang terhadap anak sepsis, dilakukan di RSUP Cipto Mangunkusumo Jakarta, RSUP H. Adam Malik Medan dan RSUP Kariadi Semarang dalam rentang waktu Maret–Desember 2015. Dilakukan pemeriksaan sindekan-1 dan ACR urin pada pasien sepsis yang dirawat di instalasi rawat intensif anak pada hari rawatan ke-1, 2, 3 dan 7, dan mencatat skor Pediatric Logistic Organ Dysfunction pada hari rawatan ke-1 dan 3.
Tiga puluh subjek sehat dan 49 subjek sepsis diikutsertakan dalam penelitian. Pada kelompok sehat didapati median ACR urin 10,5 (3–88) mg/g dan rerata sindekan-1 sebesar 27,7 (SB 2,24) ng/mL. Sindekan-1 di atas persentil 90 (41,42 ng/mL) ditetapkan sebagai batasan kebocoran plasma sistemik. Didapati 40 orang (81,6%) subjek sepsis dengan sindekan-1 > 41,42 ng/mL dan 33 orang (67,3%) menunjukkan ACR urin > 300 mg/g pada hari rawatan 1. Didapati koefisien korelasi (r) 0,32 (P < 0,001) antara ACR urin dan sindekan-1. Area under the curve ACR urin terhadap kebocoran plasma sistemik diperoleh sebesar 65,7% (95% IK 54,5–77%; P = 0,012). ACR urin > 157,5 mg/g ditetapkan sebagai cut-off point kebocoran plasma sistemik dengan sensitivitas 77,4% dan spesifisitas 48%. ACR urin dapat digunakan sebagai penanda kebocoran plasma sistemik, peningkatan ACR urin akan mengikuti peningkatan sindekan-1.
.....Systemic plasma leakage during sepsis can cause several complications from shock to death. There is no feasible measurement of systemic plasma leakage in children. Glycocalyx degradation, marked by increased serum syndecan-1, alters vascular permeability. In the glomerulus this can manifest as albuminuria, therefore elevated urinary albumin-creatinine ratio (ACR) potentially provides an index of systemic plasma leakage. Nowadays. there is no reference value of syndecan-1 and urinary ACR as a marker of systemic plasma leakage in pediatric population. This study aims to analyze the role of urinary ACR and to determine its reference value as a marker of systemic plasma leakage in pediatric sepsis, by analyzing its correlation with syndecan-1.
This study consisted of descriptive study on healthy children and longitudinal prospective study with repeated cross-sectional design on septic children, was conducted at Cipto Mangunkusumo Hospital Jakarta,

Haji Adam Malik Hospital Medan and Kariadi Hospital Semarang from March to December 2015. We examined serum syndecan-1 and urinary ACR of septic patients in pediatric intensive care unit on day 1, 2, 3 and 7. Pediatric Logistic Organ Dysfunction (PELOD) score were recorded on day 1 and 3.
Thirty healthy subjects and 49 septic subjects were recruited. In the healthy group, median of urinary ACR was 10.5 (3–88) mg/g and mean of syndecan-1 was 27.7 + 2.24) ng/mL. Syndecan-1 more than 90th percentile (41.42 ng/mL) was determined as systemic plasma leakage. Forty (81.6%) septic subjects had syndecan-1 > 41.42 ng/mL and 33 (67.3%) subjects had urinary ACR > 300 mg/g on day 1. Correlation coefficient (r) between urinary ACR and syndecan-1 was 0.32 ($P < 0.001$). Area under the curve of urinary ACR and plasma leakage was 65.7% (95% CI 54.5–77%; $p = 0.012$). Urinary ACR > 157.5 mg/g was determined as cut-off point of systemic plasma leakage with sensitivity 77.4% and specificity 48%. Urinary ACR can be used as marker of systemic plasma leakage. Increased urinary ACR would indicate increased syndecan-1.