Hubungan kadar plasminogen activator inhibitor type 1(PAI-1) dengan luaran pada pasien sepsis anak = The relationship between plasminogen activator inhibitor type 1 (PAI-1) and clinical outcome in children with sepsis

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Abstrak

Latar belakang: Koagulasi intravaskular diseminata (KID) merupakan komplikasi dari sepsis yang ditandai oleh perdarahan dan trombosis mikrovaskular dan berkaitan erat dengan terjadinya disfungsi organ multipel. KID terjadi akibat ketidakseimbangan antara sistem koagulasi dengan sistem fibrinolisis. Plasminogen activator inhibitor type 1 (PAI-1) merupakan protein fase akut yang berperan penting penekanan sistem fibrinolisis. Peningkatan PAI-1 pada sepsis diketahui memiliki korelasi dengan luaran yang buruk.
Tujuan: Untuk mengetahui hubungan kadar PAI-1 dengan kejadian KID dan kematian pada pasien sepsis anak.
Metode: Penelitian analitik prospektif dilakukan pada 35 subjek sepsis yang dirawat di PICU, Instalasi Gawat Darurat serta Ruang perawatan anak RS Cipto Mangunkusumo antara bulan Januari-April 2015. Pengukuran kadar PAI-1 dilakukan pada hari pertama dan keempat sejak sepsis ditegakkan. Pemeriksaan profil koagulasi sistemik dilakukan pada hari keempat sepsis. Diagnosis KID overt menggunakan skor KID berdasarkan International Society of Thrombosis and Haemostasis. Subjek diikuti sampai hari ke 28 perawatan untuk menilai luaran kematian.
Hasil: Kadar PAI-1 lebih tinggi secara bermakna pada sepsis berat. Terdapat perbedaan yang bermakna antara kadar PAI-1 hari keempat dengan hari pertama pada KID non overt (95,25 (SB 46,57) ng/mL vs 60,36 (SB 37,31) ng/mL, p=<0,001) dan subjek hidup (82,47 (SB 44,43) ng/mL vs 58,39 (SB 32,98) ng/mL, p=0,021). Terdapat perbedaan kadar PAI-1 hari keempat dengan hari pertama pada subjek KID overt (111,25 (SB 32,93) ng/mL vs 96,26 (SB 52,84) ng/mL) dan subjek meninggal (99,33 (SB 47,53) ng/mL vs 128,58 (SB 37,12) ng/mL), namun tidak bermakna secara statistik. Korelasi kadar PAI-1 dengan skor KID adalah r = 0,606 (p = <0,001).
Simpulan: Kadar PAI-1 mengalami penurunan yang bermakna pada hari keempat sepsis dibanding hari pertama pada subjek yang mengalami KID non-overt dan subjek yang bertahan hidup. Sedangkan pada subjek yang mengalami KID overt dan subjek yang meninggal, kadar PAI-1 hari keempat sepsis tetap tinggi. Terdapat korelasi kuat berbanding lurus antara kadar PAI-1 dengan skor KID.
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Background: Sepsis-induced disseminated intravascular coagulation (DIC) is characterized by massive bleeding and microvascular thrombosis and it is closely related to the development of multiple organ dysfunctions. The imbalance between activation of coagulation system and inhibition of the fibrinolysis system in sepsis leads to the development of DIC. The acute-phase protein, plasminogen activator inhibitor type 1 (PAI-1) is a key element in the inhibition of fibrinolysis. Elevated levels of PAI-1 have been related to worse outcome in sepsis.
Objective: To investigate the relationship between plasma PAI-1 level and clinical outcome in children with sepsis.

Methods: A total of 35 children with sepsis admitted to Cipto Mangunkusumo hospital between January and April 2015 were enrolled to this analitic prospective study. Plasma PAI-1 was measured on day 1 and 4 since sepsis was diagnosed. Systemic coagulation profile was measured on day 4. The Diagnosis of overt DIC was made using the International Society of Thrombosis and Haemostasis scoring system. Subjects were followed up until death or 28 days of care.
Results: PAI-1 levels were significantly higher in severe sepsis. There were significant difference between PAI-1 levels on day 4 compared to day 1 in non- overt DIC subjects (95.25 (SB 46.57) ng/mL vs 60.36 (SB 37.31) ng/mL, p=<0.001) and survivors (82.47 (SB 44.43) ng/mL vs 58.39 (SB 32.98) ng/mL, p=0.021). There were no significant difference between PAI-1 levels on day 4 compared to day 1 in overt DIC subjects (111.25 (SB 32.93) ng/mL vs 96.26 (SB 52.84) ng/mL) and nonsurvivors (99.33 (SB 47.53) ng/mL vs 128.58 (SB 37.12) ng/mL). The correlation observed between PAI-1 and DIC score was r=0.606 (p= < 0.001).
Conclusions: There were significant decrease of PAI-1 levels on day 4 compared to day 1 in non-overt DIC subjects and survivors. Meanwhile, in overt DIC subjects and nonsurvivors there were no differences. PAI-1 levels were positively correlated with DIC score.