

# Model prediksi mortalitas dini pasca fase resusitasi awal pasien sepsis berat dan syok sepsis berdasarkan parameter akhir resusitasi = End points resuscitation based prediction model for early mortality after early resuscitative phase of severe sepsis and septic shock

Robert Sinto, author

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## Abstrak

Latar Belakang. Angka kejadian dan mortalitas pasien sepsis berat dan syok sepsis di dunia masih tinggi. Belum diketahui peran gabungan parameter akhir resusitasi makrosirkulasi dan mikrosirkulasi yang disusun dalam sebuah model prediksi mortalitas dini pasca fase resusitasi awal pasien sepsis berat dan syok sepsis.

Tujuan. Menentukan model prediksi terjadinya mortalitas dini pasca fase resusitasi awal pasien sepsis berat dan syok sepsis berdasarkan parameter akhir resusitasi makrosirkulasi dan mikrosirkulasi.

Metode. Penelitian dengan desain kohort retrospektif dilakukan terhadap pasien sepsis berat dan/atau syok sepsis yang berusia lebih dari sama dengan 18 tahun dan dirawat di ruang rawat intensif Rumah Sakit Cipto Mangunkusumo pada periode waktu Januari 2011 sampai Desember 2012. Pasien diamati selama 120 jam pertama pasca inisiasi fase resusitasi awal untuk melihat luaran yang terjadi dan waktu timbul luaran berupa mortalitas. Sembilan prediktor terjadinya mortalitas dini yang telah didefinisikan sebelumnya diidentifikasi pasca pasien melewati fase resusitasi awal. Prediktor independen mortalitas dini diidentifikasi dengan analisis regresi Cox's Proportional Hazard dan setiap faktor independen dikuantifikasi untuk mengembangkan suatu model prediksi mortalitas dini. Kemampuan kalibrasi model tersebut ditentukan dengan uji Hosmer-Lameshow dan kemampuan diskriminasinya ditentukan dengan menghitung area under curve (AUC) dari receiver operating curve.

Hasil. Subjek penelitian terdiri atas 268 pasien. Sebagian besar (54,9%) merupakan pasien laki-laki, dengan median (rentang) usia 49 tahun (18;86). Mortalitas terjadi pada 70 pasien (insidens kumulatif 26,1%, insidens densitas 0,002 per orang-jam) dalam 120 jam pertama pasca inisiasi fase resusitasi awal. Dua prediktor independen mortalitas dini diidentifikasi, yakni: bersihan laktat (adjusted hazard ratio[HR] 11,81 [IK95% 6,50-21,46]) dan jumlah disfungsi organ (2 disfungsi organ, adjusted HR 1,47 [IK95% 0,58- 3,72]; >3 disfungsi organ, adjusted HR 3,79 [IK95% 1,65-8,69]). Model prediksi ditentukan dengan menggunakan model akhir analisis multivariat dan distratifikasi menjadi dua kelompok tingkatan risiko: rendah (probabilitas mortalitas dini 7,8%), dan tinggi (72,3%). Uji Hosmer-Lemeshow menunjukkan presisi yang baik (p 0,745) dan AUC menunjukkan kemampuan diskriminasi yang sangat baik (0,91 [IK95% 0,87-0,95]).

Kesimpulan. Model prediksi terjadinya mortalitas dini pasca fase resusitasi awal pasien sepsis berat dan syok sepsis berdasarkan parameter akhir resusitasi makrosirkulasi dan mikrosirkulasi dapat disusun berdasarkan parameter bersihan laktat dan jumlah disfungsi organ.

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Introduction. The incidence and mortality rates of patients with severe sepsis and septic shock in the world is still high. There is unknown role of macrocirculation and microcirculation end points resuscitation which are combined as the component of prediction model for early mortality after early resuscitative phase of patient with severe sepsis and septic shock.

**Aim.** To develop a prediction model for early mortality after early resuscitative phase of patient with severe sepsis and septic shock based on macrocirculation and microcirculation end points resuscitation.

**Method.** A retrospective cohort study was conducted in severe sepsis and septic shock patients (aged 18 years and older) who were hospitalized in Intensive Care Unit Rumah Sakit Cipto Mangunkusumo from January 2011 until December 2012. Patients' outcome and time to outcome were observed during first 120 hours of initiation of early resuscitative phase. Nine predefined predictors for development of early mortality were identified after early resuscitative phase. Independent predictors for early mortality were identified by Cox's proportional hazard regression analysis and each independent predictor was quantified to develop early mortality prediction model. The calibration performance of the model was tested by Hosmer-Lameshow test and its discrimination ability was determined by calculating area under the receiver operating characteristic curve (AUC).

**Results.** Subjects consist of 268 patients, predominantly male (54.9%), with median (range) age of 49 (18;86) years old. Mortality developed in 70 patients (cumulative incidence 26.1%, incidence density 0.002 per person-hours) during first 120 hours of initiation of early resuscitative phase. Two independent predictors for early mortality were identified, including: lactate clearance (adjusted hazard ratio[HR] 11.81 [95%CI 6.50-21.46]) and number of organ dysfunction (2 organs dysfunction, adjusted HR 1.47 [95%CI 0.58- 3.72]; >3 organs dysfunction, adjusted HR 3.79 [95%CI 1.65-8.69]). Predictive model was performed using the final model of multivariate analysis and stratified into two levels: low- (probability for early mortality 7.8%), and high-risk (72.3%) groups. The Hosmer-Lemeshow test revealed good precision (p-value 0.745) and the AUC showed very good discrimination ability (0.91 [95% CI 0.87-0.97]).

**Conclusion.** A prediction model for early mortality after early resuscitative phase of patient with severe sepsis and septic shock based on macrocirculation and microcirculation end points resuscitation can be developed based on two parameters, i.e. lactate clearance and number of organ dysfunction.