

# Prediktor konversi luka bakar sebagai acuan tata laksana konservatif dan operatif: kajian terhadap imageJ, FLIR ONE®, dan pengembangan model skoring faktor risiko = Predictor of burn wound conversion as a reference for conservative and operative management: review of imageJ, FLIR ONE®, and development of risk factor score model

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## Abstrak

Konversi luka bakar merupakan perubahan zona kedalaman dari dangkal menjadi dalam pada 3–7 hari pasca luka bakar. Saat ini, proses autofagi, inflamasi, iskemia, infeksi, dan reactive oxygen species dianggap berperan dalam patogenesis konversi luka bakar. Penelitian ini bertujuan untuk mengkaji faktor risiko terjadinya konversi luka bakar pada pasien dewasa dan mengembangkan sistem skor untuk memprediksi kejadian konversi luka bakar sebagai acuan tatalaksana konservatif dan operatif.

Penelitian dilaksanakan dengan metode nested case control pada pasien luka bakar dewasa yang dirawat di Unit Luka Bakar RSUPN Dr. Cipto Mangunkusumo dan RS Islam Jakarta Cempaka Putih. Subjek direkrut dengan metode consecutive sampling pada Februari 2019–Agustus 2020. Faktor risiko yang diteliti adalah karakteristik klinis, pemeriksaan klinis lokal, dan pemeriksaan klinis sistemik. Faktor risiko dianalisis secara bivariat dan multivariat regresi logistik.

Terdapat 40 subjek kelompok kasus dan 20 subjek kelompok kontrol. Luka bakar di regio trunkus (OR = 3,67;  $p = 0,028$ ), regio tungkai (OR = 6,93;  $p = 0,001$ ), luas luka bakar yang dihitung dengan ImageJ  $39,49\%$  TBSA (OR = 32,11  $p < 0,001$ ), suhu permukaan luka yang diukur dengan termografi FLIR ONE®  $-1,55$  oC (OR = 13,78;  $p < 0,001$ ), kadar prokalsitonin  $0,075$  ng/mL (OR = 12;  $p < 0,001$ ), dan kadar laktat darah  $1,75$  mmol/L (OR = 7;  $p = 0,001$ ) memiliki hubungan bermakna dengan konversi luka bakar. Dikembangkan 3 model konversi luka bakar dari variabel bermakna. Model 1 diterapkan di fasilitas kesehatan tersier dengan sensitivitas dan spesifisitas sebesar 92,5% dan 85% (IK95% 0,835–1,00;  $p < 0,001$ ). Model 2 dan 3 dapat diterapkan di fasilitas kesehatan primer dan sekunder dengan model 2 memiliki sensitivitas dan spesifisitas sebesar 95% dan 70% (IK95% 0,830–1,00;  $p < 0,001$ ) dan model 3 memiliki sensitivitas dan spesifisitas sebesar 92,5% dan 85% (IK95% 0,832–1,00;  $p < 0,001$ ).

Model skor yang dibuat dapat dipertimbangkan digunakan dalam praktek sehari-hari terutama sebagai acuan tatalaksana konservatif dan operatif.

.....Burns are a global public health problem with high morbidity and mortality rates. Burn wound conversion describes the process by which superficial-partial thickness burns convert into deeper burns within 3–7 days after the burn. Currently, autophagy, inflammation, ischemia, infection, and reactive oxygen species are thought to play a role in the pathogenesis of burn wound conversion. This study aims to assess risk factors for burn wound conversion and develop a scoring system to predict burn conversion as a reference for burn wound management.

The study was conducted using the nested case control method, in adult burn patients who were treated at Dr. Cipto Mangunkusumo and Jakarta Islamic Hospital Cempaka Putih. Subjects were recruited by consecutive sampling method in February 2019–August 2020. The role of clinical characteristics, local clinical examination, and systemic examination as predictors of burn wound conversion were assessed. The

risk factors were analyzed using bivariate and logistic regression multivariate analysis.

There were 40 subjects in case group and 20 subjects in control group. Involvement of trunk (OR = 3.67;  $p = 0.028$ ), limbs (OR = 6.93;  $p = 0.001$ ), burn extent measured using ImageJ <sup>3</sup> 9.49 %TBSA (OR = 32.11  $p < 0.001$ ), wound surface temperature measured using FLIR ONE® thermography -1.55 oC (OR = 13.78;  $p < 0.001$ ), procalsitonin level 0.075 ng/mL (OR = 12;  $p < 0.001$ ), dan blood lactate level 1.75 mmol/L (OR = 7;  $p = 0.001$ ) had significant relationship with burn wound conversion. Three scoring models were developed based on the significant variables with model 1 to be applied in tertiary health facilities and model 2 and 3 to be applied in primary and secondary health facilities with sensitivity and specificity of 92.5% and 85% (95% CI 0.835–1.00;  $p < 0.001$ ), 95% and 70% (95% CI 0.830–1.00;  $p < 0.001$ ) and 92,5% and 85% (95% CI 0.832–1.00;  $p < 0.001$ ), respectively).

The scoring models can be considered to be used in daily practice, especially as a reference for conservative and operative management.