Original Article

Accuracy of Sepsis Criteria of ABA versus CDC for CLABSI Diagnosis in Major Burn Patients, and CLABSI Risk Factors

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Background: Systemic inflammatory response syndrome (SIRS) can occur as a physiological response without indicating a burn infection. The Centers for Disease Control and Prevention's (CDC's) clinical sepsis criteria for infection screening may not be accurate with burn patients, especially for diagnosing central line-associated bloodstream infections (CLABSIs). New clinical sepsis criteria were therefore proposed by the American Burn Association (ABA) in 2007. Nonetheless, no study has compared the accuracy of the ABA and CDC clinical sepsis criteria for burn-CLABSI diagnoses.

Objective: The present study aimed to investigate the relative accuracies of the ABA and CDC clinical sepsis criteria for burn-CLABSI diagnoses, and to report the CLABSI incidence at Siriraj Hospital's Burn Unit.

Materials and Methods: A retrospective chart review was conducted of burn patients admitted to the Burn Unit 2007 to 2015. Patients with central venous catheter insertions were included. Details of demographic data; comorbidities; burn type; total burn surface area; and type, duration, and purpose of the central lines were analyzed. The sensitivities and specificities of the ABA and CDC clinical sepsis criteria for CLABSI diagnoses were compared.

Results: Of the 101 patients enrolled, CLABSIs were diagnosed in 38 (37.8%). The most common infection site was the internal jugular vein (33%), with CLABSIs occurring most frequently with non-dialysis double lumen catheters. The sensitivity and specificity of the ABA criteria were 76.3% and 93.6%, respectively, with an 85.9% accuracy.

Conclusion: The ABA clinical sepsis criteria can be used to diagnose CLABSI in burn patients with acceptable accuracy and a higher specificity than the CDC criteria.

Keywords: ABA clinical sepsis criteria, CDC clinical sepsis criteria, Sepsis in burns, CLABSI in burns, Burn infection

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After major burn injuries, patients develop hypermetabolic responses due to inflammatory cytokines. Inadequate fluid resuscitation leads to burn shock while over resuscitation results in fluid creep[(1)]. Only proper volume management ensures good outcomes.

Vascular access for major burn patients is difficult because of the limited area available for a peripheral venous puncture site. Moreover, the greater the body surface area involved, the more rapid is the fluid rate and greater is the volume required. In general practice, central venous catheters are frequently used for burn injuries covering more than 40% of the total body surface area (TBSA). The catheters can provide large fluid volumes in a short period of time and be used for volume monitoring by measuring the central venous pressure. In the case of critical burn patients, the catheters can be accessed and used for purposes other than monitoring, such as the provision of hemodialysis or long-term parenteral nutrition.

Infections are one of the most common complications of using central venous catheters. A central line-associated bloodstream infection (CLABSI) has been defined by the Centers for Disease Control and Prevention (CDC) as a laboratory-confirmed bloodstream infection (LCBI) where an eligible bloodstream infection organism is identified and an eligible central line is present in the laboratory-confirmed bloodstream infection either on the day of the event or the day before[(2)].

A laboratory-confirmed infection has been defined as a positive blood culture with clinical sepsis or systemic inflammatory response syndrome (SIRS). For a diagnosis, SIRS requires at least two of the following four criteria:

Clinical sepsis criteria from the CDC

1) Body temperature of >38°C or <36°C.
2) Heart rate of >90/minute.
3) Respiratory rate of >20/minute or $PaCO_2$ of <32 mmHg.
4) White blood cell count of >12,000 cells/mcL, or <4,000 cells/mcL, or >10% immature bands.

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The hypermetabolic response in burn patients leads to SIRS, characterized by a mean body temperature of at least 38.5°C, tachycardia, an increased respiratory rate, and leukocytosis. In other words, SIRS can occur as a physiological response to a burn without there being an infection. Strict compliance with the CDC guidelines may lead to over-investigation, the overuse of antibiotics, and the use of substantial resources without commensurate benefits. Moreover, inappropriate antibiotic prescription increases the prevalence of drug-resistant organisms.

Consequently, the use of the CDC clinical sepsis criteria for infection screening may not be accurate when applied to burn patients, especially for the diagnosis of CLABSI. The American Burn Association (ABA) therefore promulgated new clinical sepsis criteria for burn patients in 2007. The ABA criteria focused on clinical aspects other than the vital signs (Table 1)[3]. At least three of the following six criteria are needed for a sepsis diagnosis:

Clinical sepsis criteria from the ABA

1) Body temperature of >39°C or <36.5°C.

2) Heart rate of >110/minute.

3) Respiratory rate of >25/minute or a minute ventilation of >12 L/minute.

4) Platelet count of <100,000/mcL.

5) Hyperglycemia: (A) Non-diabetes mellitus (DM): plasma glucose of >200 mg/dL, or insulin of >7 units/hour via intravenous dripping, (B) DM: increase of >25% of the regular dose of insulin in 24 hours.

6) Feeding intolerance: abdominal distention; residual content of >2 times of feeding volume; and diarrhea of >2,500 mL/day.

In addition, it is required that a microbiologically documented infection be identified through at least one of the following: (A) A positive blood culture, (B) A pathologic tissue analysis, and (C) A clinical response to antimicrobials.

In 2012, Hogan et al. reported on their study of the correlation between the ABA clinical sepsis criteria and the presence of bacteremia in burn patients admitted to an intensive care unit[4]. However, before the current study, no research has been undertaken to compare the accuracies of the ABA and CDC clinical sepsis criteria for burn-CLABSI diagnoses.

Objective

The objectives of the present study were to evaluate the accuracy of the ABA clinical sepsis criteria relative to that of the CDC clinical sepsis criteria for CLABSI diagnoses in burn patients, and to report the incidence of CLABSIs at the Burn Unit, Siriraj Hospital.

Materials and Methods

The present study was conducted in a retrospective cohort study under approval of Siriraj Hospital Institutional Review Board Committee (SIRB). A review was undertaken of the charts of burn patients with any central venous catheter insertion who had been admitted to the Burn Unit at Siriraj Hospital 2007 to 2015. Patients aged below fifteen were excluded.

The authors calculated the sample size from Hogan et al, using a two-sided 95.0% confidence interval for the area under a receiver-operating characteristic curve of 0.65 ± 0.09, determined by the STATA 11 program. The present study needed a total of 144 subjects.

Despite extending the period of the review (from 3 years to 8 years), the number of burn patients admitted to the Burn Unit with a central line insertion was unfortunately less than expected. Of the 105 individuals who were admitted, four were excluded as they were under 15 years of age, leaving 101 patients for inclusion in the statistical analysis.

Details of the subjects' demographic data; comorbidities; types of burn injury; total body surface areas

Table 1. Clinical sepsis criteria of the CDC and ABA systems

Parameters	CDC criteria (2/4)	ABA criteria (3/6)
Vital signs		
BT	>38°C or <36°C	>39°C or <36.5°C
HR	>90/min	>110/min
RS	RR >20/min or $PaCO_2$ <32 mmHg	RR >25/min, or MV >12 L/min
Complete blood count	WBC >12,000, or <4,000 cells/mcL, or immature bands >10%	Platelet count <100,000/mcL
Hyperglycemia	Non-DM	Plasma glucose >200 mg/dL, or intravenous insulin >7 units/hr
	DM	>25% regular insulin dosage in 24 hr (any route)
Feeding intolerance		Abdominal distension, GRV >2 x feeding volume, Diarrhea >2,500 mL/day

CDC = Centers for Disease Control and Prevention; ABA = American Burn Association; BT = body temperature; HR = heart rate; RS = respiratory system; min = minute; MV = minute ventilation; DM = diabetes mellitus; hr = hour; GRV = gastric residual volume

involved; type, duration, and purpose of the central lines; complete blood counts; feeding tolerance; vital signs; hospital stays; and mortality dates were collected and analyzed.

The program Statistical Package for Social Science (SPSS), version 18.0, was used to analyze the data. The independent t-test was used to analyze continuous data, while the Mann-Whitney, Chi-square, and Fisher's exact tests were used for categorical data. A *p*-value of less than 0.05 was considered to be statistically significant.

The factors associated with the CLABSIs were presented as odds ratio (OR) with a 95% confidence interval (95% CI). The *p*-value corresponded to the logistic regression analysis. The association of each sepsis criterion in both the CDC and ABA systems with the CLABSI diagnoses were analyzed by logistic regression analysis and presented as OR with a 95% CI. The accuracies of the CDC and ABA sepsis criteria were assessed using the area under a receiver-operating characteristic curve.

Results

Of the 101 patients included in the present study, CLABSIs were diagnosed in 38 (37.6%). Their demographic data, comorbidities, and lengths of hospital stay are presented in Table 2. Having the CLABSI prolonged their lengths of hospital stay significantly (61.2±4.8 vs. 40.02±3.6 days; *p*-value = 0.018). On the other hand, there were no statistically significant differences between the other group parameters (such as sex, age, and comorbidities).

The most common burn type was flame injury, accounting for 78.9% of cases. The remainder were electrical burns (11%), scald burns (9%), chemical burns (1%), and contact with a hot object (1%). The access locations were the subclavian vein (48.5%), femoral vein (45.5%), and internal jugular vein (23.8%). The CLABSI incidence was 50% for the internal jugular vein, 42.8% for the subclavian vein, and 39.13% for the femoral vein (Figure 1).

The differences in the types of burn injury, total body surface area of the burns, and inhalation injuries of the two groups were not statistically significant (Table 3). The total catheter days for the CLABSI group (28 days) was significantly greater than that for the non-CLABSI group (15 days), with a *p*-value of <0.001 (Table 4). A double lumen catheter insertion without hemodialysis was significantly more frequent in the non-CLABSI group than in the CLABSI group (*p*-value = 0.014), whereas the other types of central lines were not statistically different. As well, the use of the catheters for IV access, volume monitoring, and hemodialysis were not significantly different between the two groups. However, the CLABSI group had a significantly increased use of the catheters for blood transfusions (OR 6.45; *p*-value = 0.008) and parenteral nutrition (OR 2.75; *p*-value <0.001). Moreover, the non-dialysis double lumen catheter type was found significantly more often in the CLABSI group (OR 2.36; *p*-value = 0.014).

The locations of the catheter insertions in each group were not found to be significantly different (Table 5).

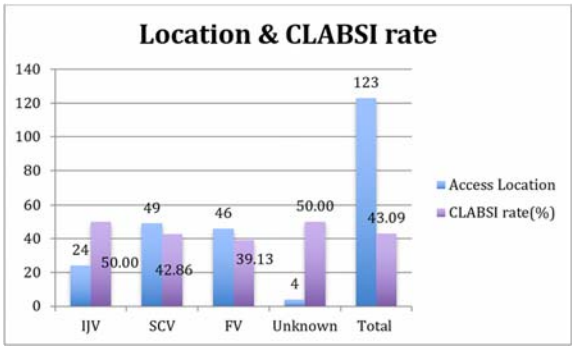

Figure 1. Insertion site and CLABSI rate. IJV = internal jugular vein; SCV = subclavian vein; FV = femoral vein

Table 2. Demographic data and lengths of hospital stay

Factors	CLABSI n = 38	Non-CLABSI n = 63	*p*-value
Male (%)	27 (71.1)	49 (77.8)	0.482
Female (%)	11 (28.9)	14 (22.2)	0.482
Age (mean ± SD; years)	50.6±19.1	43.7±19.4	0.083
HT (%)	9 (23.7)	10 (15.9)	0.431
DM (%)	4 (10.5)	3 (4.8)	0.421
DLP (%)	3 (7.9)	2 (3.2)	0.362
CVA/TIA (%)	2 (5.3)	2 (3.2)	0.630
CKD (%)	1 (2.6)	1 (1.6)	1.000
COPD (%)	2 (5.3)	3 (4.8)	1.000
Hospital stay (mean ± SD; days)	61.2±4.8	40.02±3.6	0.018*

* Statistically significant.
CLABSI = central line-associated bloodstream infection; HT = essential hypertension; DM = diabetes mellitus; DLP = dyslipidemia; CVA = cerebrovascular disease; TIA = transient ischemic attack; CKD = chronic kidney disease; COPD = chronic obstructive pulmonary disease

Table 3. Types and severity of burn injuries

Factors	CLABSI n = 38	Non-CLABSI n = 63	OR (95% CI)	*p*-value
Burn type				
Flame (%)	30 (78.9)	49 (77.8)	1.04 (0.56, 1.94)	1.000
Scald (%)	5 (13.2)	4 (6.3)	1.55 (0.81, 2.95)	0.291
Electrical (%)	3 (7.9)	8 (12.7)	0.7 (0.26, 1.9)	0.529
Contact with hot object (%)	0	1 (1.6)	0 (0, 1)	1.000
Chemical (%)	0	1 (1.6)	0 (0, 1)	1.000
%TBSA of injury (mean ± SD)	54.4±23.2	52.0±25.1	1 (0.99, 1.02)	0.623
<20 (%)	3 (7.9)	7 (11.1)	0.78 (0.29, 2.08)	0.739
20 to 40 (%)	12 (31.6)	19 (30.2)	1.04 (0.61, 1.78)	1.000
40 to 60 (%)	9 (23.7)	13 (20.6)	1.11 (0.62, 1.99)	0.805
>60 (%)	14 (36.8)	24 (38.1)	0.97 (0.57, 1.63)	1.000
Inhalation injury (%)	23 (60.5)	27 (42.9)	1.56 (0.93, 2.63)	0.103

CLABSI = central line-associated bloodstream infection; %TBSA = percentage of total body surface area burned

Table 4. Characteristics of central venous catheters for both groups

Factors	CLABSI n = 38	Non-CLABSI n = 63	OR (95% CI)	*p*-value
Total catheter days (days)			1.07 (1.03, 1.1)	<0.001*
Mean ± SD	28.0±15.4	15.1±12.9		
Median (min-max)	27.5 (4 to 66)	11 (1 to 69)		
Purpose of catheter-use				
IV fluid infusion (%)	36 (94.7)	62 (98.4)	0.55 (0.24, 1.28)	0.555
Blood transfusion (%)	37 (97.4)	49 (77.8)	6.45 (0.96, 43.54)	0.008*
Parenteral nutrition (%)	17 (44.7)	6 (9.5)	2.75 (1.77, 4.26)	<0.001*
Volume monitoring (%)	31 (81.6)	45 (71.4)	1.46 (0.73, 2.89)	0.342
Hemodialysis (%)	5 (13.2)	6 (9.5)	1.24 (0.61, 2.5)	0.743
Catheter type				
Single lumen (%)	4 (10.5)	3 (4.8)	1.58 (0.79, 3.17)	0.421
Double lumen-non dialysis (%)	32 (84.2)	38 (60.3)	2.36 (1.1, 5.06)	0.014*
Double lumen-dialysis (%)	5 (13.2)	5 (7.9)	1.38 (0.7, 2.71)	0.496
Triple lumen (%)	9 (23.7)	10 (15.9)	1.34 (0.77, 2.34)	0.431
Unknown (%)	5 (13.2)	14 (22.2)	0.65 (0.29, 1.45)	0.304

* Statistically significant
CLABSI = central line-associated bloodstream infection; IV = intravenous

The number of catheter lumens per patient was smaller for the non-CLABSI group (OR 0.26; *p*-value <0.001), and a greater increase in the number of lumens per patient was found in the CLABSI group (OR 2.34; *p*-value = 0.003; Table 5).

Each clinical sepsis sign criterion from the CDC system showed no statistical difference between the groups. In the case of the ABA system, however, the respiratory system clinical sepsis sign (OR 1.74; *p*-value = 0.042) and the hyperglycemia clinical sepsis sign (OR 2.85; *p*-value = 0.018) related significantly to the CLABSI group (Table 6).

The 28-day and 6-month mortality rates for the CLABSI group were 13.2% and 39.5%, respectively. We found no statistically significant difference in the 28-day and 6-month mortality rates of the groups ($p>0.05$).

From the present study, the CDC clinical sepsis criteria showed a sensitivity of 100%, a specificity of 85.1%, an accuracy of 91.8%, a positive predictive value (PPV) of 84.4%, and a negative predictive value (NPV) of 100%. By comparison, the ABA clinical sepsis criteria showed a sensitivity of 76.3%, a specificity of 93.6% an accuracy of 85.9%, a PPV of 90.6%, and an NPV of 83% (Table 7).

Discussion

The 8-year chart review (2007 to 2015) of 101 adult burn patients who needed a central venous catheter insertion revealed that their injuries were predominantly caused by a flame. This finding is the same as that reported by a previous study[5]. In present study, the most frequently used catheter access site was the subclavian vein; this differed

Table 5. Location and number of catheters per patient for both groups

Factors	CLABSI n = 38	Non-CLABSI n = 63	OR (95% CI)	*p*-value
Location of catheter				
Internal jugular vein (%)	12 (31.6)	12 (19)	1.48 (0.89, 2.46)	0.227
Subclavian vein (%)	21 (55.3)	28 (44.4)	1.31 (0.79, 2.18)	0.312
Femoral vein (%)	18 (47.4)	28 (44.4)	1.08 (0.65, 1.78)	0.838
Number of catheter lumens per patient				
1 (%)	6 (15.8)	36 (57.1)	0.26 (0.12, 0.57)	<0.001*
2 (%)	13 (34.2)	17 (27)	1.23 (0.73, 2.06)	0.503
3 (%)	11 (28.9)	4 (6.3)	2.34 (1.51, 3.61)	0.003*
4 (%)	2 (5.3)	2 (3.2)	1.35 (0.49, 3.71)	0.630
5 (%)	2 (5.3)	2 (3.2)	1.35 (0.49, 3.71)	0.630
6 (%)	2 (5.3)	1 (1.6)	1.81 (0.78, 4.21)	0.555

* Statistically significant
CLABSI = central line-associated bloodstream infection

Table 6. Correlation of each clinical sign of the ABA and CDC sepsis criteria with CLABSI diagnoses

Clinical signs	CLABSI n = 38	Non-CLABSI n = 63	OR (95% CI)	*p*-value
CDC clinical sepsis criteria (as in Table 1)				
BT (%)	37 (97.4)	63 (100)	0.37 (0.29, 0.48)	0.376
HR (%)	38 (100)	63 (100)	NA	NA
RS (%)	34 (89.5)	52 (82.5)	1.48 (0.62, 3.57)	0.401
CBC (%)	29 (76.3)	46 (73)	1.12 (0.61, 2.04)	0.816
ABA clinical sepsis criteria (as in Table 1)				
BT (%)	31 (81.6)	42 (66.7)	1.7 (0.85, 3.4)	0.116
HR (%)	37 (97.4)	56 (88.9)	3.18 (0.5, 20.25)	0.253
RS (%)	25 (65.8)	28 (44.4)	1.74 (1.01, 3.0)	0.042*
CBC (%)	15 (39.5)	15 (23.8)	1.54 (0.94, 2.52)	0.118
Hyperglycemia (%)	4 (10.5)	0 (0)	2.85 (2.18, 3.74)	0.018*
Feeding intolerance (%)	7 (13.2)	14 (22.2)	0.65 (0.29, 1.45)	0.304

* Statistically significant
CLABSI = central line-associated bloodstream infection; CDC = centers for disease control and prevention; ABA = American burn Association

Table 7. Accuracy of both criteria with CLABSI diagnoses

Test parameter/criteria	CDC criteria	ABA criteria
Sensitivity (%)	100	76.3
Specificity (%)	85.1	93.6
Positive predictive value (%)	84.4	90.6
Negative predictive value (%)	100	83
AUC	0.926	0.85
Accuracy (%)	91.8	85.9

CLABSI = central line-associated bloodstream infection; CDC = Centers for Disease Control and Prevention; ABA = American burn Association

from other studies[6,7], which reported that the most accessed site was the femoral vein. The divergence would be because the central venous catheters at our institution were mainly used for volume monitoring; this requires catheter tips to be located in the intrathoracic central vein, thereby limiting the insertion technique. Moreover, non-dialysis catheters that can be inserted into the intrathoracic central vein via the femoral vein were not available at our hospital. The risk factors for CLABSI reported by other published studies were male, a child, burn patient, the length of hospital stay prior to central line insertion, the total length of hospital stay, catheter location, multiple vascular catheters in one patient, multi-lumen catheter, and parenteral nutrition[2,8]. In the current study, we found that the length of hospital stay, total catheter days, blood transfusion, parenteral nutrition, and increase in the number of catheter lumens in one patient were the risk factors for CLABSI, whereas sex and catheter location were not significant.

Although a multi-lumen catheter was identified as a risk factor in another study, the authors did not find this factor presented a significant difference to the group results.

This would be because the vast majority of catheters used at our hospital were the non-dialysis type of double lumen catheter, with only very limited numbers of the other types of multi-lumen catheters being utilized. All single lumen catheters in this study were silastic tubes that were inserted via the cut-down procedure, and they were not the peripherally inserted central catheter line. The risk of infection may be higher in this population group because of the infection risk associated with the cut-down operative procedure. This is almost always done at the bedside or in an emergency room, where the sterile technique can easily fail.

The use of a greater number of catheter lumens heightens the risk of microorganisms entering the body. The present study showed that the patients with a one-lumen catheter had a decreased risk for CLABSI, in contrast with those with a three-lumen catheter, who had a significantly elevated risk of developing an CLABSI. This is consistent with other reports that increasing the number of lumens per patient results in a greater risk of developing a CLABSI[9].

At 37.6%, the incidence of CLABSIs in the major burn patients at the Burn Unit of Siriraj Hospital was quite high; nevertheless, it was still comparable with the rate reported for another burn unit[10]. The complications associated with central venous catheters, such as CLABSIs, are still troublesome for burn units worldwide. In the current study, the differences in the mortality rate at 28 days and the total mortality rate for the CLABSI and non-CLABSI groups were not statistically different because of the small sample size.

From the results in Table 6, which compared the CDC and ABA criteria, the CLABSI and non-CLABSI patients could not be distinguished from each other using the CDC clinical sepsis criteria. Because SIRS can occur as a physiological response in major burn patients, all of the parameters in the CDC system can be found in such patients. In contrast, ABA's parameters are more specific than CDC's, and they include the plasma glycemic condition and feeding status. Moderate tachypnea (RR >25/min) or a moderate increase in minute ventilation (MV >12 L/min) and hyperglycemia were found to be more specifically and significantly related in the CLABSI group. The reason for this situation was not clearly identified by the present study, but the authors assume that the non-CLABSI group were in a better condition and able to breathe by themselves, whereas the patients in the CLABSI group may have breathed with a ventilator.

Our objective was to investigate the accuracy of the ABA clinical sepsis criteria compared with the CDC clinical sepsis criteria for CLABSI diagnosis in burn patients. CDC's criteria showed a sensitivity of 100%, a specificity of 85.1%, an accuracy of 91.8%, a PPV of 84.4%, and an NPV 100%. ABA's criteria had a sensitivity of 76.3%, a specificity of 93.6%, an accuracy of 85.9%, a PPV of 90.6%, and an NPV of 83%. Although the results of the present study showed that the accuracy of the CDC criteria is greater than that of the ABA criteria, the ABA clinical sepsis criteria are also acceptable, have more specificity, and can be used as an alternative method for CLABSI diagnoses in major burn patients.

Conclusion

Even though the accuracy of the CLABSI diagnoses using the CDC criteria (91.8%) was higher than that for the ABA criteria (85.9%), the accuracy of the ABA system can be trusted and is acceptable, and it provides a higher specificity. The ABA criteria can be used as an alternative method for the diagnosis of CLABSIs.

What is already known on this topic?

Post major burns response mimic signs of sepsis criteria for center of disease control of United state of America (CDC). American burn association (ABA) purpose more specific sepsis criteria in major burns.

What this study adds?

The accuracy of ABA sepsis criteria to diagnose central-line associated blood stream infection (CLABSI) in major burns.

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Potential conflicts of interest

The authors declare conflicts of interest.

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ความแม่นยำในการวินิจฉัยภาวะติดเชื้อในกระแสเลือดจากสายสวนหลอดเลือดดำส่วนกลางในผู้ป่วยแผลไหม้ขนาดใหญ่เมื่อใช้เกณฑ์ใหม่ที่กำหนดจาก สมาคมแผลไหม้อเมริกาเทียบกับเกณฑ์มาตราฐานจากสมาคมโรคติดเชื้อและปัจจัยเสี่ยงในการเกิดภาวะติดเชื้อในกระแสเลือดจากสายสวนหลอดเลือดดำส่วนกลางในผู้ป่วยแผลไหม้ขนาดใหญ่

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ภูมิหลัง: ปฏิกิริยาการอักเสบเชิงระบบเป็นการตอบสนองของร่างกายที่มักจะเกิดจากภาวะติดเชื้อในกระแสเลือด (sepsis) แต่สามารถพบได้ปกติในผู้ป่วยแผลไหม้รุนแรง แม้ไม่มีภาวะติดเชื้อ โดยเกณฑ์การวินิจฉัยภาวะติดเชื้อในกระแสเลือดจากสมาคมโรคติดเชื้ออเมริกาที่ใช้ในการวินิจฉัยภาวะนี้ในกลุ่มผู้ป่วยอื่น ๆ อาจไม่มีความแม่นยำเพียงพอในผู้ป่วยแผลไหม้และอาจทำให้การวินิจฉัยภาวะติดเชื้อในกระแสเลือดจากสายสวนหลอดเลือดดำส่วนกลาง (central-line associated bloodstream infections; CLABSIs) ไม่แม่นยำ สมาคมแผลไหม้อเมริกาจึงพิจารณาใช้เกณฑ์ใหม่ในการวินิจฉัยภาวะติดเชื้อในกระแสเลือดในผู้ป่วยแผลไหม้ในปี พ.ศ. 2550 อดีตจนถึงปัจจุบัน ยังไม่มีงานวิจัยศึกษาถึงความแม่นยำของเกณฑ์ใหม่ดังกล่าวเทียบกับเกณฑ์เก่าในการวินิจฉัยภาวะติดเชื้อในกระแสเลือดจากสายสวนหลอดเลือดดำส่วนกลางในผู้ป่วยแผลไหม้มาก่อน

วัตถุประสงค์: เพื่อศึกษาความแม่นยำของเกณฑ์การวินิจฉัยภาวะติดเชื้อในกระแสเลือดใหม่จากสมาคมแผลไหม้เทียบกับเกณฑ์เก่าจากสมาคมโรคติดเชื้อในการวินิจฉัยภาวะติดเชื้อในกระแสเลือดจากสายสวนหลอดเลือดดำส่วนกลางในผู้ป่วยแผลไหม้ และรายงานข้อมูลอุบัติการณ์การเกิดภาวะติดเชื้อในกระแสเลือดจากสายสวนหลอดเลือดดำส่วนกลางในผู้ป่วยแผลไหม้ของโรงพยาบาลศิริราช

วัสดุและวิธีการ: การศึกษาทบทวนเวชระเบียนผู้ป่วยในของหอผู้ป่วยแผลไหม้ โรงพยาบาลศิริราช ปี พ.ศ. 2550 ถึง พ.ศ. 2558 ผู้ป่วยแผลไหม้ที่ได้รับการใส่สายสวนหลอดเลือดดำส่วนกลาง ถูกนำมาศึกษาถึงข้อมูลพื้นฐาน โรคร่วม ชนิดและขนาดของการบาดเจ็บ ชนิด ตำแหน่ง ระยะเวลาและจุดประสงค์ของการใส่สายสวนหลอดเลือดดำส่วนกลาง ศึกษาเปรียบเทียบ ความไวและความจำเพาะของเกณฑ์การวินิจฉัยภาวะติดเชื้อในกระแสเลือดของเกณฑ์จากสมาคมแผลไหม้ เทียบกับเกณฑ์ของสมาคมโรคติดเชื้อในการวินิจฉัย ภาวะติดเชื้อในกระแสเลือดจากสายสวนหลอดเลือดดำส่วนกลางในผู้ป่วยแผลไหม้

ผลการศึกษา: จากผู้ป่วยแผลไหม้ 101 ราย พบภาวะติดเชื้อในกระแสเลือดจากสายสวนหลอดเลือดดำส่วนกลางจำนวน 38 ราย (คิดเป็นร้อยละ 37.8) โดยพบการติดเชื้อที่สายสวนที่ตำแหน่ง internal jugular vein มากที่สุดคิดเป็นร้อยละ 33 และพบว่าสายสวนกลุ่ม double lumen ที่ไม่ใช่สายล้างไตมีอัตราการติดเชื้อมากที่สุด และเกณฑ์การวินิจฉัยภาวะติดเชื้อในกระแสเลือดจากสมาคมแผลไหม้อเมริกามีความไว (sensitivity) ร้อยละ 76.3 ความจำเพาะ (specificity) ร้อยละ 93.6 และความแม่นยำ (accuracy) ร้อยละ 85.9 ในการวินิจฉัยภาวะติดเชื้อในกระแสเลือดจากสายสวนหลอดเลือดดำส่วนกลาง

สรุป: เกณฑ์การวินิจฉัยภาวะติดเชื้อในกระแสเลือดจากสมาคมแผลไหม้อเมริกามีความแม่นยำที่ดีโดยมีความจำเพาะมากกว่าเกณฑ์จากสมาคมโรคติดเชื้ออเมริกาในการวินิจฉัยภาวะติดเชื้อในกระแสเลือดจากสายสวนหลอดเลือดดำส่วนกลางในผู้ป่วยแผลไหม้