



Implementation of Sepsis-3 Definition in the Emergency Department: Proposed of Case Detection in Real-Life Practice



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Introduction

Sepsis is a major public health concern. Revised definitions of sepsis in 2016 from the systemic inflammatory response syndrome (SIRS) criteria to the Sequential Organ Failure Assessment (SOFA) score made changes in the sepsis detection. One-hour bundle proposed by the Surviving Sepsis Campaign Bundle 2018 made the process more practically challenging because of its time-constraint.

Materials and Methods

We retrospectively reviewed medical records of patients aged over 15 who visited the emergency department (ED) and were admitted to the internal medicine ward during Jan-Feb 2018 in Somdech Phra Pinklao Hospital. We excluded pregnant women or patients who died within 48 hours after their admissions. Data needed from the remaining patients to complete SIRS, SOFA and quick SOFA (qSOFA) score was collected. Patients' diagnosis, treatments and in-hospital mortality were reviewed. Prevalence of sepsis, according to each definition was calculated. Predictabilities of tests and/or definitions were assessed using sensitivity, specificity, ROC and AUC.

Results

We identified 217 sepsis cases, excluding 1 pregnant women and 5 patients who died within 48 hours. Sepsis incidence was classified by each definition and shown in table 1. Because the high number of missing PaO₂/FiO₂ (96/188, 51.1%), we also calculated adjusted SOFA by excluding the variable. Sensitivity of SOFA ≥2 was 0.60 (0.49-0.70), specificity was 0.94 (0.88-0.98) and AUC was 0.77 (0.72-0.82), comparing to SIRS criteria.

Results

Table 1 – Incidence of Sepsis from Jan-Feb 2018

Definition	N (211)	%
SIRS Definition	95	45.02
Sepsis-3 Definition: SOFA Score ≥ 2	64	30.33
Sepsis-3 Definition: qSOFA Score ≥ 2	57	27.01

Table 2 – Sepsis and In-Hospital Mortality

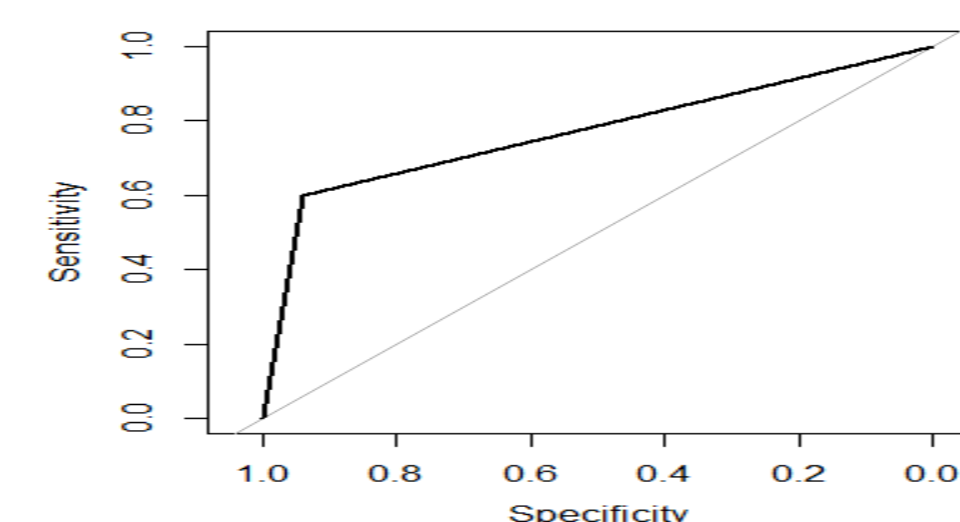
Definition	N (%)	OR (95% CI)	p-value
SIRS Definition	21/117 (17.95)	3.21 (0.69-14.77)	0.13
Sepsis-3 Definition: SOFA Score ≥ 2	18/117 (15.38)	3.76 (1.29-10.95)	0.01
Sepsis-3 Definition: qSOFA Score ≥ 2	9/117 (7.69)	3.13 (1.15-8.48)	0.02
Sepsis-3 Definition: Adjusted SOFA Score ≥ 2	17/117 (14.53)	3.83 (1.38-10.57)	<0.01
Septic Shock	4/117 (3.42)	3.09 (0.79-12.02)	0.09

Table 3 – Sepsis Diagnosis: Using 1- and 2-Step Approach

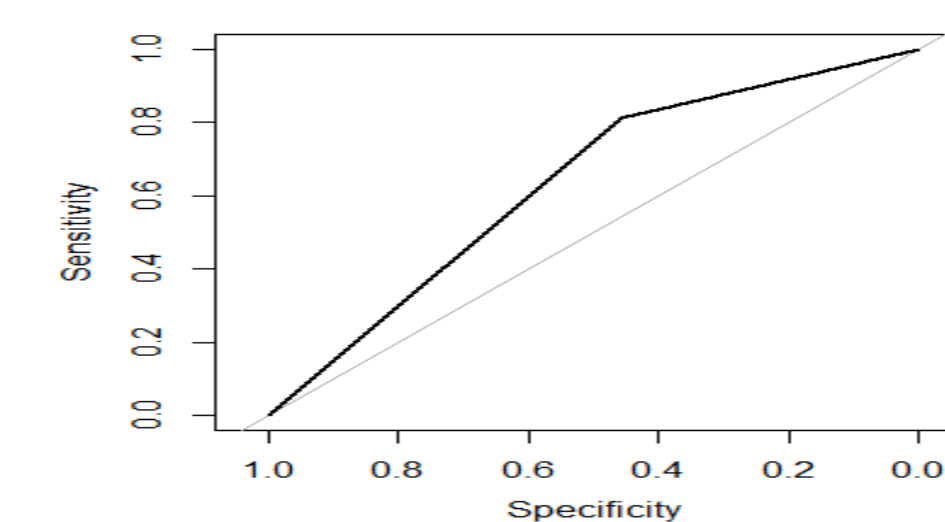
Definition	Sensitivity	Specificity	AUC
1-Step Approach (N=211)			
SIRS	0.78 (0.58-0.91)	0.38 (0.30-0.48)	0.58 (0.49-0.67)
Sepsis-3 Definition: SOFA Score ≥ 2	0.67 (0.46-0.83)	0.62 (0.52-0.70)	0.64 (0.79-0.92)
Sepsis-3 Definition: qSOFA Score ≥ 2	0.33 (0.17-0.54)	0.87 (0.79-0.92)	0.60 (0.50-0.70)
Sepsis-3 Definition: Adjusted SOFA Score ≥ 2	0.63 (0.42-0.81)	0.67 (0.57-0.75)	0.65 (0.55-0.75)
2-Step Approach (N=95)			
SIRS ≥ 2 → SOFA Score ≥ 2	0.81 (0.58-0.95)	0.46 (0.34-0.58)	0.63 (0.53-0.74)
SIRS ≥ 2 → qSOFA Score ≥ 2	0.76 (0.54-0.92)	0.54 (0.42-0.66)	0.65 (0.54-0.76)
SIRS ≥ 2 → Adjusted SOFA Score ≥ 2	0.43 (0.22-0.66)	0.75 (0.67-0.87)	0.61 (0.49-0.72)

By using 2-step approach, about 55% decrease in number of patients needed to complete the SOFA score.

Figure 2 – ROC Curve Comparing 1- and 2-Step Approach



1-Step Approach:
Using SOFA Score ≥ 2



2-Step Approach:
Screening for SIRS ≥ 2 Followed by
SOFA Score ≥ 2

Conclusion

Although SOFA score was a better diagnostic tool to detect sepsis than SIRS, practical implement of the method for all patients in the ED is difficult. Therefore, we proposed 2-step approach by using SIRS ≥2 followed by SOFA score ≥2 for sepsis case detection.

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