DERIVATION OF PREDICTOR PARAMETERS FOR EARLY DIAGNOSIS OF SEPSIS IN EMERGENCY DEPARTMENT

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Introduction

- Sepsis is life-threatening organ dysfunction caused by a dysregulated host response to infection. Sepsis continues to be a substantial cause of morbidity and mortality especially in early childhood and older adult age groups. The global incidence of sepsis has been estimated at 31.5 million with 5.3 million potential deaths annually. Sepsis is a time sensitive diagnosis similar to polytrauma, acute myocardial infarction, or stroke patients. Early identification and appropriate management in the initial hours after sepsis develops improves outcomes.
- Sepsis is a complex syndrome and its diagnosis remains challenging. A single parameter that will identify an individual who is infected from one who has a dysregulated response to their infection does not exist. The quick Sequential (Sepsis-related) Organ Failure Assessment (qSOFA) was introduced in 2016 as a bedside tool to identify patients at increased risk of getting sepsis or having adverse outcome. Owing to the non-specific nature of clinical symptoms and signs associated with sepsis, the challenge is the ability to derive reliable predictor parameters either clinical or laboratory that can be added to qSOfA score and used as a screening tool to recognize individuals presenting with sepsis, or septic shock to the ED.

Aim of the work

- The primary aim of the current work is to evaluate the predictive performance of vital signs, qSOFA and initial laboratory values (CBC, CRP, and lactate level) for early detection and diagnosis of sepsis in initial emergency department visit of patients with history of infection.

Patients

- All adult non-trauma patients (n=250) receiving medical service in the AMUH emergency department. Study subjects selected for this study were evaluated to have suspected source of infection or other factors that might increase the risk of sepsis under specific inclusion criteria. Pregnant and post cardiac arrest patient were excluded from the study subjects.

Methods

- All patients in the prospective study will be subjected to initial assessment according to ABCDE approach and qSOFA score evaluation.
- Patients will be followed as required and will be assessed for:
  - Age, gender, risk factors.
  - Complain and systemic symptoms of infection.
  - Vital signs, GCS.
  - Laboratory investigations (ABG, CBC, CRP, Lactate).
  - After data collection, SOFA score will be applied to all patients to identify septic patients.
- The statistical analyses will be performed for all enrolled patients with sepsis. Primary outcomes will be testing the validity of using qSOFA score, vital signs and initial laboratory values (CBC, CRP, and lactate level) as predictors of sepsis in emergency department.

Results

Correlation between qSOFA, sepsis, and septic shock

	qSOFA score			
	0 (n=13)	1 (n=60)	2 (n=135)	3 (n=42)
	No. (%)	No. (%)	No. (%)	No. (%)
▪ Sepsis (n=161)	5 (3.1)	49 (30.4)	83 (51.6)	24 (14.9)
r_s(p)	0.934*(<0.001*)			
Kappa (p)	0.981*(<0.001*) almost perfect agreement			
Accordance	96.55%			
▪ Septic Shock (n=68)	2 (15.4)	4 (6.7)	44 (32.6)	18 (42.9)
r_s(p)	0.972*(<0.001*)			
Kappa (p)	0.993*(<0.001*) almost perfect agreement			
Accordance	98.17%			

The relation between different parameters and sepsis

Screening Tool	Sepsis (n=161) No. (%)	Sensitivity	Specificity	PPV	NPV	Accuracy	AUC	OR
▪ Respiratory (Dyspnea)	119 (73)	87.18	83.11	85	87	91.2%	0.76	2.3454
▪ GIT (Anorexia)	126 (78)	86.70	86.24	84	81	91.6%	0.68	1.3193
▪ Muscle weakness	161 (100)	87.22	82.48	85	85	92.4%	0.78	2.7551
▪ Blood Pressure	57 (35.3)	88.49	85.83	80%	82%	91.6%	0.77	
▪ Temperature	130 (80.7)	89.63	85.72	77%	80%	92.2%	0.80	
▪ Lactate	94 (58.3)	85.47	82.22	82%	81%	90.2%	0.78	

The relation between selected parameters and septic shock

Screening Tool	Septic Shock (n=68) No. (%)	Sensitivity	Specificity	PPV	NPV	Accuracy	AUC
Symptoms related to the site of infection							
▪ Respiratory (Dyspnea)	27 (39)	87.98	82.09	83%	85%	91.3%	0.77
▪ GIT (Anorexia)	20 (29)	83.03	81.69	86%	84%	91.5%	0.69
▪ Muscle weakness	19 (27)	84.87	82.26	87%	87%	92.4%	0.72
▪ Temperature	58 (85.5)	89.63	85.72	77%	80%	92.2%	0.80
▪ Blood Pressure	68(100)	88.49	85.83	80%	82%	91.6%	0.77
▪ Lactate	65 (95.5)	87.85	83.88	82%	82%	90.4%	0.79

Conclusion

- Based on the obtained data, the qSOFA score can be a useful quick detection tool in detecting and measuring the extent of sepsis and septic shock in the emergency department.
- Advanced age (age ≥65), generalized muscle weakness, dyspnea, hyperthermia (temperature > 38°C) and elevated lactate level (lactate > 2mmol/l) in combination to qSOFA criteria had a synergistic effect in identifying septic patient in ED.

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