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Abstract

Introduction: After the first 24 hours, the major cause of death in burn patients is multiple organ dysfunction/failure syndrome. It is preceded by infection in 83% of burn patients, with reported septic mortality up to 65%. Since the early recognition and treatment of infection has been shown to decrease mortality from sepsis, we implemented a multidisciplinary algorithm designed to rapidly identify septic adult burn patients.

Methods: Adult (≥ 18 y) admissions between 7/1/2014 – 6/30/2019 were identified from our registry, and all initial sepsis screens were evaluated in the EMR. Patients were screened clinically at least BID and were considered a “positive” screen if MAP $102.2F$; HR >120 ; RR >28 (or RR $>10\%$ of ventilator set rate if set rate is >24 bpm). A positive screen prompted lab work to include CBC, BMP, procalcitonin (PCT), and lactic acid (LA), per protocol. If PCT >3.0 ng/ml or LA >2.0 mmol/L, or both thrombocytopenia and hyperglycemia were present, a “Burn Code Sepsis” was initiated and included cultures, a CXR, and empiric antibiotics. A patient was then formally considered “septic” (i.e. – infected), if the cultures were positive or the CXR demonstrated an infectious process.

Results: There were 1,523 admissions during the 5-year period, and 228 initial positive screens. Of the 228 patients with positive screens, 159 (70%) were infected. There was a significant difference in PCT level between patients with and without infections, while no difference was noted for LA, WBC, platelets, temperature, glucose, age, %TBSA burned, or time to triggering a positive screen between the groups (Table). Defining PCT ≥ 3.0 ng/mL as being positive for sepsis demonstrated a 76% PPV and a 36% NPV for PCT alone.

Conclusions: Recognition of sepsis continues to be difficult in burn patients. PCT may have a role in the early detection of sepsis. Further research is warranted.

Learning Objectives

Examine the data from 5 years of utilizing a Burn Code Sepsis Algorithm
Discuss the ongoing difficulty early identification of sepsis in burn injured patients

References

ABA Consensus Conference to Define Sepsis and Infection in Burns

<https://verbrennungsregister.net/docs/Definition%20Sepsis%20in%20Burns.pdf>

Sample characteristics by sepsis screen results

	Overall (N = 228)	Screen Positive		P Value*
		No Infection (N = 159)	Infection (N = 69)	
Age (mean SD)	49.8 ± 18.1	47.9 ± 17.5	50.7 ± 18.3	0.29
Days to screening (median count IQR)	13 [7,26]	12 [12,28]	14 [7,25]	0.80
Percent TBSA Burned (mean SD)	34.7 ± 20.7	31.9 ± 18.8	35.9 ± 21.4	0.18
Lactic Acid (mean SD)	2.1 ± 1.2	1.9 ± 0.8	2.1 ± 1.3	0.17
Procalcitonin (mean SD)	13.5 ± 29.4	7.3 ± 14.3	16.5 ± 34.0	0.03
White Blood Cells (mean SD)	13.2 ± 7.5	12.8 ± 7.2	13.4 ± 7.6	0.64
Temperature (mean SD)	101.6 ± 2.7	101.7 ± 2.0	101.5 ± 3.0	0.58
Platelets (mean SD)	357 ± 225.4	371 ± 241	351 ± 219	0.54
Blood Glucose (mean SD)	146 ± 58.7	144 ± 41.8	148 ± 64.8	0.66

*P values are for comparison characteristics across groups and are based on two sample t test