

THE EMERGENCY DIAGNOSTIC MARKERS IN PEDIATRIC PATIENTS WITH SUSPECTED SEPSIS/BACTEREMIA



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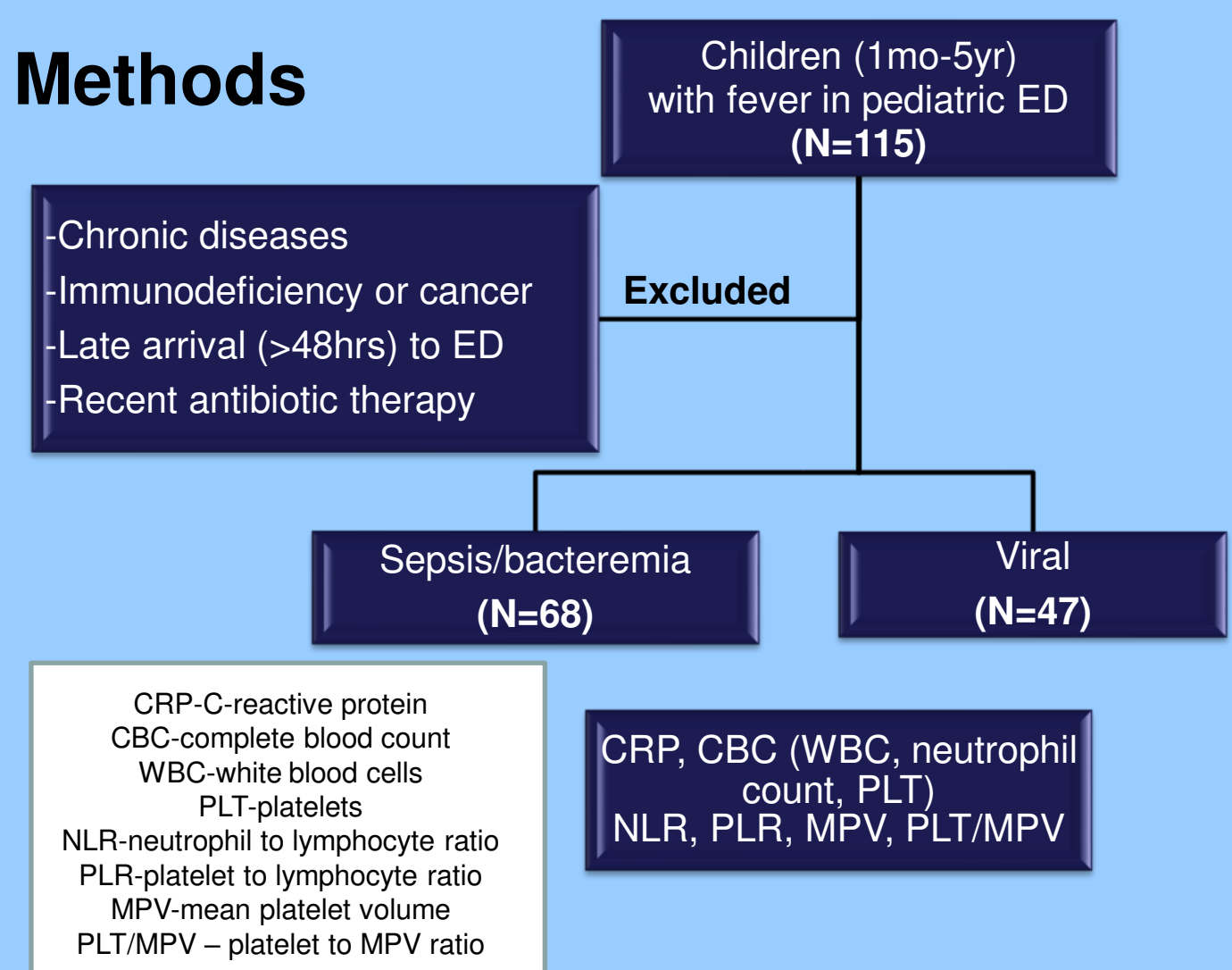
Background

- Sepsis is a clinical syndrome that is triggered by bacterial infection, which may lead to multiple organ dysfunction (1, 2)
- Quick and early detection is necessary in order to prevent more severe forms and lethal outcomes
- Sepsis specific early biomarkers are missing in clinical practice (3)

Aims

- To investigate the diagnostic value of NLR, PLR, MPV, PLT and PLT/MPV as early markers (<12h after onset of symptoms) in viral infection vs bacterial (sepsis/bacteremia) in pediatric emergency department (ED) settings
- To apply cut-off levels of inflammatory markers
- Develop a prediction model to distinguish between severe bacterial and viral infection in pediatric patients

Methods



Data analysis was performed using Microsoft Excel and IBM SPSS Statistics version 21.0 software. P value <0.05 was considered significant

Results

	Sepsis/bacteremia	Viral infection	P value
Age (months)	9 [3–24]	12 [6–27]	0.274
Gender (male)	31 (45.6%)	23 (48.9%)	0.857

Table 1. Baseline characteristics for all children, at any time of arrival

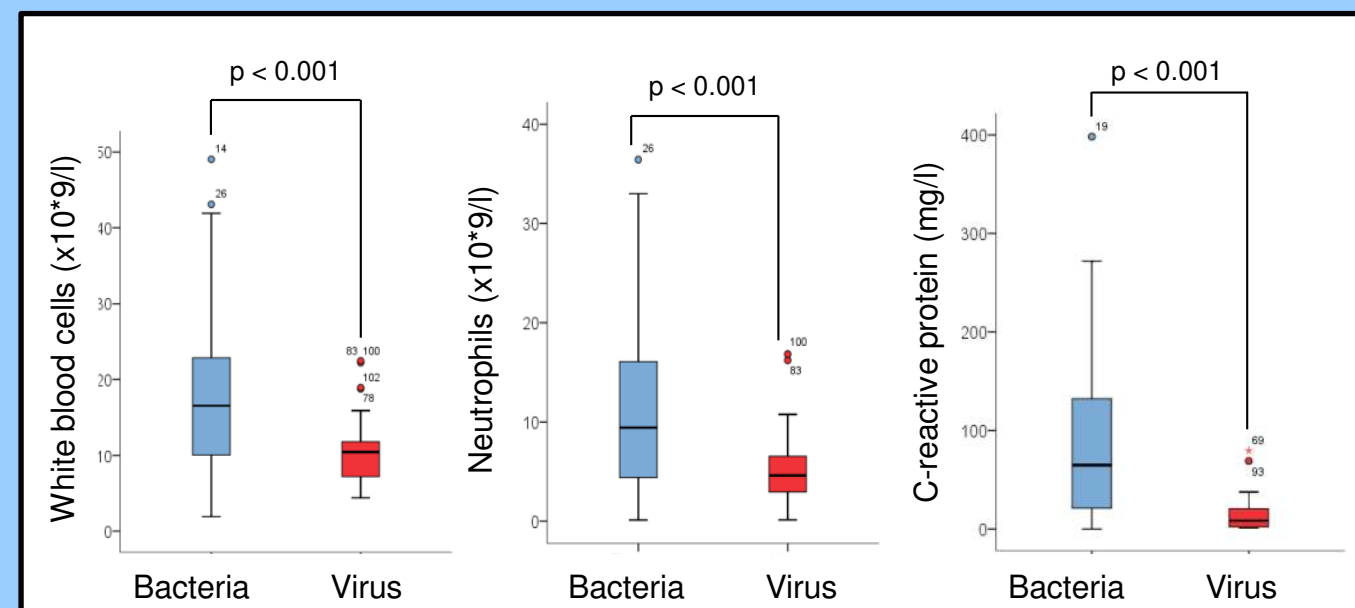


Figure 1. Sepsis/bacteremia vs. viral infection: Comparison of the entire study population, n = 115

1. Weiss SL, et al. Global epidemiology of pediatric severe sepsis: the sepsis prevalence, outcomes, and therapies study. *Am J Respir Crit Care Med.* 2015;191(10):1147-57
 2. Reinhart, K., et al. New Approaches to Sepsis: Molecular Diagnostics and Biomarkers. *Clin Microbiol Rev.* 2012; 25(4): 609–634
 3. Lanziotti, V. S., et al. Use of biomarkers in pediatric sepsis: literature review. *Rev Bras Ter Intensiva.* 2016; 28(4), 472–482

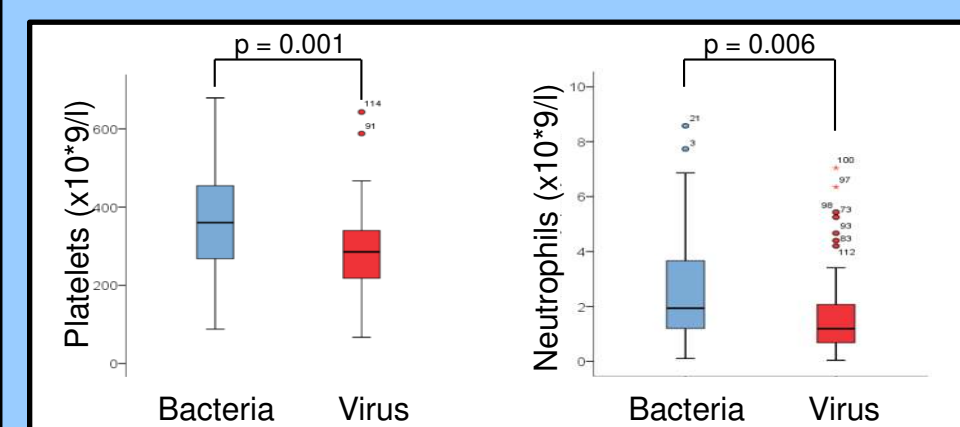


Figure 2. Comparison of laboratory markers between bacterial and viral infection patients (early and late arrival)

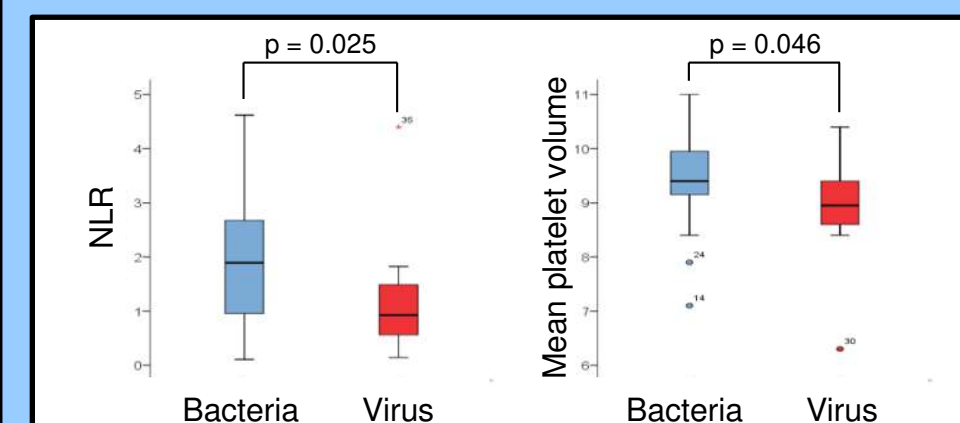


Figure 3. Sepsis/bacteremia vs. viral infection: Infants (≤12 months) with late (>12 hours) arrival to ED, n = 38

Laboratory marker	AUC	95% CI	P value
WBC (>11.5 ×10 ⁹ /L)	0.730	0.63–0.83	0.049
Neutrophils (>5.35 ×10 ⁹ /L)	0.676	0.57–0.78	0.002
PLT (>315 ×10 ⁹ /L)	0.631	0.53–0.74	0.018
CRP (>20 mg/L)	0.748	0.65–0.84	<0.001
NLR (1.58)	0.653	0.55–0.76	0.006

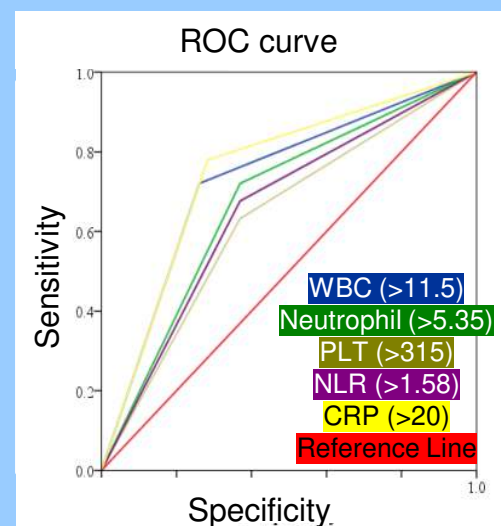
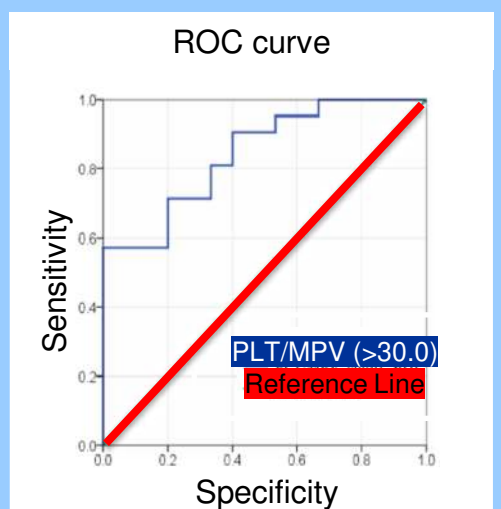


Table 2. Sensitivity and specificity, area under the curve (AUC) and confidence intervals for cut-off values for all children who arrived early to ED (<12 hours)

Laboratory marker (cut-off)	Sensitivity (%)	Specificity (%)
WBC (>11.5 ×10 ⁹ /L)	80.3	64.8
Neutrophils (>5.35 ×10 ⁹ /L)	74.2	61.2
PLT (>315 ×10 ⁹ /L)	71.7	54.5
CRP (>20 mg/L)	80.3	68.8
NLR (1.58)	73.0	57.7

Laboratory marker (cut-off)	AUC	95% CI	P value
PLT/MPV (30.0)	0.844	0.72–0.97	<0.001
	Sensitivity (%)	Specificity (%)	
	95.2	53.3	

Table 3. Sensitivity and specificity, area under the curve (AUC) and confidence intervals for cut-off values for all children who arrived early to ED (<12 hours)



Conclusion

- WBC and CRP showed to be the most reliable biomarkers to determine bacterial infection and differentiate from viral infections, at any time of arrival
- PLT, NLR and PLT/MPV could be considered as a bacterial infection marker in children who arrived to ED early
- PLT/MPV is one of the most sensitive early bacteremia/sepsis markers in infants