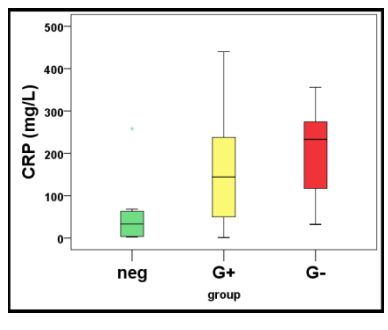
Can Biomarkers Help Identifying The Type Of Blood Stream Infection In Septic Patients?

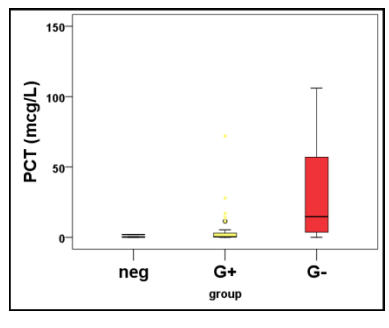
H Brodska 1 ; V Adamkova 1 ; K Pelinkova 1 ; A Studena 1 ; J Zavora 1 ; T Drabek 2
1Charles University, Institute of Medical Biochemistry and Laboratory Diagnostics, Prague, Czech Republic, 2University of Pittsburgh, Anesthesiology, Pittsburgh, United States

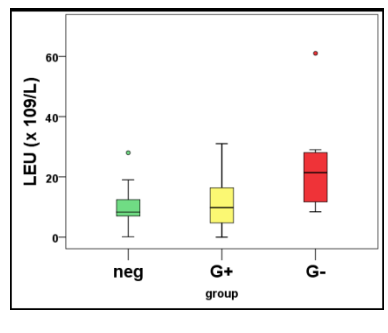
Introduction: Sepsis is one of the most prevalent causes of morbidity and mortality in hospitalized patients worldwide. Early initiation of targeted antibiotic therapy is crucial [1]. Blood stream infections are commonly divided to Gram positive (G+) or Gram negative (G-). However, blood cultures (BC) read-out may be delayed or cultures may be negative (NEG). This could affect the patient outcome [2,3]. Biomarkers may help to guide antibiotic therapy prior to BC results [4-6]. We tested the hypotheses that 1) biomarkers will discriminate between BC- vs. BC+ patients; 2) biomarkers will discriminate between G+ and G- sepsis; 3) biomarkers will correlate with severity of illness.

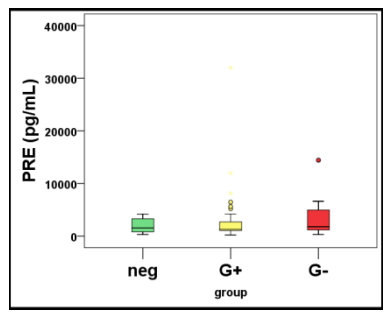
Methods: With IRB approval, a patient cohort (n=60) admitted to mixed ICU for suspected sepsis were enrolled in a prospective observational study. BC and biomarkers of sepsis (C-reactive protein, CRP; procalcitonin, PCT; presepsin, PRE; leukocytes, LEU and iron, Fe were assessed and SOFA and qSOFA were determined on admission. Data are displayed as mean±SD or median [IQR]. One-way ANOVA with post-hoc Tukey's test, Kruskal-Wallis test or Mann-Whitney test were used as appropriate. Pearson's test was used to assess correlation between SOFA and biomarkers.

Results: G- sepsis was more common in older patients and severity of their status was higher than G+ and BC - patients. CRP was the only biomarker different between BC- (33 [3, 64] mg/L) vs. BC+ (147 [51, 256] mg/L) patients (p=0.003). Numerically higher values were observed in G- patients. CRP was higher in G+ (p=0.023) and G- (p=0.006) vs. NEG. PCT was higher in G- vs. NEG (p=0.037). LEU were higher in G- vs. NEG (p=0.044) and vs. G+ (p=0.015). PRE was not different between groups. Fe was lower in G+ vs NEG (p=0.021), in G- vs NEG (p=0.004) with no difference between G+ and G- (p=0.537). In NEG patients, SOFA score did not correlate with any biomarkers. In BC+ patients, SOFA correlated with CRP (p=0.005) and LEU (p=0.023). PRE correlated with SOFA in G+ patients (p=0.032).



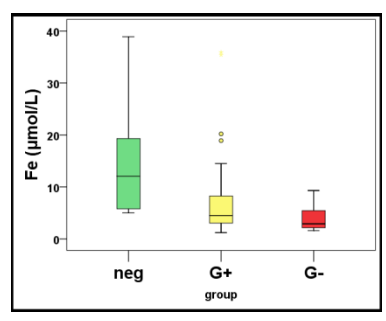






	NEG (n=10)	G+ (n=39)	G- (n=11)
age (yrs)	53±18	64±16	77±8†‡
SOFA (pts)	3.9±2.2	4.7±2.2	8.1±4.5
qSOFA (pts)	0.2±0.4	0.6±0.8	0.9±0.9

† p<0.05 vs. NEG; ‡ p<0.05 vs. G+



Conclusion:
In our limited sample-size pilot study, tested biomarkers showed limited capacity to identify BC+ patients and the type of infection. Higher values of inflammatory biomarkers observed in G- sepsis and lower values of Fe in positive BC warrant further study in a larger population of patients.

References:

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Supported by the Research Project RVO VFN 64165 of the General University Hospital in Prague, Czech republic, and by the European Union's Horizon 2020 Research and Innovation Programme under grant agreement no. 687697 (www.SmartDiagnos.eu).