Background. Brucellosis is still endemic in many developing countries and frequently leads to misdiagnosis and treatment delays. Indirect inflammatory markers such as mean platelet volume (MPV), platelet distribution width (PDW), red cell distribution width (RDW), neutrophil to lymphocyte ratio (NLR) and platelet to lymphocyte ratio (PLR) have been identified as markers of inflammation. The present study aimed to evaluate and compare the levels of these markers for prognostic purposes, and to assess the correlation of C-reactive protein (CRP) with brucellosis in adults and children.

Methods. The study included 137 adults and 141 age- and gender-matched healthy controls, as well 71 children and 81 age- and gender-matched healthy controls. Hematological parameters and CRP were retrospectively recorded and compared between the adult and pediatric patients.

Results. The mean age of the adult patients (54% female) was 43.1 ± 15.4 years, whereas the mean age of the pediatric patients (50.7% male) was 9.5 ± 3.6 years. Significantly higher lymphocyte count, and lower neutrophil count, platelet count, RDW, MPV, NLR and PLR values were found in adult brucellosis patients compared with their healthy subjects, whereas higher lymphocyte count, PDW and lower neutrophil count, platelet count, MPV, NLR and PLR values were observed in pediatric brucellosis patients compared with the control subjects. Significantly higher neutrophil count ($p = 0.019$) and NLR ($p < 0.001$) were found in adult patients compared with the pediatric patients. Positive correlation was found between CRP and NLR ($R^2 = 0.052$, $P = 0.011$), PLR ($R^2 = 0.061$, $P = 0.006$) in adult patients.

Conclusion. Based on our findings, we consider that the use of complementary indirect markers such as MPV, NLR, PLR and RDW together with the CRP test – which is used concomitantly with serological diagnostic tests in situations where brucellosis is suspected – might be helpful in the diagnosis and follow-up of brucellosis, as well as in the evaluation of complications and response to therapy, in both adult and pediatric brucellosis patients.

Disclosures. **All authors:** No reported disclosures.

1148. Impact of Procalcitonin (PCT)-Guided Antibiotic Therapy on Mortality in Critically Ill Patients: A Systematic Review and Meta-Analysis of 18 Randomized Controlled Trials

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Background. Procalcitonin (PCT)-guided antibiotic therapy has been shown to reduce antibiotic use in critically ill patients with suspected or proven infection, but its impact on mortality remains uncertain. Our meta-analysis examines the effect of PCT-guided antibiotic therapy on survival in critically ill patients.

Methods. We searched PubMed, the Cochrane Library, Scopus, Web of Science, EMBASE and clinicaltrials.gov electronic databases up to October 2016. The meta-analysis was restricted to randomized controlled trials (RCTs) of critically ill patients receiving PCT-guided antibiotic treatment and reporting survival or antibiotic duration. Study quality was assessed using the Cochrane risk of bias tool. Two reviewers conducted all review stages independently, and a third reviewer adjudicated any differences. Data was pooled using random-effects meta-analysis.

Results. Of the 18 RCTs selected (n = 5,183 patients; Table), 17 assessed mortality and 11 assessed antibiotic duration; 8 scored ≥3 and 10 scored ≤2 out of 6 on the risk of bias assessment. Compared with controls, PCT-guided antibiotic treatment was associated with a significant reduction in mortality (20.7% vs. 23.0%; risk ratio [RR] 0.90[95% CI, 0.81–0.99], I^2=0%; Figure 1). Survival benefit was retained in the RCT subset with a lower risk of bias (score ≥ 3; RR 0.87 [95% CI, 0.77,0.98], I^2=0%; Figure 2) but not with higher risk (score ≤ 2; RR 0.98 [95% CI, 0.80–1.20], I^2=0%). Our analysis of the effect of PCT-guided antibiotic therapy on antibiotic duration displayed significant heterogeneity (I^2=61.2%, P = 0.004), which precluded reporting on aggregate effect. Important limitations were: single center RCT (n = 9), lack of double blinding (all studies) and variable protocol non-adherence and timeframes examined for mortality.

Conclusion. In a meta-analysis of RCTs of critically ill patients with suspected or proven infection, PCT-guided antibiotic treatment was associated with a significant reduction in mortality. The observed survival benefit was weighted towards RCTs of relatively higher quality. However, the plausibility of this finding, as well as the impact of protocol non-adherence on outcome needs further study.

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1149. Serial Procalcitonin Levels Correlate with Microbial Etiology in Hospitalized Patients with Pneumonia

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Background. Procalcitonin (PCT) is a biomarker that is finding increasing diagnostic and prognostic utility in lower respiratory infections. It remains unclear, however, whether it can be helpful in predicting the bacterial etiology of pneumonia, with a view to informing antibiotic choice and duration. This study examines the relationship between serial PCT measurements and microbial etiology in patients hospitalized for pneumonia to determine whether changes in PCT levels provide discriminatory information on microbial etiology.

Methods. We performed a subgroup analysis of data from a prospective cohort study of 505 patients admitted to a tertiary care center with findings concerning for pneumonia. Microbial etiology of pneumonia was determined from high quality respiratory samples, blood cultures or other relevant diagnostic tests according to standard protocols. Procalcitonin levels were measured serially during the first four days of hospitalization. We compared procalcitonin levels between different bacterial etiologies over the first four days of admission, using the Mann–Whitney-U test to assess for statistical significance.

Results. Out of 505 patients, the diagnosis of pneumonia was adjudicated in 317, and bacterial etiology determined in 62 cases. The predominant pathogens were *Staphylococcus aureus* (N = 18), *Streptococcus pneumoniae* (N = 6), *Pseudomonas aeruginosa* (N = 11) and *Haemophilus influenza* (N = 5). Admission levels of PCT were lowest in *Pseudomonas* infections and highest in pneumococcal infections, though not reaching statistical significance. On hospital days two and three, pneumococcal procalcitonin levels were significantly higher than all other etiologies, but on day four, there was no statistically significant difference in PCT values for different microbial etiologies.

Conclusion. Serial procalcitonin levels during the early course of bacterial pneumonia reveal a difference between pneumococcal and other bacterial etiologies, and may have an adjunct role in guiding antibiotic choice and duration.

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1150. A Novel Host-protein Assay Accurately Distinguishes Bacterial From Viral Upper Respiratory Tract Infections

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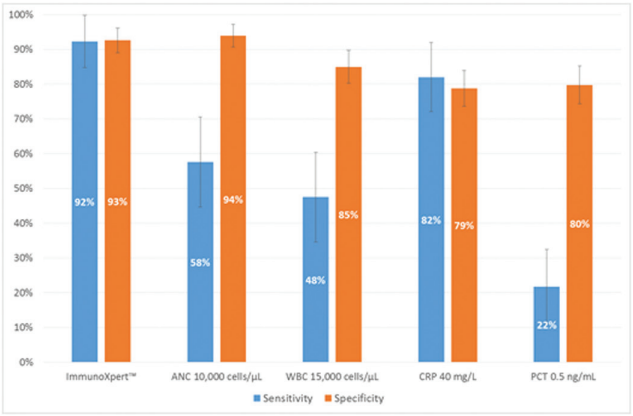
Background. Bacterial and viral infections are often clinically indistinguishable, particularly in upper respiratory tract infections (URTI), which leads to antibiotic misuse. A novel assay (ImmunoXpert™) that integrates measurements of three host-response proteins (TRAIL, IP-10, CRP) was recently developed to assist in differentiation between bacterial and viral etiologies. We evaluated the assay performance in URTI patients and compared it with standard laboratory measures.

Methods. We performed a sub-analysis of 464 patients with clinical suspicion of URTI enrolled in three previously conducted multi-center clinical studies that evaluated the assay performance in patients with acute infections: 'Curiosity' study (NCT01917461), 'Opportunity' study (NCT01931254), and 'Pathfinder' study (NCT01911143). Comparator method was predetermined criteria combined with expert panel adjudication, which was blinded to the test results. Diagnostic performance was evaluated by comparing test and comparator method outcomes.

Results. A unanimous panel adjudication was attained for 61 bacterial (13%) and 241 viral (52%) patients (162 patients (35%) had an indeterminate diagnosis). The assay distinguished between bacterial and viral infected patients with a sensitivity of 92% (95% CI: 82%- 98%) and specificity of 93% (88%-96%) with 11% equivocal test results. Overall the assay outperformed other routine laboratory tests (FIG 1), including: white blood cell count (WBC; cutoff 15,000 cells/μL, sensitivity 48% (35%-60%), $P < 10^{-6}$; specificity 85% (80%-90%), $P < 0.05$); CRP (cutoff 40 mg/L, sensitivity 82% (72%–92%), $P = 0.16$, specificity 79% (74%–84%), $P < 10^{-4}$); Procalcitonin (PCT; cutoff 0.5 ng/mL, sensitivity 22% (11%–32%), $P < 10^{-14}$, specificity 80% (74%–85%), $P < 0.001$); absolute neutrophil count (ANC; cutoff 10,000 cells/μL, sensitivity 58% (45%–71%), $P < 10^{-4}$, specificity 94% (91%–97%), $P = 0.7$).

Conclusion. The novel assay demonstrated superior performance compared with routine laboratory tests (WBC, ANC) and biomarkers (CRP, PCT), in distinguishing bacterial from viral etiologies in patients with URTI. It has the potential to help clinicians avoid missing bacterial infections or prescribing unwarranted antibiotics for viral URTIs.



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1151. Biomarker-based Assessment of Urinary Tract Infection in Persons with Spinal Cord Injury

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Background. Urinary tract infection (UTI) is the most common infection and the second leading cause of death in spinal cord injury (SCI) patients. However, there is currently no consensus about the clinical criteria for UTI in SCI patients and the lack of a universal definition of asymptomatic bacteriuria (ABU) make the diagnosis even more complex and the treatment recommendations problematic. Prompt diagnosis and timely treatment of UTI are important to prevent possible progression to sepsis. Elevated concentrations of some biomarkers may be correlated with infection and their serial measurements may be helpful to assess the effectiveness of antibiotic therapy.

Methods. Fifteen SCI participants were enrolled for either lower UTI, upper UTI (pyelonephritis), ABU, or control. Patients suspected of having any inflammation or infection other than UTI were excluded. Participants were monitored for their serum procalcitonin (PCT) and c-reactive protein (CRP) levels initially and every 3 days once the UTI was confirmed and antibiotics prescribed. In addition, the urine was cultured initially and every three days in patients with UTI for correlation with biomarkers. UTI/ABU was assessed by patient's physician.

Results. Both mean initial PCT and CRP were significantly higher in patients with lower UTI ($P = 0.027$ and $P = 0.001$, respectively) and those with upper UTI ($P = 0.044$ and $P < 0.0001$, respectively) compared with control and ABU participants. PCT and CRP were generally reduced to the normal levels gradually during the course of antibiotic therapy for those patients with UTI that were placed on antibiotic therapy. Mean bacterial colonies grown from initial urine cultures in patients with upper or lower UTI were >100,000 CFU/mL. Control participants had urine cultures of ≤1,000 CFU/mL). Generally, cultures from UTI patients placed on antibiotics were negative for the organism(s) treated for during or after the completion of antibiotic therapy.

Conclusion. Serum concentrations of CRP and PCT may be used to aid in the early assessment of UTI in SCI patients in the absence of other sources of inflammation and/or infection. In general, CRP measurements are more pronounced than PCT measurements in patients with ABU or lower UTI. However, PCT levels elevate conspicuously in patient with pyelonephritis.

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1152. Serum Procalcitonin as a Marker for Infection in Patients with Acute Myocardial Infarction

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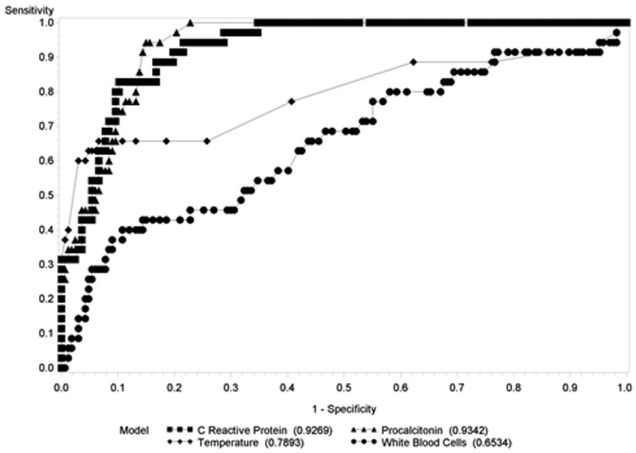
Background. Significant proportion of patients with acute myocardial infarction (AMI) also present with systemic inflammatory response syndrome (SIRS). Thus it is difficult to determine in certain situations, whether empiric antibiotic treatment is warranted. Serum procalcitonin (PCT) is known to be elevated in bacterial infections, but its performances in predicting bacterial infection among patients with AMI, who might benefit from appropriate empiric management, is unknown.

Methods. A prospective observational study was conducted at Assaf Harofeh Medical Center, Israel. Serum PCT was collected within 48 hours from patients presenting with AMI. Demographic, clinical, and laboratory data, were collected prospectively. Two experienced Infectious Diseases (ID) specialists who were blinded to the PCT results, independently determined the gold standard for infection in every patient. By utilizing sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and the area under the ROC curve (AUC), the performance of PCT, fever, white-blood cells (WBC) count and C-reactive protein (CRP) for infection diagnosis was calculated.

Results. The analysis included 230 AMI patients (age 63.0 ± 13.0 years), of which 36 (15.6%) were determined to be infected. The best cutoff for PCT as a differentiating marker between infected and non-infected patients was achieved at 0.09ng/dl (sensitivity 94.4%, specificity 85.1%, AUC ROC 0.94). This test outperformed CRP, WBC, and fever, for infection diagnosis (figure).

Conclusion. PCT should be utilized for ruling out infection in AMI patients by utilizing serum PCT>0.09ng/dl (i.e., ≥0.1ng/dl) as a cutoff.



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1153. The prognostic importance of platelet indices in patients with Crimean-Congo Hemorrhagic Fever

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Background. Platelet count is an important tool for the diagnosis and prognosis of Crimean-Congo Hemorrhagic Fever (CCHF). The platelet indices plateletcrit, mean platelet volume (MPV) and platelet distribution width (PDW) are parameters obtained as part of the automated complete blood count. These parameters are of prognostic importance in several diseases. The aim of this study was to evaluate the platelet count and its relations with platelet indices in CCHF patients.

Methods. One hundred and forty-nine patients with confirmed CCHF were included in the study. Patients were divided into two groups (severe cases, patients who exhibited hemorrhage during their hospital stay, and mild/moderate cases with no hemorrhage during hospital stay). The demographic characteristics and laboratory test results of all patients were compared. $P < 0.05$ was regarded as statistically significant.

Results. Hemorrhaging was observed in 38.3% of patients during hospitalization. Platelet count, PCT and PDW values (respectively) on the first day of hospitalization were 43.3 ± 29.3, 0.06 ± 0.07%, and 17.4 ± 1.5% in the severe cases and 64.5 ± 35.4, 0.08 ± 0.03%, and 16.8 ± 1.5% in the mild/moderate cases, respectively ($P < 0.05$). The difference between MPV values was not statistically significant. At cutoff values at ROC analysis, platelet count (≤53000) and PCT(≤0.06) exhibited 73.7% and 71.9% sensitivity, respectively, and predicted a hemorrhagic disease course with a 80.9% negative predictive value. Seven of the severe patients died ($P = 0.001$). At cutoff values,