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. 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 pediatric purposes and to assess the correlation of C-reactive protein (CRP) with brucellosis in adults and children.

Methods. The study included 137 adults and 41 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 (59.2% male) was 9.2 ± 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 (R² = 0.052, P = 0.011), PLR (R² = 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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Session: 144. Diagnostics: Biomarkers

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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 antibiotic duration.

Methods. Study quality was assessed using the Cochrane risk of bias tool. Two authors independently screened, assessed, and extracted data from randomized controlled trials (RCTs) involving critically ill patients receiving PCT-guided antibiotic treatment and reporting survival or antibiotic duration. RCTs were included if they were randomized, double-blinded, and controlled trials of critically ill patients receiving PCT-guided antibiotic therapy with or without supportive care. Seven authors of the included studies were contacted for additional data. 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 3 assessed antibiotic duration. NLR, PLR, MPV and NLR were measured at baseline and on day 3–5. Of these, PLR was the best predictor of mortality (OR = 0.99, 95% CI 0.99–1.0, p = 0.004). When PLR was <0.5, mortality was 8% (95% CI 3%–13%), compared with 12% (95% CI 7%–19%) when PLR was ≥0.5. The quality of the studies was similar, and there was no significant publication bias. No differences were observed in mortality, antibiotic duration, and adverse events between the treatment and control arms.

Conclusion. Our analysis of the effect of PCT-guided antibiotic therapy on antibiotic duration did not show any differences. Data was pooled using random-effects meta-analysis.

Disclosures. All authors: No reported disclosures.

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 (URTIs), which leads to antibiotic misuse. A novel assay (ImmunoXpert™) that integrates measurements of three host-reaction parameters was recently developed to assist in differentiation between bacterial and viral infections. We evaluated the assay performance in URTI patients and compared it with standard laboratory measures.

Methods. We performed a sub-analysis of 461 patients with clinical suspicion of URTIs enrolled in three one-center clinical studies that evaluated the assay performance in patients with acute infections: 'Curiosity' study (NCT01911143), ‘Opportunity’ study (NCT01911254), and ‘Pathfinder’ study (NCT01911143). Comparator method was predetermined criteria combined with serial procalcitonin levels during the early course of bacterial pneumonia. The study included 137 adults and 141 age- and gender-matched healthy controls, as well as 71 children and 81 age- and gender-matched healthy controls. The predominant pathogens were Staphylococcus aureus (N = 18), Streptococcus pneumoniae (N = 6), Pseudomonas aeruginosa (N = 11) and Haemophilus influenzae (N = 5). Admission levels of PCT were lower in bacterial infections and higher in viral 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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