Predictors of serious bacterial infections using serum biomarkers in an infant population aged 0 to 90 days: a prospective cohort study.
BMJ Paediatrics Open 2021;5:e000861.

Background & Objective– Young febrile infants represent a vulnerable population at risk for serious bacterial infections (SBI). This prospective cohort study aimed to evaluate the diagnostic accuracy of components of the complete blood count in comparison with C–reactive protein (CRP) to predict SBI among febrile infants.

Methods– The study conducted from Dec2018 to Nov2019 at an Urban, tertiary care hospital in Singapore included febrile infants ≤3months old with complete blood count results. Their white blood cell count (WBC), absolute neutrophil ratio (ANC), neutrophil to lymphocyte ratio (NLR), platelet to lymphocyte ratio(PLR), mean platelet volume to platelet count ratio (MPV/PCR) were analysed and compared these to the performance of CRP. Main outcome measures SBIs were defined as urinary tract infection, bacteraemia, bacterial meningitis, sepsis, pneumonia, skin and soft tissue infection, bacterial enteritis, septic arthritis or osteomyelitis.

ACADEMIC P.E.A.R.L.S

Pediatric **E**vidence **A**nd **R**esearch **L**earning **S**nippet

Serum Biomarkers in Infants for
Predicting Serious Bacterial Infection

Results – Of the 187 infants analysed, 54 (28.9%) were diagnosed with SBI. Median values of WBC, ANC, NLR and CRP were significantly higher in infants with SBI: WBC (13.8 vs 11.4×109/L, p=0.004), ANC (6.7 vs 4.1×109/L, p<0.001), NLR (1.3 vs 0.9, p=0.001) and CRP (21.0 vs 2.3mg/L, p<0.001), compared with those without.
CRP had the best discriminatory values for SBI, with area under the curve (AUC) of 0.815 (95% CI 0.747 to 0.883), compared with WBC, ANC and NLR. A predictive model consisting of WBC, ANC and NLR in combination with clinical parameters, had an AUC of 0.814 (95% CI 0.746 to 0.883). There was increased discriminative performance when this predictive model was combined with CRP, (AUC of 0.844, 95%CI 0.782 to 0.906). The optimal CRP level with best specificity and sensitivity predicting SBI was 7.2mg/L.

Conclusion – In young febrile infants, CRP was the best discriminatory biomarker for SBI. WBC, ANC and NLR when used in combination have potential diagnostic utility in this population.

EXPERT COMMENT

"Simple, easily available and inexpensive tests like Total WBC, ANC & NLR along with CRP and clinical profile can be used to predict SBI and help in avoiding indiscriminate antibiotic use in young febrile infants. Duration of fever at the time of testing is also important as CRP levels usually peak after 24-48hrs of fever onset."

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With warm regards,

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Reference

Chang SSY, Lim AZ, Ong GY, et al. Predictors of serious bacterial infections using serum biomarkers in an infant population aged 0 to 90 days: a prospective cohort study BMJ Paediatrics Open 2021;5:e000861. doi: 10.1136/bmjpo-2020-000861.