☐ A CLINICAL PREDICTION RULE TO IDENTIFY FEBRILE INFANTS 60 DAYS AND YOUNGER AT LOW RISK FOR SERIOUS BACTERIAL INFECTIONS.

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Current standard of care for a young, febrile infant includes invasive procedures, broad-spectrum antibiotics and hospitalization to rule out a serious bacterial infection. However the incidence of these types of infections in young infants have gradually been decreasing. A decision tool to help differentiate the infants at lower risk for a serious bacterial infection could potentially reduce the number of unnecessary invasive workups and hospitalizations.

The goal of this prospective, observational study was to statistically derive and validate a clinical decision rule to identify infants 60 days or younger who are at low risk for a serious bacterial infection. Serious bacterial infections were defined as a urinary tract infection, bacteremia, or bacterial meningitis. Previously healthy infants who presented to one of twenty-six emergency departments across the United States with a fever and suspected serious bacterial infection between March 2011 and May 2013 were enrolled in the study. Infants who were critically ill, premature, had pre-existing medical problems, indwelling devices, had received antibiotics within past 48 hours, or had a soft tissues infection were excluded. Infants were evaluated subjectively by the physician with the Yale Observation Scale (YOS) and then based on their gestalt. Objective evaluation included a white blood cell count, absolute neutrophil count, serum procalcitonin, urinalysis, urine culture and blood culture. It was left up to the treating physician to decide whether to obtain cerebrospinal fluid cultures or not.

Nine hundred and eight infants were randomized into the derivation cohort and nine hundred and thirteen infants were randomized into the validation cohort. The statistically derived clinical decision rule used a negative urinalysis, absolute neutrophil count of 4090/microL or less, and a serum procalcitonin level of 1.71 ng/mL or less to identify infants at low risk for a serious bacterial infection with a sensitivity of 98.8% (95% CI, 92.5%-99.9%) and negative predictive value of 99.8% (95% CI, 98.8%-100%). It did miss one infant with bacteremia (0.2%). The validation cohort showed a sensitivity of 97.7% (95% CI, 91.3%-99.6%) and a negative predictive value of 99.6% (95% CI, 98.4%-99.9%). The validation cohort missed two infants with urinary tract infections (0.4%). There were no cases of bacterial meningitis missed. The study found that neither the YOS nor clinician gestalt improved the clinical decision rule. Limitations of this study include there was no evaluation of viral causes of meningitis including herpes simplex virus as well as other biomarkers such as C-reactive protein. However, the authors did note that identification of viral meningitis or encephalitis does not fully eliminate the risk of a SBI. Other limitations include the fact that patients were only enrolled when researchers were present in the emergency rooms. Additionally, the number of infants that actually had serious bacterial infections in the study was low (9.3%). Although similar to the actual incidence in the population, the authors suggest the rule should be further tested on a population of infants with a high incidence of serious bacterial infections to further validate the decision rule.

The authors concluded this clinical decision rule accurately identifies infants at low risk for serious bacterial infections without using cerebrospinal fluid and could prevent unnecessary lumbar punctures, broad-spectrum antibiotics, and hospitalizations after further validation studies.

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This study is very promising for the future evaluation of young, febrile infants especially since it involves easily obtainable objective data (urinalysis, procalcitonin, and ANC). Extra caution should be taken with infants < 28 days due to the increased risk of herpes encephalitis. We are hopeful, though, that if further validated, this can become standard of care and reduce the need for invasive procedures and hospitalizations.