Approach to Neonatal Fever: Clinical Pearls

How do we measure temperature in children?

1. Rectal (most accurate) is gold standard and recommended from birth up to 2 years
    a. Additional methods: oral, infrared/temporal (used in hospital), axillary (low sensitivity and specificity in detecting fever)
2. Correlation between temperatures isn't exact, but general trend:
    i. Average normal oral temperature is 37 degrees C
    ii. Rectal (and tympanic) temperature is 0.3—0.6 C higher than oral temperature
    iii. Axillary and temporal temperatures are 0.3—0.6 C lower than oral temperature
3. ** A lower or normal temperature does not mean work up should be deferred if infant is ill appearing. In fact, hypothermia can be a sign of sepsis or serious infection.

Why do we have different recommendations depending on age?

1. Age defines risk for serious bacterial illness due to immune system development
    a. Patients are often separated into 0-90 days and >90 days (3 months)

Institutions are beginning to further divide the 0-90 days in order to prevent unnecessary invasive work up in those who are not as high risk of serious illnesses

    b. ** The following discussion pertains only to infants who are well appearing**Those who are ill appearing, have a pre-existing medical condition, immunosuppressed, recent foreign travel, prolonged fever or hx of prematurity < 37 weeks are beyond scope of this talk and will most likely require thorough evaluation
2. Serious infections we worry about in this age group are urinary tract infections, bacteremia, meningitis and disseminated HSV infection
    a. However the most common source is viral!

Age: Neonate to 30 days

1. Documented (history included) rectal temperature >= 38 C: all patients require complete work up, initiation of empiric antibiotics and admission
    a. Complete work up includes: blood culture, catheterized urinalysis and urine culture, LP (CSF analysis includes cell count, protein/glucose, culture and gram stain, and hold for additional studies), CBC with differential, procalcitonin
        i. If respiratory symptoms: obtain CXR
        ii. If risk factors for HSV (maternal hx), child unwell,consistent rash or lab abnormalities including CSF pleocytosis, thrombocytopenia, transaminitis in < 2 week old, pneumonia in < 2 week old: obtain HSV PCR
    b. Once culture are obtained, start empiric antibiotics
        i. If < 14 days: ampicillin and ceftazidime
            1. Ampicillin covers for Listeria
            2. Ceftazidime because risk of biliary sludging with ceftriaxone
        ii. If > 14 days: ceftriaxone
        iii. If CSF pleocytosis: cefepime, ampicillin and acyclovir

Age: Infant 30-60 days with documented fever:

1. Same work up as above but does not include LP as initial pass
    a. IF WBC is > 15k or < 5 k OR procalcitonin > 0.2 (meaning lab evidence of infection/inflammation) then proceed to LP
        i. If on CSF initial studies WBC > 10 OR positive gram stain, consider additional testing, antibiotics and admit

ii. If reassuring CSF studies, administer ceftriaxone but patient could potentially be discharged
    1. Discharge criteria: infant well appearing, close follow up with PCP within 24 hours, no social concerns and family able to obtain antibiotic prescription if indicated

b. IF no concerning WBC or procalcitonin and UA is negative, can discharge (same discharge criteria as above)
    i. If UA is positive, consider LP (infants at this age at risk of urosepsis and meningitis) versus antibiotics and discharge

Infant 61 to 90 days with documented fever:

1. Risk of bacteremia in well appearing infant is 0.4% and risk of meningitis is < 0.1%
    a. This is same as in older children and therefore at BCH children from 2 months to 24 months are treated according to same first initial pass:
        i. Full work up is not recommended for all comers
    b. Consider time of year during work up (high risk of influenza infection, etc), consider immunization within past 48 hours
    c. IF no to above, perform ONLY UA and urine cx (in all patients)

References:
1. Temperature measurement in paediatrics. Paediatr Child Health. 2000;5(5):273-284. doi:10.1093/pch/5.5.273
2. Hui C, Neto G, Tsertsvadze A, et al. Diagnosis and Management of Febrile Infants (0–3 Months). Rockville (MD): Agency for Healthcare Research and Quality (US); 2012 Mar. (Evidence Report/Technology Assessments, No. 205.)Available from: https://www.ncbi.nlm.nih.gov/books/NBK92690/