

PEM GUIDE - THE FEBRILE INFANT AND CHILD > 3 MONTHS

INTRODUCTION

Fever is the most common presenting complaint of infants and children. It is generally defined as a rectal temperature greater than 38C (100.4 F). Fever may be the presenting sign of the body's response to a benign process, such as a viral infection, or to a potentially life threatening bacterial infection, such as sepsis or meningitis. While fever usually signifies an infectious process, on rare occasions it may indicate other processes, such as: poisoning (aspirin), collagen vascular disease or malignancy. The challenge for physicians who care for infants and children is differentiating the vast majority of patients presenting with fever who will have a self-limited illness from the few who will have life threatening infections.

The evaluation of the febrile infant and child is one of the most complex topics in pediatric emergency medicine. It is well documented that a small percentage of these children are at risk for serious bacterial infections. The extent of the evaluation necessary to identify the minority of infants with these infections is unclear. Classically, these patients are divided into the "rule out sepsis" age group (0-3mo) and the "rule out bacteremia" age groups (3-36mo) reflecting the different level of risk in and epidemiology in these groups. Over time, the approach to these groups has evolved due to changes in the epidemiology due to new vaccines and the interpretation of the risk and benefits involved.

OCCULT INFECTIONS

UTI -In infants and children with fever without a source, urinary tract infection is the most common bacterial infection. Approximately 16% of girls <2 years of age and 8% of uncircumcised boys <1 year with fever without a source will have a UTI. The rate of UTI in circumcised males is significantly lower.

Bacteremia - The evaluation of nontoxic appearing febrile young children from 3 to 36 months for 'occult' bacteremia has been the subject of considerable study and debate. The introduction of the Haemophilus Influenzae type b (HIB) vaccine in the early 1990's reduced the incidence of H. influenza meningitis by 94%. The current prevalence of occult bacteremia among febrile children aged 3 to 36 months is approximately between 1 and 2%. Pneumococcal infections represent approximately 90% of bacteremia. The remaining 10% consist of N. Meningitis, Salmonella sp, Staph aureus, and Group A beta hemolytic Strep. Of children aged 3 to 36 months with fever without a source, 0.3% will develop significant sequelae (pneumonia, septic arthritis, osteomyelitis, meningitis, sepsis); but only 0.03% of febrile children without a source will develop sepsis or meningitis. The recent introduction of the heptavalent pneumococcal conjugate vaccine will likely impact the clinical decision making process. Recent data suggest significant reductions in the incidence of invasive pneumococcal disease in those who have received their primary series of vaccinations (2,4 and 6 months) as well as reductions in non-vaccinated individuals (ie herd immunity). The emergence of a multidrug resistant strain of Pneumococcus (Strain 19A) that is not covered by the heptavalent vaccine while required ongoing evaluation and may impact management decisions.

EVALUATION

Evaluation of the febrile child includes a thorough history (including age, maximum temperature, underlying medical condition, past infections and vaccination status) and physical examination (including careful assessment of general appearance and localizing signs of infection). The need for laboratory and/or radiologic evaluation should be individualized.

GENERAL APPEARANCE

Observation and clinical impression are key components in the evaluation of febrile infants and young children. Indicators such as a child's alertness, playfulness, interaction with the environment, color, state of hydration, quality of cry and the ability to be consoled have been included in a scoring system known as the Acute Illness or Yale Observation Score. The older the patient, the more reliable the clinical impression becomes in predicting serious bacterial illness (defined as urinary tract infection/pyelonephritis, bacteremia and meningitis).

PHYSICAL EXAMINATION

On physical examination, an infant may appear pale or mottled, tachypneic, tachycardic, have a weak cry, or have grunting respirations. A febrile infant with a more subtle presentation may simply be difficult to arouse. Meningeal signs may be absent despite the presence of meningitis. An infant with a urinary tract infection may have only fever with or without vomiting or diarrhea.

In older infants and children clinical impression becomes increasingly more accurate in identifying serious bacterial illness, such as meningitis or pneumonia. An older child (toddler age) with meningitis usually has nuchal rigidity and positive Kernig's and/or Brudzinski's signs.

LABORATORY EVALUATION - URINALYSIS AND URINE CULTURE

Urine should be obtained sterilely (via catheterization or suprapubic aspiration) for urinalysis and culture in uncircumcised boys up to 1 year of age (6 months for circumcised boys) and girls up to 2 years of age. Bedside ultrasonography has been shown to increase the yield of successful catheterizations.

LABORATORY EVALUATION - CBC AND BLOOD CULTURE

The practice of screening for bacteremia needs to be reevaluated in light of the decreasing incidence of invasive pneumococcal disease. A number of decision analyses have come to the conclusion the routine laboratory screening and empiric antibiotic therapy may no longer be cost effective when the incidence of occult pneumococcal bacteremia reaches 0.5%. In general, those with a temperature greater than 39 C (or 39.5 C) who have not received a complete primary series of pneumococcal vaccines undergo screening with a CBC. A total WBC >15,000 or ANC > 10,000 are the usual cutoff for considering a patient high risk for bacteremia and eligible for empiric antibiotic therapy.

LABORATORY EVALUATION - STOOL CULTURE

Send a stool culture if the patient has bloody diarrhea or >5 WBC per high powered field in a stool smear. Antibiotic therapy should be started in infants less than 3 months. Older children with salmonella enteritis rarely need antibiotic therapy

RADIOLOGIC EVALUATION - CHEST XRAY

A chest radiograph may be obtained if there are signs of lower respiratory tract disease, especially tachypnea. An elevated WBC > 20 has also been shown to be a predictor of lobar infiltrate on chest radiograph.

TREATMENT

Patients who are febrile with a positive urinalysis are presumed to have pyelonephritis. Outpatient management is an option in those infants who are well appearing, are tolerating oral fluids and in whom close follow up can be assured. Antibiotic selection should be based on community based resistance rates to E Coli the most common pathogen.

The decision to provide empiric antibiotic coverage for possible bacteremia is often based on the results of the screening CBC. A total WBC >15,000 or ANC > 10,000 are the usual cutoff for considering a patient high risk for bacteremia and eligible for empiric antibiotic therapy with intramuscular Ceftriaxone.

DISPOSITION

Patients who appear toxic (alteration in mental status, respiratory distress, poor perfusion) are treated as inpatients. Children who are well appearing are often discharged. The most important aspects of care are careful and frequent follow-up.