

# PEM GUIDE - THE FEBRILE NEONATE < 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 of 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 to the few who will have serious 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 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

Approximately 10% of well appearing infants less than 3 months of age will have a serious bacterial infection.

Infants less than 4 weeks of age represent a distinct group in that they are at higher risk of serious bacterial infection and are at risk not only for neonatally transmitted bacterial infections (*group B Streptococcus*, *Listeria Monocytogenes*), but also community acquired bacterial infections (*E. Coli*, *Strep. pneumoniae*, *Salmonella*).

Infants older than 4 weeks are typically infected with community acquired bacterial infections (*E. Coli*, *Strep. pneumoniae*, *Salmonella*).

The most common occult infection is UTI/pyelonephritis (10%). Approximately 1% of well appearing febrile infants will have bacteremia and meningitis respectively.

## EVALUATION

Evaluation of the febrile infant includes a thorough history (including prenatal and antenatal history, age, maximum temperature and underlying medical condition) and physical examination (including careful assessment of general appearance and localizing signs of infection).

The “sepsis workup” includes laboratory evaluation of blood, urine and cerebrospinal fluid. A chest radiograph and stool culture are sometimes included. A chest radiograph may be obtained if there are signs of lower respiratory tract disease, especially tachypnea. A stool culture may be sent if the patient has bloody diarrhea or >5 WBC per high powered field in a stool smear.

An number of evaluation tools that combine history, clinical findings and laboratory parameters have been developed to aid in identifying those infants at low risk for serious bacterial infection. These criteria vary with: Age, definition of previously healthy, extent of laboratory evaluation, criteria of individual labs, use of empiric antibiotics and disposition.

<b>LOW RISK CRITERIA FOR SERIOUS BACTERIAL INFECTIONS – INFANTS</b>			
	<b>Rochester</b>	<b>Boston</b>	<b>Philadelphia</b>
Age	< 60 days	28-89 days	29-60 days
Previously Healthy	Yes	Yes	Yes
No Focal Infection	Yes	Yes	Yes
Non-toxic	Yes	Yes	Yes
AIOS	NA	< 10	< 10
WBC	5-15	< 20	< 15
ABC	<1500	NA	B/N < 0.2
UA – WBC/HPF	<= 10	< 10	< 10, gram stain (-)
Stool – WBC/HPF	< = 5	NA	< 8
CSF – WBC/mm <sup>3</sup>	NA	< 10	< 8, gram stain (-)
CXR	NA	Negative	Yes
Empiric Antibiotics	No	Yes	No
Disposition	Home	Home	Home

## **MANAGEMENT**

### **INFANTS < 4 WEEKS OF AGE**

In the infant less than 4 weeks of age clinical impression is inadequate. Below 4 weeks of age, infants should undergo a full evaluation for sepsis and admission.

Infants who are toxic appearing (altered mental status, respiratory distress, poor perfusion) or well appearing and not fulfilling low risk criteria should receive empiric antibiotic coverage for the most common pathogens. This typically includes intravenous Ampicillin and Cefotaxime. The addition of acyclovir is sometimes recommended to cover herpes simplex

In infants who are well appearing and fulfill low risk criteria the decision to initiate antibiotic coverage is controversial. Some guidelines recommend that all infants in this age group receive empiric antibiotic coverage. Others suggest that well appearing infants fulfilling low risk criteria may be admitted for observation without empiric antibiotic coverage.

## **INFANTS 4-12 WEEKS OF AGE**

Infants who appear toxic should undergo a full sepsis evaluation and be treated as inpatients with ceftriaxone. Ampicillin is generally added to cover *Listeria monocytogenes* in infants less than 6-8 weeks of age.

From 4 to 12 weeks of age, there is a growing consensus that infants who meet criteria for being low risk for serious bacterial infection may be safely managed as outpatients.

These infants should at a minimum undergo screening for bacteremia and UTI. There is varying practice in this age group for who should undergo a lumbar puncture. Some advocate that a CSF analysis be performed in all infants. Others recommend routine lumbar puncture in the 4-8 week age group but not in the 8-12 week olds. In general, if a lumbar puncture is not performed initially and laboratory screening indicate a high risk of bacteremia (WBC  $<5$  or  $>15$ , ABC  $>2500$ , B/N  $> 0.2$ ) or UTI (positive urinalysis) then the patient should have a lumbar puncture performed prior to the initiation of empiric antibiotic with ceftriaxone.

For those who are managed as outpatients the most important aspect of care is careful and frequent follow-up.