

Title of case: 12 day old female with fever
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Learning Objectives: KAS 1-7

HPI: A 12 day old F is brought into the emergency room for an axillary temperature of 39.2 °C. She has otherwise been acting appropriately with good intake and output. Parents deny any cough, congestion, rhinorrhea, vomiting, diarrhea, or otherwise foul smelling diapers. The family has also been taking appropriate precautions by asking friends and family to not visit until their daughter is at least a month old. On examination the infant is crying but consolable with a pacifier. The infant was born via C-section at 38 weeks gestation and had an uncomplicated newborn course.

Pertinent ROS:

- No cough, congestion, or rhinorrhea
- No vomiting, diarrhea or otherwise foul smelling diapers
- No rashes

Birth hx: ex 38 weeks, planned C-section due to mother having 2 prior C-sections, uncomplicated nursery course, GBS negative, all other prenatal labs negative

No PMH, PSH, Meds, or allergies

Imm: received HBV vaccine at birth

Dev: normal for age

Social hx: lives with mom and dad, 4 year old sister and 6 year old brother

Family hx: mother with hypothyroidism on levothyroxine, father with hypertension, both siblings are healthy and developing appropriately

Vitals: 38.4 °C (rectal), heart rate 160, 81/58, RR 36, satting at 99%

PE:

GENERAL APPEARANCE: well-nourished, well developed

HEAD: anterior fontanelle open, soft, & flat, no cranial hematomas

EYES: conjunctiva, sclera, & pupils normal; red reflexes present bilaterally

EARS: normal position & rotation; canals present

NOSE: passages patent

MOUTH: palate intact; no deformities noted

NECK: supple, no masses palpated, clavicles intact

HEART: RRR, normal S1 & S2, no m/r/g

PULSES: 2+ brachial & femoral pulses bilaterally

LUNGS: CTA bilaterally, no tachypnea/retractions

ABDOMEN: soft, non-tender, non-distended; no masses, no hepatosplenomegaly; umbilicus clean and without erythema or induration

GU FEMALE: normal appearance; no discharge, no GU rashes

HIPS: negative Barlow & Ortolani

EXTREMITIES: no deformities, full range of motion

SKIN: no significant lesions, no nevus simplex, no mongolian spots

BACK: no midline defects

NEURO: cries but consolable; good Moro, suck, & grasp reflexes; normal tone & strength

Question 1. Based on the patient's history and physical, which of the following sets of diagnostic labs would it be most appropriate to obtain?

- Urinalysis, urine culture, blood culture, CBC, CSF studies, CRP and procalcitonin
- Urinalysis, urine culture, blood culture, CBC, and CSF studies. May consider CRP and procalcitonin**
- Urinalysis, urine culture, blood culture, CBC, and CSF studies
- Urinalysis, urine culture, blood culture, CBC, CSF studies, CRP, procalcitonin, lactate, ammonia, blood gas

Explanation: Due to the risk of invasive bacterial infection, all febrile infants age 8-21 days should undergo a full septic evaluation. This includes blood, urine, and CSF studies.

Inflammatory markers do not influence this initial recommendation, but may be helpful in later management, such as how long to continue antimicrobials. In addition, herpes simplex virus (HSV) studies should also be sent out if there is any maternal history of genital HSV lesions or fevers within 48 hours of delivery or infant history of vesicles, seizures, hypothermia, mucus membrane ulcers, CSF pleocytosis in the absence of a positive CSF gram stain result, leukopenia thrombocytopenia, or elevated alanine aminotransferase levels.

Learning Goal: KAS 1-4

Question 2. The initial studies all come back without any significant findings. The patient continues to appear well but a temperature recheck reconfirms a fever of 38.6 °C. The parents ask if they can go home and come back the next day for a recheck. You advise the family that it would be best to:

- Go home with next day follow up
- Go home with next day follow up after the infant receives parenteral antibiotics
- Admit the infant for in-house observation without parenteral antibiotics
- Administer parenteral antibiotics and admit the infant for in-house observation**

Explanation: Febrile infants age 8-21 days should be actively monitored in-house while awaiting for results of bacterial cultures. Empiric parenteral antibiotics should ideally be initiated prior to obtaining cultures. Gram negative organisms are responsible for the majority of infections (60-80%), with Escherichia coli most commonly detected. The prevalence of Group B Streptococcus

infection has declined due to prenatal screening and peripartum antimicrobial prophylaxis. *Listeria monocytogenes* is rarely encountered. Empiric antimicrobials should thus at minimum provide coverage for *Escherichia coli* and Group B *Streptococcus* (often Ampicillin and Ceftazidime). Acyclovir should also be considered if there is any concern for HSV infection.

Learning Goal: KAS 5-6

Question 3. The infant is admitted for in-house monitoring. The laboratory soon thereafter calls to report that the CSF viral PCR panel tests positive for enterovirus. The other CSF values include a WBC $5/\text{mm}^3$, RBC $2/\text{mm}^3$, protein 73 mg/dL, and glucose 45 mg/dL. The patient had just fed 2 ounces of formula and is comfortably sleeping. Of the following, the most appropriate next step is to

- a. **Discontinue antimicrobials**
- b. Initiate acyclovir for a 21 day course
- c. Continue empiric antimicrobials until all cultures are negative for 72 hours
- d. Repeat CSF studies

Explanation: Concomitant enteroviral meningitis and bacterial meningitis is rare. As such, if CSF is positive for enterovirus antimicrobial agents should generally be discontinued. However, if there are other laboratory or clinical signs concerning for concomitant bacterial infection, it is reasonable to continue antimicrobial agents until all cultures are negative for 24-36 hours.

Learning Goal: KAS 7

Question 4. Antimicrobials are discontinued only a few hours into their hospital stay. The parents ask when it is safe for them to go home. The infant may be discharged with close outpatient follow up:

- a. Immediately after the CSF tests positive for enterovirus
- b. **After at least 24 hours of observation**
- c. After at least 48 hours of observation
- d. After at least 72 hours of observation

Explanation: Although infants whose CSF is positive for enterovirus may be observed without antimicrobial agents, they should remain in a hospital setting for a minimum of 24 hours because of the small risk of progression to enteroviral sepsis, which generally only occurs in infants <21 days of age

Learning Goal: KAS 7

Case resolution: The patient is monitored in-house until all cultures are negative for 24 hours. The patient defervesced 24 hours into the admission, and otherwise had a good energy level and oral intake. The patient is discharged home with outpatient follow up.

Citations:

Pantell R H, Roberts K B, Adams W G, et al. Evaluation and Management of Well-Appearing Febrile Infants 8 to 60 Days Old. *Pediatrics*. 2021;148(2):e2021052228