

Title of case: 55 day old male with fever
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Learning Objectives: KAS 15-20

HPI: A 55 day old M, born via normal spontaneous vaginal delivery at 37 weeks and 3 days, presents to the outpatient pediatrician for an urgent care visit for fever. The parents also mention that their son has been fussy throughout the night. Besides an axillary temperature of 38.3°C this morning the parents deny any cough, congestion, rhinorrhea, vomiting, diarrhea, foul smelling diapers, or localized areas of erythema, tenderness, or fluctuance.

Pertinent ROS:

- Fever
- Fussiness throughout the night
- No cough, congestion, or rhinorrhea
- No vomiting, diarrhea or otherwise foul smelling diapers
- No signs of skin and soft tissue infection

Birth hx: ex 37 weeks and 3 days, normal spontaneous vaginal delivery, uncomplicated nursery course, GBS negative, no maternal fever, rupture of membranes of 6 hours

No PMH, PSH, Meds, or allergies

Imm: received HBV vaccine at birth

Dev: normal for age

Social hx: lives with mom, dad, aunt, uncle, and two cousins

Family hx: father with GERD and cholecystectomy, mother with asthma, eczema, and seasonal allergies

Vitals: 38.7 °C (rectal), heart rate 140, 77/49, RR 40, satting at 100%

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 MALE: uncircumcised normal male genitals, testes bilaterally descended, no GU rash

EXTREMITIES: no deformities, full range of motion

SKIN: scattered flat and non-tender erythematous macules on the chest and trunk

BACK: no midline defects

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

Question 1. Screening labs are ordered including a urinalysis. Which of the following methods should be used to obtain the urine sample for urinalysis?

- a. **Bagged specimen, spontaneous void, or stimulated void**
- b. In-and-out catheterization
- c. Suprapubic aspiration
- d. Indwelling catheter

Explanation: Clinicians should obtain urine specimen by bag, spontaneous void, or stimulated void for urinalysis for well appearing infants. If urinalysis results are positive, an in-and-out catheterized sample should be obtained for culture. The rate of positive urine culture results without an abnormal urinalysis is roughly the same as the rate of asymptomatic bacteriuria and contamination. Studies have shown that limiting catheterizations to children with positive urine screen results from bag specimens reduced catheterization rates by >50% without increasing length of time in the facility or missing any UTIs. However specimens obtained by methods other than catheterization or suprapubic aspiration are not suitable for culture because of a high contamination rate. Infants 8-21 days of age should have urine samples obtained with in-and-out catheterization or suprapubic aspiration.

Learning Goal: KAS 15

Question 2. Inflammatory markers are all negative. Urinalysis results show large leukocyte esterase and negative nitrites. Based on the urinalysis results, which of the following are the next best steps?

- a. Obtain CSF studies, and the patient should be admitted for parenteral antimicrobials
- b. CSF studies are not needed, and the patient should be admitted for parenteral antimicrobials
- c. Obtain CSF studies, and the patient should be discharged after oral antimicrobials are given if close follow up can be arranged
- d. **CSF studies are not needed, and the patient should be discharged after oral antimicrobials are given if close follow up can be arranged**

Explanation: Parenteral antibiotics are generally recommended if any inflammatory marker is positive. Inflammatory markers include temperature 38.5°C , procalcitonin $>0.5\text{ ng/mL}$, CRP $>20\text{ mg/L}$, and ANC $>4000\text{-}5200/\text{mm}^3$. Inflammatory markers are predictive of invasive bacterial infection including bacterial meningitis. However the risk is still low at about 0.25%. CSF studies

therefore may be considered in the presence of positive inflammatory markers but are not required. Parenteral antibiotics are not indicated if all inflammatory markers are negative; however, oral antibiotics should be given if a urinalysis is positive to cover for a urinary tract infection.

Learning Goal: KAS 18-20

Question 3. The procalcitonin comes back elevated at 1.0 ng/mL. The other labs are normal. The infant has just taken in 2 ounces of formula and is sleeping comfortably. The risk of bacteremia in an otherwise well appearing 29-60 day old newborn with these lab findings is approximately:

- a. <1%
- b. <5%**
- c. 20%
- d. 50%

Explanation: The risk of bacteremia is increased if an inflammatory marker is abnormal. With either an ANC $>4000/\text{mm}^3$ or procalcitonin $>0.5 \text{ ng/mL}$, the risk of bacteremia is 3.2%, compared to a risk of 0.2% if all inflammatory markers are negative. However the risks and costs associated with hospitalization does not clearly outweigh the benefits in this age group. For low risk infants, the decision whether to hospitalize or not should be a shared decision with the parents and should be made after physicians clearly provide estimates of the risks of underlying invasive bacterial infections and benefits of home versus hospital monitoring.

Learning Goal: KAS 20

Question 4. The team decides not to obtain CSF studies. After a thorough discussion on the risks and benefits of observing closely in the hospital or at home, the parents decide they would prefer to take care of their baby girl at home. Which of the following is the next best step?

- a. Discharge home after administering parenteral antimicrobials with follow up for the next day**
- b. Discharge home after administering parenteral antimicrobials without follow up
- c. Discharge home without parenteral antimicrobials with follow up for the next day
- d. Discharge home without parenteral antimicrobials without follow up

Explanation: Parenteral antibiotics are generally recommended if any inflammatory marker is positive. Holding antimicrobials may be an option if CSF studies, if obtained, are negative. Obtaining CSF studies is not routinely indicated and should be a shared decision with the family. Patients may be managed at home if all of the following criteria are met: CSF studies (if obtained) are normal, parenteral antimicrobials are administered, appropriate parental education has been provided, follow up plans for reevaluation in 24 hours have been developed and are in place, and plans have been developed and are in place in case of change in clinical status, including means of communication between family and providers and access to emergency medical care.

Case resolution: The parents agree to a next day follow up and are discharged. They present to their PCP the next day with a healthy infant who no longer has a fever. Blood and urine cultures are otherwise negative at 36 hours.

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

1. Bagged sample
2. Circumcision
3. 29-60 days with positive UA and neg IM → oral antibiotics and can dc with follow up
4. 24-36 hour culture for discharge