

# CIS CME

Clinics India School of Continuing Medical Education

## Quick Case Work-up

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### Child with Recurrent Fever

#### History

A 2-year-old boy (Weight: 9 kg; Length: 81 cm) presented with high fever of two days duration. The child was apparently well prior to fever onset. The patient was treated with paracetamol; however, the fever continued to be high for the last two days. The child continued to look sick and was lethargic. He refused to eat and consumed only small amount of liquids. He vomited once when fed. He had no other symptoms.

On initial physical examination, the child's temperature was 103°F, pulse was 140/min, and the respiratory rate was 30 per min. He looked sick, was irritable and exhibited signs of mild dehydration. Examination of the ears, chest, and other systems was normal and there were no signs of skin rash. The patient's past medical history showed that he had recurrent fever (3-4 days in duration) over the last few months; however, the fever got better with antibiotics. There were no significant symptoms during the episodes of fever.

#### Physical examination at a glance

<b>Weight</b>	: 9 kg	<b>Dehydration</b>	: Mild
<b>Length</b>	: 81 cm	<b>Appearance</b>	: Sick and irritable
<b>Temperature</b>	: 103°F	<b>Skin</b>	: No rash
<b>Pulse</b>	: 140/min	<b>ENT</b>	: Normal
<b>Respiratory rate</b>	: 30/min	<b>Systemic examination</b>	: Normal

#### What is the best management approach?

*Select one or more.*

- 1 Antibiotic – if so, which one?
- 2 Antipyretic – if so, which one?
- 3 Urinalysis, urine culture and sensitivity
- 4 CBC and PS
- 5 Chest x-ray
- 6 Other tests

# CIS CME–Discussion

## Quick Case Work-up

### **CASE DISCUSSION**

It is optimal to analyze the patient's past history in order to arrive at a provisional diagnosis. This helps guide a focused physical examination and specific laboratory tests to confirm the diagnosis.

### **HISTORY ANALYSIS**

Fever at the onset of illness invariably denotes an acute infection. Although many non-infective disorders such as systemic inflammatory disease and malignancy may also begin with fever, they are rare and the correct diagnosis in such diseases usually evolves over time.

A high fever at the onset of illness suggests a disease developing at the site of entry of organisms such as occurs in acute tonsillitis, bacillary dysentery or urinary tract infection (UTI). An acute bacterial infection that starts as bacterimia and then localizes to some site in the body often occurs with moderate fever on the first few days that peaks by days 3-4. This typically occurs in typhoid fever.

Since the patient presented with a high fever at the onset of illness, it is likely to be either an acute viral or acute bacterial infection at the site of entry of the organisms. However, since there are no accompanying symptoms such as cold, cough, diarrhea, or vomiting, it is less likely to be an acute viral infection. In fact, none of the previous episodes of fever were accompanied by such symptoms. Thus, it is likely to be an acute bacterial infection at the site of entry of organisms. Acute tonsillitis would have presented with difficulty in swallowing and painful and enlarged jugulodigastric lymph nodes. Acute bacillary dysentery would have presented with loose stools with visible mucus and/or blood; therefore, both these infections are ruled out. Thus, this patient most likely has a non-localized acute bacterial infection. In addition, it favors a urinary tract infection since this is likely to recur. This child's previous febrile episodes probably represent recurrent bacterial urinary tract infection. The child was treated with antibiotics and got better without a definite diagnosis. The patient vomited once and this may be due to the disease itself or to forced feeding.

**Conclusion.** The patient is suffering from an acute non-localizing bacterial infection, most likely a UTI.

### **PHYSICAL EXAMINATION FINDINGS**

This 2-year-old child's body weight is that of a 1-year-old and his length is similar to an 18 month old. These findings suggest that he is undernourished and is not thriving. When body length is affected, it suggests a chronic illness. Thus, past recurrent episodes of fever may represent recurrent UTI that may have damaged the kidneys, hence affecting growth.

## MANAGEMENT ANALYSIS

### OPTION ①

**Treatment with an antibiotic is necessary.** Since this child appears to be suffering from a UTI it justifies treatment with an antibiotic; however, not before sending out a urine sample for urinalysis and urine culture. Gram-negative bacteria cause a UTI, thus the antibiotic of choice is ampicillin, amoxycillin or cotrimoxazole. Ampicillin may result in diarrhea and so should be avoided. Amoxycillin should be reserved for a respiratory tract infection; therefore, cotrimoxazole may be the ideal choice for this patient. Second or third generation cephalosporins such as cefuroxime or cefixime and quinolones such as nalidixic acid or ciprofloxacin may also work but are better reserved for drug resistant infections. Ideally, an oral antibiotic should be used in this child. An intravenous antibiotic for a UTI may be necessary in a young infant with sepsis. Antibiotics may be changed as per the culture and sensitivity report only in the absence of a response. If the sensitivity report suggests drug resistance but the child has clinically responded, the antibiotic should not be changed. It should be continued for 7-10 days in this patient.

This child may require long-term antibiotic prophylaxis that should be decided by the outcome of further tests, as discussed below. In a child who already has a scarred kidney due to previous UTI episodes, a single daily dose of antibiotic is required that may have to be continued in the child until 5 years of age. This would prevent recurrent UTI and further damage to the kidney. Nevertheless, whatever damage has already occurred, is irreversible.

### OPTION ②

**Treatment with an antipyretic is necessary.** A child with a fever deserves an antipyretic to alleviate discomfort caused by the fever. An antipyretic is not intended to reduce the fever to normal but only to relieve discomfort caused by fever. Paracetamol is the ideal antipyretic and ibuprofen and mefenamic acid are acceptable alternatives.

### OPTION ③

**Urinalysis, urine culture and sensitivity are most necessary.** It is essential to order a urinalysis and urine culture and sensitivity before the first dose of antibiotic is administered. Urinalysis alone may not confirm the diagnosis of UTI unless it shows a large number of pus cells and even then, bacteriological diagnosis is not achieved. Especially in this patient, who probably has had recurrent episodes of UTI, urine culture and sensitivity is mandatory. The collection of the urine sample for culture has to be meticulous to avoid contamination. A mid-stream urine sample is preferred and should be sent to the laboratory immediately. In

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an older child who can follow instructions, it is best if the urine sample is collected in the laboratory and immediately processed. In a clean-catch sample, more than 100,000 colonies per ml are diagnostic of UTI. Antibiotic sensitivity is equally important in this patient, as recurrent use of antibiotics in the past may have resulted in drug resistance.

## OPTION 4

**CBC and PS are acceptable but not mandatory.** Since this child presented with fever for 2 days without localization, ordering a CBC and PS may rule out malaria. However, it may not differentiate a bacterial from viral infection except in the case of marked neutrophilic leucocytosis, which may favor acute bacterial infection.

## OPTION 5

**Chest x-ray is optional in the early phase.** During the first few days of a non-localized fever, a chest x-ray may be considered as respiratory symptoms or chest findings in bacterial pneumonia may not appear during this time period. However, if urinalysis strongly suggests a UTI, a chest x-ray would not be necessary.

## OPTION 6

**Other tests are necessary.** UTI is a serious disease in children since it is often due to an underlying anatomical (posterior urethral valve or pyeloureteric junction (PUJ) obstruction) or functional defect (vesicoureteric reflux; VUR). Such a defect results in recurrent UTI that damages the kidney and ultimately results in chronic renal failure. Progression of renal dysfunction occurs subtly and is often missed. Thus, it is important not to miss UTI and once it is diagnosed, not to miss an underlying defect.

An abdominal ultrasound is necessary for every child diagnosed with a UTI since it can detect a PUJ obstruction or any other anatomical defect. Since this patient is only 2-years-old, even if the ultrasound is normal, one must confirm whether recent or past UTI episodes have already damaged the kidney. This can be achieved by a DMSA radionuclide scan that may pick up renal scarring indicative of kidney damage. As an active infection may simulate a renal scar, a DMSA scan is best carried out 2-3 months after the infection is cured. If the DMSA scan reveals a renal scar, it is mandatory to look for VUR by a micturating cysto-urethrogram.

In summary, this patient suffers from an acute bacterial UTI. The child has had recurrent UTI episodes that have gone undiagnosed but treated with antibiotics without proper monitoring. It is likely that this child has irreversible renal damage that could have been prevented by a rational approach and proper diagnosis. ■