

Abstract:

A 6-year-old girl with a 5-day history of fever, progressive rash, and arthritis is described. Fever accompanied by a rash is common presenting complaint for children in the emergency department. The differential diagnosis is fairly broad and can be grouped into 5 categories: immune mediated, rheumatologic, oncologic, infectious, and postinfectious. The evaluation of these patients is largely directed by clues provided on history and physical examination, including complete travel history and animal exposures. Further testing commonly includes complete blood count, acute phase reactants, and potentially joint aspiration.

Keywords:

fever; rash; rat-bite fever;
Streptobacillus moniliformis

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Not Just Another Rash

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A 6-year-old girl presents to the emergency department (ED) with the complaint of progressive rash for the past 5 days. The patient's mother states that the child had been previously healthy before developing a rash, which she described as "splotchy and red" and initially present over the face, dorsum of the hands, and lower extremities. It had been accompanied by daily fevers to 103°F and prompted presentation to an ED at another hospital on the second day of illness. This visit did not result in a definitive diagnosis, and the child was discharged with antipyretics and instructions for supportive care.

Beginning on the third day of illness, the child began to experience joint pain and swelling, primarily in her ankles, knees, wrists, and elbows. The patient's pain was unresponsive to acetaminophen and ibuprofen, and thus, the family sought re-evaluation at their pediatrician's office that afternoon. Her physician began a course of oral steroids and recommended the continued use of supportive care for her fever and joint pains. However, over the subsequent 48 hours, the rash progressed to involve the torso, and her joint pains were so extreme that she had missed school due to her inability to ambulate.

Now, 5 days into the illness, the patient presents to the ED with continued fever, rash, and joint pains. The parent denies any history of cough, congestion, sore throat, or ear pain, and there has been no vomiting or diarrhea. A full review of systems is negative. Medical history is significant for frequent episodes of streptococcal pharyngitis with the most recent event occurring approximately 2 months ago. At that time, the child was treated with azithromycin. She is currently taking prednisone daily as well as acetaminophen and ibuprofen around the clock for her joint pains and fevers. The child has no drug allergies and is fully immunized. The family medical history is significant for a paternal grandmother with systemic lupus erythematosus (SLE)

and rheumatoid arthritis in both her mother and maternal grandmother. She lives at home with her mother, and there has not been any recent travel or sick contacts.

The physical examination reveals a well-nourished, alert child who generally appears uncomfortable but is nontoxic and in no acute distress. The vital signs include a temperature of 98.2°F, heart rate of 91 beats per minute, respiratory rate of 20 per minute, blood pressure of 109/71 mm Hg, and her oxygen saturation is 100% on room air. Her head, neck, cardiovascular, pulmonary, and abdominal examinations are benign without focal abnormality. The extremities are noted to be extremely tender to palpation over all joints, especially over both wrists and ankles, with a small effusion present in the right knee. However, despite this tenderness, she does exhibit full range of motion of all joints. She does have an erythematous, macular rash over the malar region and chin. Also detected are scattered, scabbed, and healing lesions over her fingers and the dorsal aspect of her hands, toes, legs, and face. A complete neurologic examination shows an antalgic gait but is otherwise normal.

Laboratory studies in the ED reveal a white blood cell count of 14800/ μ L with 70% neutrophils, 12% lymphocytes, 10% monocytes, 4% atypical lymphocytes, 2% eosinophils, and 2% metamyelocytes. The patient's hemoglobin level is 14.8 g/dL, hematocrit is 39%, and platelet count is 371000/ μ L. A comprehensive metabolic panel, including magnesium and phosphorus levels, returns without any abnormality. A urinalysis shows a specific gravity of 1.027 and pH of 6.5 and is otherwise negative. Quantitative complement levels of C3 and C4 are normal at 160 mg/dL (normal, 88-201) and 25 mg/dL (15-45), respectively. Other laboratory findings include rheumatoid factor of 7 IU/mL (0-15), C-reactive protein of 39.2 mg/L (0-10), erythrocyte sedimentation rate of 36 mm/h (0-20), and an elevated antistreptolysin O at 414 IU/mL with a reference range of more than 250 being positive. An electrocardiogram is obtained and demonstrates sinus rhythm and is otherwise normal for age. A chest radiograph demonstrates no acute cardiopulmonary process. In addition, a blood culture is sent from the ED.

While in the ED, the child is given a dose of ketorolac with improvement in her joint pain. An echocardiogram is ordered, and she is subsequently admitted to the general pediatric inpatient service for further observation and diagnostic evaluation. Both orthopedic surgery and infectious disease consultations are made. The definitive diagnostic study is ordered the following day after a key historical point is obtained.

DIFFERENTIAL DIAGNOSIS

Individually, fever and rash represent 2 of the most common presenting complaints to a pediatric ED. Combining these conditions as well as including evidence of arthritis helps focus the differential diagnosis.

The causes of fever, rash, and arthritis can be grouped into 5 categories: immune mediated, infectious, rheumatologic, oncologic, and postinfectious. A complete differential diagnosis is provided in Table 1. Many of these entities can be eliminated as potential etiologies of this patient's symptoms due

TABLE 1. Differential diagnosis of fever, rash, and arthritis.

Immune mediated
Serum sickness
Serum sickness-like reaction
Cryopyrin-related disorder
Sarcoidosis
Mixed cryoglobulinemia
Sweet's syndrome
Rheumatologic
Systemic onset juvenile idiopathic arthritis
Systemic lupus erythematosus
Dermatomyositis
Oncologic
Leukemia
Lymphoma
Infectious
Viral
Hepatitis B
Hepatitis C
Parvovirus B19
Adenovirus
Enterovirus
Herpes simplex virus
Varicella
Epstein-Barr virus
Bacterial
Disseminated gonorrhea
Syphilis
Mycoplasma
Lyme disease (<i>B burgdorferi</i>)
Rat-bite fever (<i>S moniliformis</i>)
Cat-scratch fever (<i>B henselae</i>)
Fungal
Mycobacterial
Postinfectious
Henoch-Schonlein purpura
Acute rheumatic fever
Kawasaki disease
Reactive arthritis

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