

A Toddler With Prolonged Fever and Intermittent Cough

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Abstract

Fever of unknown origin is an important diagnostic challenge in pediatrics that requires a thoughtful approach. The differential diagnosis is broad and includes infectious, autoimmune, oncologic, neurologic, genetic, and iatrogenic causes. Infection remains the most common etiology, and uncommon presentations of infections are still more likely than classic presentations of rare conditions. We report a case of a retropharyngeal abscess in a toddler whose presentation is marked by a prolonged fever (>3 weeks). This case highlights the importance of close follow-up with serially repeated history and physical examinations to guide the evaluation of a patient with fever of unknown origin.

Keywords

fever, fever of unknown origin, retropharyngeal abscess

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Case Report

A previously healthy, immunized, 15-month-old girl was admitted with 2 weeks of daily intermittent fevers and 3 days of decreased intake, irritability, and an intermittent cough. Systems review was otherwise unremarkable, including no history of torticollis, neck swelling, neck pain, or drooling. She was not on any home medications except acetaminophen as needed. There was a sick contact at daycare with *Streptococcal* tonsillopharyngitis, and her mother had a mild cough and congestion. There was no travel history.

Examination demonstrated fever (up to 40.5°C) with otherwise normal vital signs and no distress. She had small, nontender bilateral cervical lymphadenopathy, a clear oropharynx, no conjunctivitis, and no oral or extremity changes. Cardiovascular, respiratory, abdominal, and joint examinations were normal. A faint erythematous maculopapular rash was noted on her legs.

A multidisciplinary approach to fever of unknown origin (FUO) in a toddler was taken, which included Infectious Disease, Oncology, and Rheumatology specialist consultation. An extensive infectious workup was negative. This included blood, urine, and throat cultures, as well as testing for tuberculosis, Epstein-Barr virus, human immunodeficiency virus, parvovirus, adenovirus, cytomegalovirus, and hepatitis A, B, and C. Chest radiograph, abdominal ultrasound, and blood smear demonstrated no evidence of any

malignant processes. Further investigations revealed elevated inflammatory markers, including a white blood cell count ($16 \times 10^9/L$; reference range = $6.5\text{--}13 \times 10^9/L$), C-reactive protein (290 mg/L; 0.1–1 mg/L), erythrocyte sedimentation rate (76 mm/h; 2–34 mm/h), and ferritin (523 µg/L; 5–100 µg/L), with an associated normocytic anemia (hemoglobin 87 g/L; 102–127 g/L). Liver enzymes, platelets, albumin, and an echocardiogram were unremarkable.

With no identifiable infectious or oncologic etiology, the patient was managed with supportive care. Despite no direct evidence apart from prolonged fever and elevated inflammatory markers (including anemia, an indirect sign of inflammation), she was treated with intravenous immunoglobulin on day 18 of fever for concern of atypical Kawasaki disease. Although this resulted in some clinical improvement, her fevers

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Figure 1. Lateral neck radiograph demonstrating prevertebral soft tissue swelling and narrowing of the upper airway.

persisted. Subsequently, indomethacin was trialed for suspicion of an undeclared systemic juvenile idiopathic arthritis. Given that her oral intake and fevers were improving, and no new symptoms had developed, she was discharged home on day 20 of fever with close follow-up arranged.

The patient re-presented to the emergency department 4 days later with persistent fevers, intermittent stridor, drooling, and coughing when drinking. Further imaging revealed the diagnosis.

Final Diagnosis

A lateral neck radiograph demonstrated prevertebral soft tissue swelling with narrowing of the upper airway (Figure 1), and computed tomography with contrast showed a retropharyngeal abscess (RPA) extending into the posterior mediastinum (Figure 2). The RPA's cranio-caudal length was 10 cm, with associated extensive deep neck lymphadenopathy.

Hospital Course

Intravenous ceftriaxone and clindamycin were initiated, and the patient was taken to the operating room where the abscess was drained. Subsequently, she was supported in the pediatric intensive care unit with an



Figure 2. Computed tomography of neck and chest with contrast demonstrating a retropharyngeal abscess extending into the posterior mediastinum.

indwelling drain in situ and airway support. She defervesced the following day and was extubated 2 days postoperatively with full resolution of her preoperative symptoms. Cultures from the abscess grew *Streptococcus pyogenes*, while blood cultures remained negative. Based on sensitivities, her antibiotics were narrowed to ampicillin. She was discharged home 7 days postoperatively with a peripherally inserted central catheter to complete a 2-week course of intravenous ampicillin, followed by a 2-week course of oral amoxicillin, without complication. In follow-up, she remains healthy and well.

Discussion

Fever of unknown origin poses an important diagnostic and therapeutic challenge in pediatrics. It is defined by the American Academy of Pediatrics as daily core temperatures greater than 38.0°C, which remain undiagnosed following at least 8 days of investigations.¹ This is in contrast to a former definition of FUO, which referred to a period up to 3 weeks of undiagnosed fever.² This shift in definition is attributable to improved diagnostic studies, allowing physicians to identify many causes of fever, in particular infectious ones, early. In the absence of a clear infectious entity over the first week, consideration of other possibilities, such as autoimmunity and malignancy, is often the next step. However, it is prudent to keep in mind that an infection remains the most prevalent cause of FUO, even in unusual or atypical cases lasting 3 weeks or longer.³

Evaluation of a child with FUO requires a thoughtful, focused approach based on a detailed history and physical examination. Frequent repetition of clinical assessment is essential, as up to 25% of pertinent findings may not be present at the time of initial evaluation.¹ Consideration of deep-seated pyogenic infections is important in cases of sustained fevers without a clear infectious source, as these may go undetected initially in the absence of specific signs or symptoms.¹ In such cases where an occult abscess is suspected, appropriate imaging studies should be considered.

Retropharyngeal abscesses typically occur in young children, with most presenting prior to the age of 5 years. While many cases of RPAs are polymicrobial (aerobic and anaerobic) in nature, infections with single organisms such as *Streptococcus pyogenes* and *Staphylococcus aureus* have become increasingly prevalent.⁴⁻⁶ Retropharyngeal abscesses present a diagnostic challenge to physicians given their relative infrequency and variable constellations of presenting signs and symptoms.⁷ The most common signs and symptoms include restricted neck movement and/or torticollis, neck swelling, fever, lymphadenopathy, dysphagia, and sore throat, with a mean duration of less than 4 days.⁷⁻¹² However, a case of an RPA presenting as fever for 2 weeks in an otherwise well-appearing child has been reported.¹³ Stridor and respiratory distress are relatively infrequent signs, and may present later as a collection of pus accumulates.⁷ Thus, frequent reassessment is pivotal to enable the timely diagnosis and treatment of an RPA.

Conclusion

Our patient represents a good example of the challenge that FUO poses a pediatric clinician. Her presentation was initially marked by a prolonged fever, with more specific signs and symptoms of an RPA manifesting only much later. This highlights that close follow-up with serially repeated history and physical examinations is essential in guiding the evaluation of a patient with FUO, as pertinent findings may not be present at the time of initial evaluation. It is important to bear in mind that infection remains the most common etiology of FUO in the pediatric population, and uncommon manifestations of infections are still more likely than are classic presentations of more rare conditions. As such, deep-seated pyogenic infections should be considered as a potential cause of FUO, even in the initial absence of typical signs or symptoms.

Author Contributions

CG: Contributed to conception and design; drafted manuscript; critically revised manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy.

OS: Contributed to conception and design; drafted manuscript; critically revised manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy.

CEB: Contributed to conception and design; drafted manuscript; critically revised manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy.

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Ethical Approval

This report anonymously describes routine clinical care, which does not constitute research, and therefore does not require formal ethical approval.

Informed Consent

The authors confirm that informed consent was obtained from the patient's family to use potentially identifiable information.

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