

Migratory Arthritis & Fever

Elizabeth Dockery, DO¹ & Rabab Elmezayen, MD, PhD²

¹ Family Medicine Resident, PGY-3 - Johnston Memorial Hospital, Abingdon, Virginia

² Clinical Faculty, Infectious Disease - Johnston Memorial Hospital, Abingdon, Virginia

A 55-year-old Caucasian female presented to the emergency department with fever and flu-like symptoms for the past three days. Review of symptoms was positive for shortness of breath, non-productive cough, sneezing, sore throat, body aches, nausea, vomiting, and a temperature of 103° F at home. She called her primary care office a few days prior to her ER visit and was empirically prescribed oseltamivir for influenza. After treatment with oseltamivir, symptoms did not resolve, and she developed new onset symptoms of red, swollen, painful joints and a new subcutaneous nodule on the lateral left foot. Her pain originated in her left MCP joint and then spread to her right elbow and right knee.

On physical examination, vital signs were T 102.8° F, HR 117, RR 20, BP 119/59, and SpO2 93% RA. The patient was in mild distress and frail appearing. On HEENT exam, the patient was normocephalic with a slightly erythematous oropharynx. She had a midline uvula and no other lesions. Eyes showed reddened sclera without any exudate or drainage. Lung sounds were diminished bilaterally, but otherwise clear to auscultation. Her heart rate was regular rate and rhythm, without any murmurs, rubs or gallops. Extremities revealed decreased range of motion, redness, edema, and tenderness to palpation of the right elbow (*Figure 1*) and right knee (*Figure 2*). She also had an erythematous and tender 3 cm circular nodule on the left metatarsal/tarsal joint (*Figure 3*).

Urinalysis was suspicious for UTI. Remaining lab work was unremarkable. The patient was admitted to the hospital and started on empiric ceftriaxone IV daily for UTI.

QUESTIONS

- What was the most likely diagnosis?
 - Acute rheumatic fever
 - Reactive arthritis
 - Lyme disease
 - Rheumatoid arthritis
 - Septic arthritis
- Based on the diagnosis criteria, how is infection with Group A Streptococcus confirmed in a patient with the suspected disease?
 - Positive blood cultures
 - Elevated ESR
 - Rising anti-streptolysin O titers
 - Elevated CRP
 - All of the above
- Which of the following is considered a major criterion for the presumed diagnosis?
 - Fever > 38.5 C
 - Arthritis
 - ESR > 60mm in the first hour
 - Prolonged PR interval
 - Carditis

FIGURE 1:

Right elbow



FIGURE 2:

Right knee



FIGURE 3:

Left lateral foot



CORRESPONDENCE:

Elizabeth Dockery, DO
elizabeth.dockery@balladhealth.org

ANSWERS

1. What is the most likely diagnosis?

Correct answer: a) Acute rheumatic fever

Acute rheumatic fever is characterized by a systemic inflammatory response secondary to group A streptococcus.¹ Presenting symptoms may include high fever, polyarthritits, rash, chorea, and subcutaneous nodules.

2. Based on the diagnosis criteria, how is infection with Group A Streptococcus confirmed in a patient with the suspected disease?

Correct answer: c) Rising anti-streptolysin O titers

The American Heart Association states that evidence of a preceding streptococcal infection for acute rheumatic fever can be diagnosed by either of the following: 1) an increased or rising anti-streptolysin O titer or other streptococcal antibodies, 2) a positive throat culture for group A beta-hemolytic streptococci, or 3) a positive rapid group A streptococcal carbohydrate antigen test.² A four-fold rise in anti-streptolysin O titers confirms the diagnosis of ARF after a recent streptococcal infection.¹

3. Which of the following is considered a major criterion for the presumed diagnosis?

Correct answer: e) Carditis

Diagnosis of acute rheumatic fever is based on the Jones criteria, which was recently updated in 2015. Diagnosis is established by evidence of a preceding streptococcal infection in addition to 2 major criteria or 1 major criteria with 2 minor criteria. Major criteria include carditis, polyarthritits, chorea, erythema marginatum, and subcutaneous nodules. Minor criteria include polyarthralgia, fever (> 38.5 C), ESR > 60mm in the first hour, CRP >3.0 mg/dL, and prolonged PR interval on ECG. With established rheumatic heart disease or a reliable past history for acute rheumatic fever, three minor criteria may be sufficient to diagnose recurrent rheumatic fever.^{1,2}

DISCUSSION

Acute rheumatic fever (ARF) is characterized by a systemic inflammatory response secondary to group A streptococcus.¹ This typically develops two to three weeks after a throat infection. The most common manifestations are carditis (50% - 70%) and arthritis (35% - 66%). Other common clinical manifestations are chorea (10% - 30%), subcutaneous nodules (< 10%), and erythema marginatum (< 6%).^{1,2}

ARF is typically a syndrome of childhood, with most cases occurring in pediatrics aged 5 to 15 years.¹ However, attacks may occur at any age.³ The etiology is not fully understood, but it is believed to involve cross reactivity of streptococcal antibodies with cardiac, synovial, and brain tissue.¹ Thus resulting in the clinical features of carditis, arthritis and chorea respectively.

Classically, carditis has been a clinical judgment based on auscultation of murmurs consistent with mitral or aortic valve

regurgitation. However, Doppler echocardiogram has been found to be a reliable source of diagnosing carditis in the absence of auscultatory findings and is recommended in all cases or confirmed or suspected acute rheumatic fever.² Pericarditis and myocarditis may also occur in acute rheumatic fever, and if severe enough, can result in congestive heart failure. The sequela of carditis can take weeks to months, so patients with an initial normal echocardiogram should have a repeat echo in 2 - 4 weeks.²

Polyarthritits associated with rheumatic fever is usually asymmetric, migratory, and involving the large joints such as the elbows, wrists, knees, and ankles.² The arthritis is typically self-limited, resolving in several weeks, but NSAIDs and salicylates have proven to be effective for rapid recovery.¹ Small joint involvement is less common.²

Chorea is characterized by involuntary, rhythmic movements of the trunk and extremities that is often associated with muscle weakness and emotional lability.² It is important to determine that the cause of chorea is not an underlying neurological disorder such as Huntington disease, Wilson disease or systemic lupus erythematosus.² Chorea may also only be unilateral, so tics, hyperkinesia and conversion disorder should also be ruled out.² Since chorea is a latent manifestation of ARF, it may not be possible to prove infection with GAS.²

Skin manifestations include erythema marginatum and subcutaneous nodules. Erythema marginatum is rare and occurs in less than 6% of cases.¹ It is described as a pink rash with central clearing that blanches with pressure and may worsen with heat.² Raised borders with outward-spreading macules and papules are also characteristic.¹ It is usually located on the trunk and proximal extremities, sparing the face.² Subcutaneous nodules are also rare findings and usually appear during the first few weeks of the inflammatory phase.¹ They are firm protuberances typically found on the extensor surfaces of joints close to bony protuberances.² They are approximately 1 cm in size and can be singular or clustered.²

Fever accompanying acute rheumatic fever commonly exceeds 38.5 C orally and can be treated with antipyretics.² Elevated C-reactive protein and/or erythrocyte sedimentation rates are lab values consistent with ARF. Normal CRP and ESR should cause a clinician to seriously rethink the diagnosis of ARF.² First degree heart block can be used as a minor criteria for diagnosis in the absence of carditis. PR interval of 0.16 seconds in children younger than age 12 and 0.18 seconds in children 12 years of age and older are considered prolonged.¹

Antibiotic treatment of acute rheumatic fever is usually penicillin. Symptoms such as fever and arthritis can be treated with salicylates or NSAIDs as mentioned above. Oral Penicillin VK 250 mg twice daily in children or 500 mg twice daily in adolescents for 10 days is recommended.¹ Another option is a one-time dose of intramuscular benzathine penicillin. Erythromycin is the recommended for patients with penicillin allergy.¹ Prophylaxis is recommended to help prevent recurrent episodes of acute rheumatic fever. The World Health Organization recommends intramuscular benzathine penicillin injections every three to four weeks for prophylaxis. The timeframe is debatable on the duration of prophylaxis treatment, but the consensus is a minimum of 10 years.¹

HOSPITAL COURSE:

The patient's signs and symptoms of migrating polyarthritis, fatigue, sore throat, fever, and subcutaneous nodules were consistent with ARF. Her blood cultures were positive for streptococcus pyogenes (group A B-hemolytic streptococcus). CRP, ESR and anti-streptolysin-O titers were all markedly elevated. A throat culture was obtained 3 days after starting antibiotics, but was negative for Group A Streptococci. Echocardiogram obtained showed mild mitral and tricuspid regurgitation, but no valvular vegetations were noted. The patient had an allergy to penicillin and was continued on IV ceftriaxone for bacteremia. She improved and was discharged home on hospital day 7 with 1 more week of IV ceftriaxone and oral azithromycin 250 mg daily for 8 weeks after completing her IV antibiotic course.

CONCLUSION:

Acute rheumatic fever is usually not initially considered in the differential diagnosis for adults with fever and arthralgia. Though uncommon, adult-onset ARF is not rare in developing countries as sporadic incidences of small endemic areas have been reported in the United States since 1980.⁴ From these incidences in the United States, carditis and arthritis were the main complaints, whereas throat pain was rare.⁴ Therefore, ARF should be considered in older patients with new onset arthritis and fevers.

AUTHOR DISCLOSURES:

No relevant financial affiliations

REFERENCES:

1. Gewitz MH, Baltimore RS, Tani LY, et al. Revision of the Jones Criteria for the diagnosis of acute rheumatic fever in the era of Doppler echocardiography: a scientific statement from the American Heart Association. *Circulation*. 2015;131(20):1806-1818. DOI: 10.1161/CIR.0000000000000205. Epub 2015 Apr 23.
2. Webb RH, Grant C and Harnden A. Acute rheumatic fever. *BMJ*. 2015;351:h3443. DOI: 10.1136/bmj.h3443. <http://www.bmj.com/content/351/bmj.h3443>. Accessed February 18, 2018.
3. Ben-Dov I, Berry E. Acute rheumatic fever in adults over the age of 45 years: an analysis of 23 patients together with a review of the literature. *Seminars in Arthritis & Rheumatism*. 1980;10(2):100-110. PMID: 7292018. [https://doi.org/10.1016/0049-0172\(80\)90003-7](https://doi.org/10.1016/0049-0172(80)90003-7). Accessed February 16, 2018.
4. Nakashima D, Ueda K, Tsukuda K, et al. Adult-onset Acute Rheumatic Fever. *Internal medicine*. 2012;51(19):2805-2808. Epub 2012 Oct 1. PMID: 23037480. https://www.jstage.jst.go.jp/article/internalmedicine/51/19/51_19.7661/_article. Accessed February 16, 2018.

CALENDAR OF EVENTS**2018****OCTOBER 5 - 9, 2018**

OMED®18

AOA/ACFP Osteopathic Medical Conference & Exposition
San Diego, California

www.acofp.org

2019**JANUARY 18 - 20, 2019**

Midwinter Osteopathic Family Practice Conference
Iowa Chapter the ACOFP
Des Moines, Iowa

www.ioma.org

JANUARY 24 - 27, 2019

Missouri Winter Family Medicine Update
Missouri Society of the ACOFP
Independence, Missouri

www.msacofp.org

JANUARY 24 - 27, 2019

MAOFP's Midwinter Family Medicine Update
Bellaire, Michigan

www.maofp.org

MARCH 21 - 24, 2019

ACOFP 56th Annual Convention
& Scientific Seminars

Chicago, Illinois

www.acofp.org

OCTOBER 25 - 28, 2019

OMED®19

AOA/ACFP Osteopathic Medical Conference & Exposition
Baltimore, MD

www.acofp.org

CME Resource: Osteopathic Family Physician Offers 2 Hours of 1-B CME

ACOFP members who read Osteopathic Family Physician can receive two hours of Category 1-B continuing medical education credit for completing quizzes in the journal. Visit the eLearning Center at www.acofp.org to access the quizzes.