International Journal of Advances in Medicine
Kinasih KVNR et al. Int J Adv Med. 2025 Jan;12(1):89-93
http://www.ijmedicine.com
pISSN 2349-3925 | eISSN 2349-3933
DOI: https://dx.doi.org/10.18203/2349-3933.ijam20243785

Case Report

Acute rheumatic fever in young adult patients: a case report

Komang V. N. R. Kinasih*, Anak A. I. S. K. Dewi

Department of Internal Medicine, Wangaya Regional Hospital, Denpasar, Bali, Indonesia

Received: 20 November 2024
Revised: 10 December 2024
Accepted: 11 December 2024

***Correspondence:**
Dr. Komang V. N. R. Kinasih,
E-mail: vikanariswari@gmail.com

ABSTRACT

Acute rheumatic fever (ARF) is an inflammatory response to group A *Streptococcus* (GAS) infection. The incidence ranges from 8 to 51 per 100.000 children and young adults worldwide. A 19-year-old male patient admitted with complaint of abdominal pain and joint pain of knee in both legs and elbow in both hands. Multiple erythematous macules, round in shape, elevated of white blood cells and anti-streptolysin O titer (ASOT) are present in this case. The diagnosis of ARF is made using the Jones criteria. Intramuscular benzathine penicillin G as a single dose is recommended for management of ARF and as secondary prophylaxis to prevent recurrences. Comprehensive treatment was needed for patient with rheumatic fever to prevent reoccurrence and also complication which may arise.

Keywords: Acute rheumatic fever, ARF, Young adults

INTRODUCTION

Acute rheumatic fever (ARF) is and inflammatory condition resulting from infection of group A *Streptococcus*, usually occurs two to three weeks following a throat infection, most commonly tonsillopharyngitis.[1,2] The occurrence of ARF varies significantly and is generally lower in more developed socioeconomic settings. Globally, in incidences ranges from 8 to 51 cases per 100.000 children and young adults. Prevalence of acute rheumatic in Indonesia is not yet known for sure, although some research shown the prevalence of rheumatic heart disease is around 0.3 to 0.8 per 1.000 school kids. Therefore, the prevalence of acute rheumatic fever can roughly be estimated to be higher, considering rheumatic heart disease is a result of acute rheumatic fever. Recent estimates suggest that the global prevalence of rheumatic heart disease (RHD) is approximately 33.4 million, with an annual death toll to around 639.000.[3-5]

Between 0.3-3% of individuals with group A *Streptococcus* pharyngitis develops ARF, with the risk influences by genetic factors and the virulence of the infecting strain. While the exact mechanisms behind ARF are not fully understood, the most widely accepted theory is molecular mimicry. Genetic factors play a role in the production of cross-reactive antibodies that lead to valve damage in ARF. The diagnosis of ARF is based on the 2015 modified Jones criteria. Clinical signs of group A *Streptococcus* (GAS) pharyngitis typically include a sudden sore throat, painful swallowing (odynophagia), fever, and headache.

An examination of anti-streptolysin O (ASO) titers or other streptococcal antibodies, such as anti-deoxyribonuclease B can confirmed history of recent GAS infection. ASO titers begin to rise approximately one week after infection and peak between 3 to 6 weeks, while anti-deoxyribonuclease B titers increase 1 to 2 weeks after infections, peaking at 6 to 8 weeks. The priority target in managing ARF is to prevent recurrences through long-term penicillin therapy by giving secondary prophylaxis, which in turn will reduce the risk of developing rheumatic heart disease (RHD).[4,6]

In this case report we present a 19 years old male patient with acute rheumatic fever.

CASE REPORT

A 19-year-old male patient came to hospital with chief complaint of abdominal pain and joint pain. The patient experienced abdominal pain for three days before being admitted to hospital, with the pain gradually intensifying each day. The patient felt abdominal pain with pain scale 6 out of 10, and was felt in some part of the stomach. The patient also experience pain in joint of knee in both legs and elbow in both hands in the past one week and getting worse since morning before admitted to hospital. This complaint mostly felt when the patient tried to sit or squat and then stand up. There is no swelling and redness in the joint, but patient feel pain when the knee and elbow are touched. Patient also notice a red dot in both his leg for one week, which disappeared in a few days and then a new dot appears. The patients also have symptoms of nausea and vomiting in the past 1 day before admission. Other complaint such as uncoordinated movement and another skin lesion is denied. Patient also said that one week prior he experienced sore throat and a slight cough, without fever, but didn't took any medicine to lessen these symptoms. Previously, around 1 month ago, patient have similar symptoms. Patient said he often experience cough and sore throat but never took medication to lessen the symptoms. Patient said that there were a few family members that has symptoms of fever and coughing in the last week. There was no history of surgeries, allergies, or familial disease.

A physical examination performed on the patient revealed a clear consciousness, with blood pressure 130/80 mmHg, a heart rate of 80 times per minute, respiratory rate 20 times per minute, oxygen saturation 99% on room air, and a body temperature of 36.8 ºC. On general examination, head, eyes, nose and ears is normal. No enlargement of lymph node was palpable on the neck, tonsil was T1/T1 and no erythema. Thorax and cardiovascular examination was within normal limit, there was no murmur or gallop. On extremities, patient felt pain in knee joint and elbow joint on palpation, there is no redness, swelling, or heat on examination. On skin examination, there are multiple erythematous macules, round in shape, with clear boundaries, varying in diameter on both lower extremities.

Figure 1 (A & B): Erythema marginatum on both extremities.[2]

Additional examination was performed on the patient, including laboratory test, electrocardiography (ECG), thorax X-ray, and echocardiography. From the complete blood count test, the result obtained are: leukocytes are 15.45×10^3/Ul, hemoglobin is 15.3 g/dl, hematocrit is 45.1%, and the platelet is 248×10^3/ul. These laboratory test found an increase in white blood cells with neutrophils dominant, and increase in neutrophil-to-lymphocyte ratio. From electrolyte examination, it was found the blood natrium are 141 mmol/l, kalium are 4.0 mmol/l, and chloride are 102 mmol/l. Erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) examination were not performed in this patient. From the ECG examination, it was found a normal sinus rhythm, early repolarization, with no prolong PR interval. Thorax X-ray found lung and heart within normal limit, with normal cardiothoracic ratio.

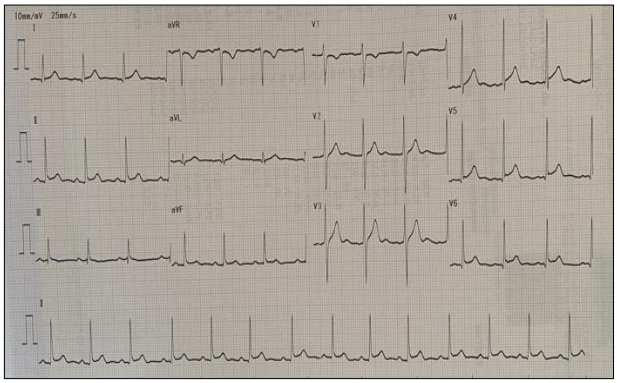

Figure 2: ECG examination result.

According to all the accumulated data, the patient was then diagnosed with ARF. The patient is then given treatment of infusion 0.9% NaCl 20 drops per minutes, paracetamol 1000 mg intravenously every 8 hours, to lessen the symptoms of joint and abdominal pain. The patient also received ondansetron 3×4 mg iv, esomeprazole 2×1 amp, and methylprednisolone 2×31.25 mg iv.

The patient was assessed for the anti-streptolysin O titer (ASOT), which returned a result of 800 IU/ml. and echocardiography found a result of ejection fraction of 61%, no regional wall motion abnormalities, and valve appear within normal. The patient was then given intramuscular injection of benzathine penicillin G 1.2 million IU single dose. The patient was then undergone daily follow up, and after 3 days of hospitalization, patient feels better with and has no more complaints or symptoms, and considered healthy enough to send home, with note that patient will have to receive monthly injection of benzathine penicillin G to prevent the reoccurrence of infection and to decrease the risk of complication such as RHD.

DISCUSSION

ARF is an acute condition that arises as an autoimmune reaction to *Streptococcus pyogenes*, or group A beta-

hemolytic *Streptococcus* (GAS) infection, therefore the disease usually begins after patient's experience pharyngitis. ARF can leads to multiple illness such as joint pain and swelling, chorea, skin and subcutaneous manifestations, fever, cardiac valve regurgitation, and even might be a potential for secondary heart failure. Persistent damage to the heart valves and active inflammation of the heart tissue caused by acute rheumatic fever may cause chronic damage known as RHD.

The incidence of ARF for the initial case is highest in children aged 5-14 years, but can also occur in older adolescent and adult. Cases in people aged >30 years old are rare. In contrast, RHD is a chronic condition resulting from repeated episodes of ARF, which leads to progressive damage to the heart valves. As a result, RHD typically become more prevalent in adulthood, particularly the ages of 25 and 45 years. ARF occurs with equal frequency in both males and females. The most important factors underlying the occurrence of ARF was said to be household overcrowding.[1,7]

After an infection of group A *Streptococcus* in the pharynx, neutrophils cells, dendritic cell, and macrophages phagocytes the bacteria and present the antigen to T cells. In response, B cells and T cells produce antibodies, such as IgM and IgG, and activate T cells, particularly CD4+ cells. In genetically predisposed individuals, this immune response can lead to autoimmune reactions against the body's own tissues, driven by both antibodies that *Streptococcus*-specific and T cells, this process known as molecular mimicry, and inflammatory process in body tissues activated by cross reacting antibodies. The cross-reactive immune response leads to the forming of immune complexes and causing transient migratory polyarthritis. It also causes Sydenham's chorea, which is a result of the antibodies binding to basal ganglia and neuronal cells. Additionally, the antibodies attach to keratin, resulting in erythema marginatum and subcutaneous nodules in the skin. Furthermore, this immune response contributes to inflammation of both myocardium and the heart valves.[8,9]

When evaluating suspected liver metastases, high-quality imaging is crucial. It can help pinpoint the primary condition and confirm the diagnosis. Triple-phase CT and MRI scans are the most widely used imaging modalities. The triple-phase CT scan consists of a non-contrast phase, arterial phase, and venous phase. Liver metastasis and primary liver tumors tend to have the strongest attenuation in the arterial phase and tend to be hypo attenuating in non-contrast studies. CT imaging evaluates metastatic tumor size, morphology, degree of liver disease, and the predicted future liver remnant. MRI is another modality that can be utilized if there is difficulty characterizing a liver lesion. Liver metastasis on T1 weighted imaging appears hypo-intense and hyperintense on T2 imaging 8. On this patient we did not perform abdominal CT-scan and also MRI. From abdominal USG examination we found that the patient had fatty liver disease (grade I-II) and splenomegaly.

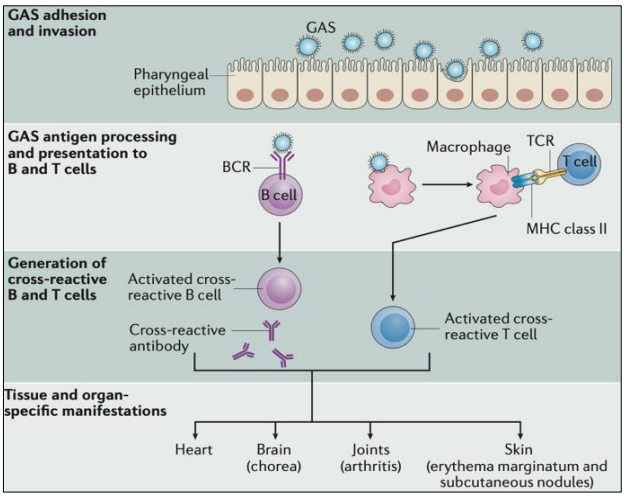

Figure 3: Pathophysiology of ARF after infection of group A *Streptococcus* (GAS).[7]

BCR: B cell receptor; TCR: T cell receptor

Table 1: Jones criteria used for the diagnosis of ARF.[7]

Criteria and population	Sign and symptoms
Major	
Low risk*	Carditis‡ (clinical and/or subclinical, chorea, arthritis (polyarthritis only), subcutaneous nodules, erythema marginatum
Moderate and high risk	Carditis (clinical and/or subclinical, chorea, arthritis (include polyarthralgia, polyarthritis, monoarthritis), subcutaneous nodules, erythema marginatum
Minor	
Low risk*	Fever (≥38.5ºC), polyarthralgia, CRP ≥3.0 mg/dl and/or ESR ≥60 mm/hour¶, prolonged PR interval
Moderate and high risk	Fever (≥38.5ºC), monoarthralgia, CRP ≥3.0 mg/dl and/or ESR ≥60 mm/hour, prolonged PR interval

CRP: C-reactive protein; ESR: erythrocyte sedimentation rate; *the incidence of ARF is ≤2 per 100,000 school-aged children, or the annual prevalence of RHD is ≤1 per 1,000 people; ‡defined as echocardiographic valvulitis; ¶CRP values should exceed the normal upper limit; the ESR may change over the course of ARF, therefore the highest ESR values should be used

In this case, we found the patient is a 19-year-old male, with chief complaint of pain on both elbow and knee also abdominal pain. The patient had symptoms of cough and sore throat around one month, but didn't took any medication. Other than that, around one week before hospitalization, patient also had cough and sore throat but didn't took medication. Patient said that there were a few

family members that also experience fever and cough in the last week that the patient was in close contact with.

There are 4 stadiums of acute rheumatic fever clinical journey. Stadium one occur when group A *Streptococcus* infected the upper respiratory system. Symptoms on this stage usually only limited to fever, cough, dysphagia, lasting for 2-4 days and can heal without treatment. Stadium two is a latent period, which is a period between GAS infection and the onset of acute rheumatic fever symptoms, this period lasted for 1-3 weeks. Stadium three is an acute phase of rheumatic fever, where various clinical manifestation may occur. Stadium four is inactive stadium, where in patients without valve involvement or without residual valve symptoms will not show any symptoms. In this period, patients may experience reactivation of the disease at any time.[3,10]

The diagnosis of ARF is made using clinical criteria, known as the Jones criteria. The Jones criteria provide a framework to allocate individual clinical features and make a syndromic diagnosis. It is divided into major and minor manifestation, and also between low and moderate-high risk population. ARF is diagnose when there are two major manifestations or one major manifestation with at least two minor manifestations.[7,8]

The most common manifestations of ARF are arthritis and fever. A migratory asymmetrical polyarthritis often affects the large joints, causing pain, swelling, restricted movement, and local warmth. Carditis occurs in more than 50% of patients, typically involving valvulitis of the mitral valve, and less frequently, the aortic valve. Subcutaneous nodules and erythema marginatum are less common signs of ARF. Erythema marginatum, a rare symptom seen in less than 5% of cases, presents as an annular rash on the torso, upper arms, and legs. It is not painful or itchy and may persist and fluctuate for several weeks. Abdominal pain can also be found, but rarely occurs in acute rheumatic fever. Anorexia, nausea and vomiting commonly occurs.[1,3,7,10]

In this patient, two major criteria and one minor criteria of the Jones criteria were found. One of the symptoms are joint pain for one week prior to hospitalization. The pain was felt on both knees and both elbow, and getting worse since 3 days before hospitalization. The pain mostly felt when the patient was standing up, but without migration, swelling, or redness. Patient also notice a few small-diameter red dot in both of his lower leg for one week, but then some disappeared in a few days after and then new dot appears. These dots were said without pain or itching. Other symptoms experienced by the patient were severe abdominal pain with pain scale 6 out of 10, nausea, and also vomiting since 1 day before admission. On examination, patient felt pain in knee and elbow on palpation, but no heat, redness, or swelling were found on examination. There are also multiple erythematous macules, with round-shape, without skin elevation and painless on both lower leg.

Acute phase reactant such as ESR and CRP may elevate, and is included in minor criteria in jones criteria. Prolong PR interval on ECG also included in minor criteria. Therefore, in additional examination, the diagnostic guidelines use elevation of erythrocyte sedimentation rate (ESR) above 30 mm and elevated C reactive protein. Elevated streptococcal blood antibody titer by positive pharyngeal culture, for example anti-streptolysin titer (ASOT), is sign of prior infection of group A *Streptococcus*.[1,3]

Pharyngeal culture is a gold standard to confirm a group A *Streptococcus* infection, but often negative by the time symptoms appear. Other laboratory testing to assess for a recent past GAS infection may be performed using serology. Anti-streptolysin O titer (ASOT) or anti-deoxyribonuclease B (ADB) are most commonly utilized, and usually rise 2 to 3 weeks after GAS infection. ASOT will reach its peak in titer 3-6 weeks' post infection and return to normal range within 6-12 months. The upper normal limit used for anti-streptolysin O titers are vary by age, for individuals aged 15-24 years, it is 238 IU.[2]

In this case report, a complete blood count (CBC) revealed an increase in white blood cells (15.45×103/Ul) with mainly neutrophils, and elevated neutrophil-to-lymphocyte ratio. These findings may indicate inflammation or an ongoing infection. Unfortunately, ESR and CRP examination were not performed in this patient. The patient was then examined of ASOT, and the result of are 800 IU/ml. This shown an increase in titer and indicate post infection of group A *Streptococcus*. ECG and echocardiography examination of the patient shown a normal sinus rhythm, with no prolong PR interval and ejection fraction of 61%.

A comprehensive treatment was needed for patient with rheumatic fever to prevent reoccurrence and complication of the disease. Intramuscular benzathine penicillin G, administered as a single dose, is recommended for management of ARF. This treatment is typically given until the patient begins long-term long term secondary antibiotic prophylaxis. The aim of secondary prophylaxis is to prevent recurrences of ARF. Benzathine penicillin is the preferred antibiotics recommended by the World Health Organization, administered every three to four weeks. The duration of secondary prophylaxis is determined based on expert recommendations.[1,8,9] The patient was given injection of benzathine penicillin 1.2 million IU single dose, and then was given explanation to receive monthly injection to prevent reoccurrence and complication of the disease.

Because of patient chief complaint of pain in joint and abdominal, this patient was given paracetamol 1000 mg intravenously every 8 hours. Anti-inflammatory treatment like corticosteroids, for example methylprednisolone, have long been used to prevent heart damage in acute rheumatic fever, although new evidence has shown little effect of corticosteroid in preventing cardiac disease. In patient with

complain of arthritis, paracetamol is the preferred treatment. Otherwise, NSAID such as ibuprofen could also be effective to treat arthralgia and arthritis symptoms in patient.[11,12]

CONCLUSION

Acute rheumatic fever is an acute illness that occur due to autoimmune response to infection caused by GAS, that can cause multiple symptoms such as joint pain and swelling, chorea, skin and subcutaneous manifestations, fever, and cardiac valve regurgitation. Because of these multiple symptoms, comprehensive treatment was needed for patient with rheumatic fever. Proper treatment was also needed in case of acute rheumatic fever to prevent reoccurrence and complication which may arise, like rheumatic heart disease.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. Webb RH, Grant C, Harnden A. Acute rheumatic fever. BMJ. 2015;351:h3443.
2. Chowdhury S, Koziatek C, Rajnik M. Acute Rheumatic Fever. Treasure Island (FL): StatPearls Publishing. 2023.
3. Fitriany J, Annisa I. Acute rheumatic fever. Averrous. 2019;5(2):11.
4. Auala T, Zavale BG, Mbakwem AÇ, Mocumbi AO. Acute Rheumatic Fever and Rheumatic Heart Disease: Highlighting the Role of Group A Streptococcus in the Global Burden of Cardiovascular Disease. Pathogens. 2022;11(5):496.
5. Arafuri N, Murni IK, Julia M, Nugroho S, Soehadi N. Survival of Rheumatic Heart Disease in Indonesian Children. Glob Heart. 2022;17(1):71.
6. Lahiri S, Sanyahumbi A. Acute Rheumatic Fever. Pediatr Rev. 2021;42(5):221-32.
7. Carapetis JR, Beaton A, Cunningham MW, Guilherme L, Karthikeyan G, Mayosi BM, et al. Acute rheumatic fever and rheumatic heart disease. Nat Rev Dis Primers. 2016;2(1):15084.
8. Karthikeyan G, Guilherme L. Acute rheumatic fever. The Lancet. 2018;392(10142):161-74.
9. Ralph AP, Noonan S, Wade V, Currie BJ. The 2020 Australian guideline for prevention, diagnosis and management of acute rheumatic fever and rheumatic heart disease. Med J Aust. 2021;214(5):220-7.
10. Kartikasari I, Akil S. Diagnosis and Management of Acute Rheumatic Fever. Qanun Medika. 2022;7(2).
11. Lilyasari O, Prakoso R, Kurniawati Y, Roebiono PS, Rahajoe AU, Sakidjan I, et al. Clinical Profile and Management of Rheumatic Heart Disease in Children and Young Adults at a Tertiary Cardiac Center in Indonesia. Front Surg. 2020;7:47.
12. Cilliers A, Adler AJ, Saloojee H. Anti-inflammatory treatment for carditis in acute rheumatic fever. Cochrane Database Syst Rev. 2015;5:CD003176.

Cite this article as: Kinasih KVNR, Dewi AAISK. Acute rheumatic fever in young adult patients: a case-report. Int J Adv Med 2025;12:89-93.