PHRC Bulletin

Acute Rheumatic Fever – Diagnosis and Management

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Acute Rheumatic Fever (ARF) is a multisystem inflammatory disease which follows pharyngeal infection with group A streptococci (GAS). Joint manifestations usually predominate but cardiological complications, both acute and chronic, are of greater significance. The disease occurs predominantly in childhood (5-15 years). The pathogenic mechanisms include toxic effect of streptococcal toxin on target organs and abnormal immune response of the host to streptococcal antigens. This leads to generalized vasculitis, an exudative and proliferative inflammatory reaction involving connective tissues primarily of heart, joints, brain and skin. Valvulitis leads to regurgitation and eventually stenosis due to fibrosis and calcification.

Rheumatic Fever is a major health problem in developing countries. Prevalence in Indian school children is reported to be 2-11 per thousand (ICMR 1977). Other Indian population surveys have shown the load of Rheumatic fever and heart disease to be 2-7 per thousand population in children and young adults (5-30 years). There appears to be a cyclical rise and fall of virtual clones of streptococci. This was evident in disease outbreak in mid 1980 in parts of United States.

Clinical features:

Current guidelines for diagnosis of initial attack of ARF are Jones criteria (1944) revised by American Heart Association (1992). The diagnosis of ARF must be based on clinical judgement and these criteria are mainly helpful in ruling out the diagnosis.

Modified Jones criteria

Major manifestations	**Minor manifestations**
J – Joints - arthritis	1. Arthralgia
🖤 - Heart- carditis	2. Fever
N- Nodules- subcutaneous	3. Raised ESR
E- Erythemo marginatum	4. Raised CRP
S- Sydneham's chorea	5. Prolonged PR interval
Diagnosis: 2 major or 1 major + 2 minor criteria	

All patients should have supporting evidence of GAS infection in the form of positive throat culture or rapid streptococcal antigen or elevated/rising streptococcal antibody titer.

These criteria may not be strictly adhered to in a situation of isolated chorea or carditis. A new episode of ARF in a known case of ARF or Rheumatic heart disease may be difficult to diagnose.

Arthritis

Polyarthritis is commonest presenting feature of ARF occurring in about 75% cases. Large joints of extremities are involved one after another (migratory polyarthritis) associated with acute febrile illness. Knees, ankles, elbows and wrist are commonly involved. Hips, small joints and spine involvement is less common. Involvement of atlanto-axial joint is called as Grisel's syndrome. Untreated joints remain inflamed for a week at the most. The swelling lasts for another week or so followed by complete disappearance. X ray may show mild effusion. Empiric treatment with anti-inflammatory drugs leads to quick remission of joint symptoms and can pose diagnostic difficulties. Synovial fluid examination reveals inflammation and is of no diagnostic utility. Arthritis usually lasts for1-2 weeks (maximum 4 weeks) and never causes permanent deformities.

Carditis

Rheumatic carditis is a pancarditis involving all three layers of the heart. Carditis can occur as a sole manifestation of ARF. Patients can present with chest pain due to pericarditis. Valvular involvement manifests as new or changing organic murmurs usually apical, pansystolic and mid-diastolic (Carey – Coombs due to rapid flow over mitral valve). Severe valvular damage leads to cardiomegaly and congestive cardiac failure. Echocardiography with doppler studies is the most sensitive test for identification of carditis which can at times be subclinical. Cardiomyopathy may be in the form of heart block varying from 1^0 to 3^0.

Rheumatic heart disease occurring 10-20 year after the original attack of ARF, is the most common form of acquired valvular disease. Mitral insufficiency and aortic involvement occur less often.

Nodules

Nodules in ARF are associated with severe carditis (and not arthritis). They are firm, painless and range from few to 20 mm in size and are seen on extensor surface of knees, elbows and spine. They usually resolve within a few days.

Erythema marginatum

This painless, non-pruritic, erythematous macular rash over trunk and proximal limbs is also associated with carditis. The lesion extends peripherally with sharp outer edge while the central area gradually clears up. The inner margin is diffuse. The lesions often persist or recur, even when other features of disease have disappeared.

Sydneham's chorea (St. Vitus dance)

Choriform involuntary movements are abrupt, uncoordinated, non-rhythmic and purposeless. Chorea occurs in less than 15% cases of ARF. The onset is usually more than 8-12 weeks after streptococcal sore throat. The movements disappear during sleep. They commonly involve face and limbs resulting in grimaces, slurred speech, inappropriate smiles and clumsy handwriting. Chorea can be unilateral. Emotional and behavioral changes generally precede onset of chorea.

Behavioral disorders such as tics and obsessive-compulsive disorder can persist in later life due to functional disruption of basal ganglia pathways.

Other features

Fever usually lasts for1-2 weeks. Arthralgias may be present instead of true synovitis. Abdominal pain due to mesenteric microvasculitis and pneumonia due to alveolitis are also known to occur. Epistaxis occurring in long standing cases can be due to large doses of Aspirin used in these patients.

Investigations

Laboratory investigations are not really helpful in establishing diagnosis of RF. Two types of tests are generally required.

1. **Inflammatory markers**- These include normocytic normochromic anemia, raised ESR and CRP. ESR and CRP can be used to monitor degree of Inflammation especially when treatment is tapered. These may be normal in case of pure chorea or persistent erythema marginatum
2. **Tests for streptococcal infection**- Throat swabs should be obtained for culture though only 11% are likely to be positive. Streptococcal antibodies can be tested by antistreptolysin O titer estimation. A positive ASO titer indicates non specific immune stimulation resulting in a polyclonal gammopathy demonstrating past streptococcal exposure. A four-fold rise (320 Todd units in children) is diagnostically significant. These titers start rising about 7 days after infection, peak at 3-5 weeks (i.e., onset of arthritis) and gradually return to baseline over next 6-12 months. These titers also rise in infections caused by other streptococci (e.g., sore throat, skin infections, scarlet fever) and also other species of bacteria producing ASO – like products. It can be normal in about 20% cases of ARF. A repeat examination should be ordered after 2 weeks for rising titer. The sensitivity can be further improved up by 95% by testing other streptococcal products viz. anti-DNase-B and anti-streptokinase. More specific

investigations like myosin and tropo-myosin antibodies and estimation of D8/17 positive B cells can also be used in doubtful cases.

Management

Aspirin (100 mg/kg/day) is used in all cases of arthritis. A serum level of 20 mg/dl should be aimed at. The treatment should be continued till all symptoms subside. Carditis requires bedrest accordingly to severity followed by gradual ambulation. Prednisolone (2 mg/kg/day) should be used in cases of carditis. Chorea can be managed with drugs such as diazepam and haloperidol. Penicillin should be given to all patients for a minimum period of 10 days. All contacts should also be similarly treated (primary prophylaxis). Erythromycin, amoxicillin, cephalexin or clindamycin can be used in patients sensitive to penicillin.

Secondary prophylaxis

Prevention of colonization of GAS in upper respiratory tract is important in patients with history of documented ARF. Benzathine Penicillin 12,00,000 units every 3 weeks should be administered to all patients for indefinite period to avoid recurrences of ARF. Patients without cardiac involvement can be given shorter prophylaxis.