

## ARF

### Acquired Heart Disease ACUTE RHEUMATIC FEVER

Acute rheumatic fever (ARF) is a systemic disease characterized by inflammatory lesions of connective tissue and endothelial tissue. It is a primary type of acquired heart disease.

#### Etiology/Incidence

1. The pathogenesis is thought to be an autoimmune response to group A beta-hemolytic Streptococcus.
2. Most first attacks of ARF are preceded by an untreated streptococcal infection of the throat or upper respiratory tract at an interval of 2 to 6 weeks.
3. ARF is not caused by direct infection by the organism.
4. ARF is commonly seen in children 5 to 15 years of age, during winter months, and in poorer living conditions.
5. Incidence is greater in underdeveloped countries, although it is on the rise in the United States.

#### Altered Physiology

1. There is a cross-reactivity between cardiac tissue antigens and streptococcal cell wall components.
2. The Streptococcus may no longer be present, but autoantibodies attack one's heart (myocardium, pericardium, or valves).
3. The unique pathologic lesion of rheumatic fever is the Aschoff body, a collection of reticuloendothelial cells surrounding a necrotic center on some structure of the heart.
4. The inflammatory process involves the heart, joints, skin, and central nervous system. The inflammation may involve the leaflets or chordae tendinae of the heart valves, most frequently the mitral or aortic valves, resulting in sclerosis and fusion of valve margins.
5. Valvular incompetence results.
6. There is a high recurrence rate.
7. Of those with AFR, 75% progress to rheumatic heart disease in adulthood.
8. ARF is a preventable condition with penicillin treatment of the primary infection. Erythromycin is treatment for those with penicillin sensitivities.

#### Complications

1. Significant CHF
2. Pericarditis, pericardial effusions
3. Aortic/mitral valve regurgitation
4. Permanent cardiac damage

#### Clinical Manifestations and Diagnostic Evaluation

No single clinical or laboratory finding is characteristic of ARF. The diagnosis is based on a combination of manifestations characteristic of this disease and in the absence of other diseases that may mimic it. For this reason, the Jones criteria, as established by a committee of the American Heart Association, are used. The presence of two major criteria, or one major and two minor criteria, plus evidence of a preceding streptococcal infection are required to establish a diagnosis.

#### A. Major Manifestations

1. Carditis—manifested by significant murmurs, signs of pericarditis, cardiac enlargement, or CHF.
2. Polyarthritides—almost always migratory and is manifested by swelling, heat, redness and tenderness or by pain and limitation of motion of two or more joints. (The synovial fluid is sterile.)
3. Chorea, a CNS disorder that lasts 1 to 3 months—purposeless, involuntary, rapid movements often are associated with muscle weakness, involuntary facial grimaces, speech disturbances, and emotional lability.
4. Erythema marginatum—an evanescent nonpruritic, pink rash. The erythematous areas have pale centers and round or wavy margins, vary greatly in size, and occur mainly on the trunk and extremities. Erythema is transient, migrates from place to place, and may be brought out by the application of heat.
5. Subcutaneous nodules—firm, painless nodules seen or felt over the extensor surface of certain joints, particularly elbows, knees, and wrists, in the occipital region, or over the spinous processes of the thoracic and lumbar vertebrae; the skin overlying them moves freely and is not inflamed.

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### B. Minor Manifestations

1. History of previous rheumatic fever or evidence of preexisting rheumatic heart disease
2. Arthralgia—pain in one or more joints without evidence of inflammation, tenderness to touch, or limitation of motion
3. Fever—temperature in excess of 38°C (100.4°F)
4. Elevated erythrocyte sedimentation rate (ESR)
5. Positive C-reactive protein
6. ECG changes—mainly PR interval prolongation
7. Elevated white blood cell count (leukocytosis)

### C. Supporting Evidence of Streptococcal Infection

1. Increased titer of streptococcal antibodies (antistreptolysin O or ASO titer)
2. Positive throat culture for group A beta-hemolytic streptococci
3. Recent scarlet fever

### Treatment

1. Treatment of streptococcal infection—generally intramuscular (IM) penicillin G (Bicillin L-A); erythromycin (Eryc) for patients with penicillin allergy
2. Prevention of permanent cardiac damage—corticosteroids for patients with carditis
3. Palliative management of other symptoms—salicylates prescribed for patients with arthritis (but not while on high-dose corticosteroids due to risk of gastrointestinal bleeding); antipyretics after diagnosis has been established
4. Prevention of recurrences of ARF

### Nursing Assessment

1. Listen to the child's chest with a stethoscope to become familiar with the murmur or to determine the presence of a murmur not previously heard; listen for a friction rub.
2. Ask whether the child is experiencing any pain or discomfort. (Also observe the child's facial expression as child moves because children may deny pain, thinking they will be able to go home or resume activity.)
3. Describe the pain as to location, when it occurs, and whether there is any heat, swelling, redness, or tenderness.
4. Examine the knees, elbows, wrists, occipital region, and spine for nodules; describe location.
5. Determine whether the child has any muscle weakness or rapid, purposeless movements.

### Nursing Diagnoses

- A. Risk for Infection related to ARF progression
- B. Decreased Cardiac Output related to heart damage
- C. Pain related to polyarthritis and bed rest
- D. Risk for Injury related to progression of ARF and chorea
- E. Activity Intolerance related to muscle weakness and inflamed joints

### Nursing Interventions

#### A. Controlling Infection

1. Administer medication as prescribed by the healthcare provider.

#### NURSING ALERT:

Before administering penicillin, elicit a history for possible drug allergy.

2. Administer salicylates with milk or antacids.
  - a. Observe for gastrointestinal upset, ringing in the ears, headaches, bleeding, and disturbances in the mental state.
  - b. Report side effects promptly.
  - c. Monitor salicylate blood levels as ordered.
  - d. Withhold antipyretics during the diagnostic period as requested.
3. Prepare the child and family for the expected side effects of steroid therapy, such as rounding facial contour, acne, excessive hair, weight gain.
  - a. Watch for mental and emotional disturbances, which may necessitate discontinuing the medication.
  - b. Hypertension and the tendency to retain water and sodium may result from steroid therapy. Restrict sodium and fluids, and obtain daily weights as indicated.
  - c. Be aware that steroids diminish the child's resistance to infection and may mask symptoms of infection.

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NURSING ALERT:

Do not place a child with an infectious disease in a room with a child with rheumatic fever. Restrict visitors and personnel with infectious diseases from contact with the child on steroid therapy.

d. Make the family aware that a combination of steroid therapy and stress may lead to the development of gastric ulcers.

4. Administer antipyretics; alternating schedule of different antipyretics may be required to provide relief of child's fever.

5. Administer medications punctually and at regular intervals to achieve constant therapeutic blood levels.

6. Report signs of increased rheumatic activity as salicylates or steroids are being tapered.

a. Observe for the development or disappearance of any major or minor manifestations of the disease.

b. Monitor carditis by careful documentation of the child's pulse (sleeping pulse counted for 1 full minute), respirations, and blood pressure.

B. Maintaining Cardiac Output

1. Explain to the child the need for rest (usually prescribed for 4-12 weeks, depending on the severity of the disease and healthcare provider's preference).

2. Assure the child that bed rest will be imposed no longer than necessary. This is usually until the ESR returns to normal.

3. Organize nursing care to provide periods of uninterrupted rest.

4. Assure the child that needs will be met by reviewing call light and answering calls promptly.

5. Assist the child to resume activity very gradually once asymptomatic at rest and indicators of acute inflammation have become normal.

6. Continue to monitor the pulse rate carefully after periods of activity to assess the degree of cardiac compensation.

7. Provide nursing care for the child with CHF if symptomatic.

C. Maintaining Comfort

1. Use bed cradle.

2. Reassure that arthritis is not destructive.

3. Change positions in bed often to decrease stiffness and decrease skin breakdown.

4. Support inflamed joints; handle gently.

5. Provide meticulous skin care.

6. Position the legs in good body alignment; use a foot board.

7. Elevate the back of the bed, and support the arms with pillows when child is dyspneic.

D. Providing Safe, Supportive Care for the child with Chorea

1. Place the child in a bed with padded side rails, especially if uncontrolled body movements are severe.

2. Feed the child slowly and carefully because of uncoordinated movements of the head, mouth, and swallowing muscles. Avoid the use of sharp eating utensils, and do not use straws.

3. Provide frequent feedings that are high in calories, protein, vitamins, and iron, because constant movements cause the child to burn calories at a rapid rate.

4. Spend time talking with the child even though speech may be defective. If severe, use other methods of communication.

5. Administer sedative, if prescribed.

6. Reassure the child about the cause of instability and that symptoms will subside.

7. Encourage positive parent-child relationships that may have been strained if the onset of symptoms was insidious (eg, lack of concentration at school, mood swings, deteriorating handwriting, irritability).

8. Help the child regain former skills once symptoms begin to subside.

a. Support the child during periods of ambulation.

b. Provide activities that require the use of large muscles, and progress to materials that require fine coordination.

9. Keep the environment calm, and provide increased periods of rest because movements increase with fatigue and increased excitement.

E. Maintaining Bed Rest

1. Complete or partial bed rest is encouraged.

2. Help the child understand the restrictions and that progress may be slow.

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3. Initiate appropriate measures to help the child maintain level of development during the lengthy hospitalization.
  - a. Refer to care of the hospitalized child, Chapter 41.
  - b. Arrange for continuation of school and tutors.
  - c. Facilitate interaction with family, including siblings.
  - d. Provide diversional activities that will help the child feel a sense of achievement or satisfaction.
  - e. Offer quiet play, such as board games, television, radio, reading, and drawing.
  - f. Involve child life groups and physical and occupational therapy.
  - g. Facilitate contact with peers through writing, tape recording, telephone, or selected visitation.

#### F. Reducing Anxiety for Child and Parent

1. Explain ARF and its progression and management, such as the need for intravenous (IV) line and follow-up laboratory work.
2. Use honest, simple, age-appropriate explanations.
  - a. Give the child information about rheumatic fever in understandable terms; for example, "Rheumatic fever is a hard thing to understand because you can't see it. When you scratch yourself, you can see the mark, and you can see the scratch heal. Rheumatic fever is something like that—only you can't see the healing because it happens to the tissue underneath the skin (and sometimes it happens to the valves in the heart)."
  - b. Assure the child that healthcare providers know how to treat rheumatic fever.
  - c. Communicate information about the child's reactions to all staff members to provide consistent information.
  - d. Children may be concerned that they have had a heart attack; reassure that their heart is functioning by letting them listen to it.
3. Allow the child and parent time to ask questions and express their concerns.
4. Allow the child to participate in decision making when possible.

#### Family Education/Health Maintenance

1. Initiate specific preventive teaching to prevent a recurrence or an additional case of rheumatic fever within the family.
  - a. Have all family members screened for Streptococcus by referring them for throat cultures.
  - b. All people with positive cultures should be treated.
  - c. Teach the specific symptoms of streptococcal infections and the need for antibiotics.
2. Prevent a recurrent attack of rheumatic fever by reinforcing the need for prophylactic antimicrobial therapy.
  - a. Penicillin is the drug of choice—either IM benzathine penicillin G every 28 days, oral penicillin V (Pen-Vee K) or G (Pentids) twice daily, or one daily dose of sulfadiazine (Microsulfon).
  - b. Continuous prophylaxis is recommended throughout the childhood years and well into adult life, often indefinitely.
  - c. Use creativity in recommending methods to remind families about administering the medication.
    - (1) The child should be taught to assume responsibility for own medication at an early age so that it becomes habitual.
    - (2) Some children profit from the use of a calendar or special chart. Others find it useful to associate their medication schedule with other routine tasks, such as brushing their teeth.
  - d. Encourage administration of prophylactic medication on schedule.
  - e. Advise on additional prophylaxis for prevention of infective endocarditis. The American Heart Association's recommendations for the prevention of endocarditis should be observed for children undergoing certain dental procedures and for surgery or instrumentation of the upper respiratory tract, genitourinary tract, or lower gastrointestinal tract.
3. Begin to prepare for discharge early enough with the parents that sufficient adjustments and preparations may be made.
  - a. The child should have own bed and preferably own room.
  - b. A responsible adult must be in the home to care for child.
  - c. Provide information about activity restrictions, medications (dosage, schedule, side effects), dietary instructions, symptoms to report

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(pain, malaise, anorexia, tachycardia, tachypnea, weight gain), telephone number of healthcare provider, follow-up appointment.

d. Initiate a community nursing referral; this may be done prior to discharge if a home evaluation is desired or if home care nursing is needed.

e. Offer financial consultation as available.

4. Instruct in additional measures to maintain health.

a. Complete immunization schedules

b. Regular medical and dental care

c. The need to seek immediate medical care for signs of

streptococcal infections

Evaluation

A. Reduction in symptoms; no serious symptoms of medications

B. Stable vital signs; no signs of CHF

C. Patient comfortable as evidenced by unlabored respirations and

no complaints

D. Neurologic status improving and no injuries reported

E. Child coping effectively with activity restrictions

F. Anxiety reduced as evidenced by family cooperation and

appropriate discussion of disease management