Module 3.5
Prevention of 
rheumatic heart disease (RHD)

Group A Streptococcus → Group A Streptococcal Infection → Acute Rheumatic Fever → Rheumatic Heart Disease
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INTRODUCTION

Group A streptococcal infections of the throat, if not inadequately treated, can lead to acute rheumatic fever which can cause rheumatic heart disease (RHD) and acute glomerulonephritis. Each year, nearly half a million people die from RHD. Almost exclusively, the people who die of RHD live in low- and middle-income countries or in vulnerable communities in high-income countries. About 30% of sore throats in children and 5% in adults are bacterial, usually due to Group A streptococcus (GAS), the bacteria which causes rheumatic heart disease and acute glomerulonephritis. Adequate primary treatment of bacterial sore throats or tonsillitis can prevent rheumatic heart disease. Primary prevention of rheumatic heart disease begins in a primary health care facility with best practice sore throat treatment.

LEARNING OBJECTIVES

At the end of the session, participants will be able to:

- Suspect, diagnose and treat streptococcal infection among individuals presenting with sore throat.
- Suspect and refer rheumatic fever (RF) and rheumatic heart disease (RHD) cases to a higher health facility for confirmation and further management.
- Provide follow-up of RF/RHD cases for secondary prevention.

TOPICS COVERED

- Suspicion and referrals of RF and RHD cases to higher health facility.
- Differential diagnosis of sore throat.
- Algorithm for sore throat management.
- Follow-up RF and RHD cases for adherence to secondary prophylaxis.
- Patient communication.

COMPETENCY

- Be able to suspect, diagnose, treat/refer streptococcal pharyngitis and communicate to patients to prevent RHD.
TEACHING AND LEARNING ACTIVITIES

Total session time: 100 minutes

Activity 1. Approaches for prevention and control of RF and RHD: 20 minutes

Step 1. Divide the participants into convenient groups.

Step 2. Ask the groups to discuss the following conditions that describe the current epidemiological situation in the country:

1. Is sore throat common among children and adolescents in your country?
2. Is RF and RHD still a public health priority in your country?

Step 3. Ask few groups to share their responses on the condition in the table provided below.

<table>
<thead>
<tr>
<th>Conditions</th>
<th>What are the causes?</th>
<th>What are its implications?</th>
<th>What can we do to address this condition?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sore throat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rheumatic fever</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rheumatic heart disease</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Step 4. Present the powerpoint slides with following contents:

- Global and regional burden of RF and RHD
- Approaches for the prevention and control of RF and RHD
  - Streptococcal infection and pathogenesis of RHD
  - Diagnosis and management of streptococcal sore throat
  - Diagnosis of acute RF and RHD
  - RHD in pregnancy.

Activity 2. Sore throat examination 15 minutes

Material required for examination: Tongue depressor and torch

Important: examiner will need to wash hands before and after the procedure.

Prevention of rheumatic heart disease (RHD)
Step 1. Present powerpoint slides containing the steps for sore throat examination.

Step 2. Invite participants to share the practical problems in conducting the sore throat examination.

**Activity 3. Management of sore throat when culture and testing is not available: 25 minutes**

Primary health care facilities may not have testing facilities for streptococcus or referring to a higher centre may not always be feasible due to distances and other logistics challenges.

Step 1. Ask participants how to handle sore throat when culture or testing is not available.

Step 2. Discuss the clinical criteria to estimate risk for streptococcus pharyngitis using the simple tool below.

A. Determine the patient’s total sore throat score by assigning points to the following criteria:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature &gt;38 degree Celsius</td>
<td>1</td>
</tr>
<tr>
<td>No cough</td>
<td>1</td>
</tr>
<tr>
<td>Tender anterior cervical adenopathy</td>
<td>1</td>
</tr>
<tr>
<td>Tonsillar swelling or exudate</td>
<td>1</td>
</tr>
<tr>
<td>Age 3–14 years</td>
<td>1</td>
</tr>
<tr>
<td>Age 15–44 years</td>
<td>0</td>
</tr>
<tr>
<td>Age &gt;=45 years</td>
<td>-1</td>
</tr>
<tr>
<td><strong>TOTAL SCORE</strong></td>
<td>..../5</td>
</tr>
</tbody>
</table>

B. If score equals 4 or more then the patient should be treated with antibiotic (see the algorithm).

If patient do not meet the above criteria, recommend paracetamol or look for other causes.

If sore throat or fever persists, refer to higher health facility.
Prevention of rheumatic heart disease (RHD)

**Management of sore throat with GAS infection**

1. **Patient with sore throat**
   - Is throat culture or rapid strep antigen test available?
     - **NO**
       - Throat culture
     - **YES**
     - **Rapid strep test available**
       - **NO**
       - Throat culture
       - **YES**
         - **Rapid strep test available**
           - Test and wait for the result
           - **Positive**
             - Score of 4 or more
               - Treat with penicillin. Advise that others in household with sore throat undergo testing
             - **NO**
               - Negative: prescribe paracetamol. Advise to return if not better in one week
           - **NO**
             - Follow McIsaac criteria:
               - **Criteria** | **Point**
                 | Temp > 38 °C | 1
                 | No cough | 1
                 | Tender anterior cervical adenopathy | 1
                 | Tonsillar swelling or exudate | 1
                 | Age 3–14 years | 1
                 | Age 15–44 years | 0
                 | Age > 45 years | -1
               - **Total score** | ...
               - **YES**
               - Reassure, prescribe paracetamol and treat for upper respiratory tract infection. Advise to return if not better.
               - **NO**
                 - **YES**
                   - Reassure, prescribe paracetamol and treat for upper respiratory tract infection. Advise to return if not better.

**Secondary prophylaxis**

<table>
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<th>Condition of patient</th>
<th>Duration</th>
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<tr>
<td>With artificial valves</td>
<td>Lifetime</td>
</tr>
</tbody>
</table>
Activity 4. Administering injection benzathine penicillin: 10 minutes

The materials required are syringe, drug, spirit and mannequin.

Step 1. Demonstrate the steps for unwrapping the syringe, fitting the needle and dissolving the injection benzathine penicillin as shown in the demonstration slide.

After this, demonstrate the steps for injecting benzathine penicillin into a dummy. Always give a test dose intradermally before giving the actual dose.

Step 2. Clean the upper outer quadrant of the gluteal region with spirit and let it dry.

Step 3. Insert the needle at 90 degrees to the body.

Step 4. Push slowly for half a minute.

Step 5. Present the powerpoint slides on the reactions due to penicillin and its management.

Activity 5. Patient communication: 15 minutes

Step 1. Engage the participants to do the role play with one participant acting as primary health care provider and another acting as patient. Ask participants to refer to the workbook for diagnosis of sore throat, RF and RHD.

Role play 1: Primary health care provider inquiring about sore throat.

Primary health care provider will ask the patient about his/her symptoms and will arrive at diagnosis and treatment. He/she should explain how streptococcus sore throat occurs and how it leads to RF and RHD.

Role play 2: Primary health care provider inquiring about RF.

Primary health care provider will ask the patient about his/her symptoms and will arrive at diagnosis. Explain that it is important to consult the doctor early so that if there is anything of concern, it gets detected early and can be managed. Listen carefully to patient’s fears/concerns and offer your help if he/she needs it and refer accordingly. He/she should explain how strep sore throat occurs and how it leads to RF and RHD.

Primary health care provider will fill the important information in the referral card.
**Role play 3: Primary health care provider inquiring about rheumatic heart disease.**

Primary health care provider should inform the patient that there seems to be an abnormality in his/her heart going by the symptoms and that it requires the urgent attention of a doctor. Advise patient to attend appropriate health facility as early as possible, where he/she can undergo further investigation including ECG and echocardiography. Explain that it is important to consult a doctor soon so that if there is any disease of concern, it can get detected early and treated successfully. Listen patiently to his/her fears/concerns and offer your help if he/she needs it.

**Role play 4: Diagnosed RF/RHD patient counselling for regular secondary prophylaxis and how to record it.**

The primary health care provider will ask the patient about his/her treatment compliance. The patient will explain his/her issues and reasons for not being able to go for secondary prophylaxis regularly. The primary health care provider will counsel the patent for regular secondary prophylaxis emphasizing that it is important to prevent streptococcus sore throat. He/she should explain how strep sore throat occurs and how it leads to RF and RHD, and how repeated attacks of strep sore throat may worsen the existing disease.

- Discuss with the participants how communications can be improved.
- Provide RF/RHD brochures to participant in order to educate further.

**Activity 6. Supporting adherence with secondary prophylaxis:**

**15 minutes**

**Step 1.** Ask participants to discuss how to improve adherence with secondary prophylaxis (injection penicillin) among RHD patients.

**Step 2.** Ask few volunteers to share their ideas to improve adherence with secondary prophylaxis.

**Facilitator’s explanatory notes**

Some of the responses may include the following.

- Memory cues for patients
- Text messaging and phone calls.
- Maintainence of RF and RHD register
1. Which of the following groups of streptococcal infections can lead to rheumatic fever (RF)?
   (a) Group A
   (b) Group C
   (c) Group G
   (d) Group B.

2. The dose of injection Benzathine penicillin used for treatment of child weighing <30 kg and having streptococcal pharyngitis is
   (a) 600 000 units
   (b) 2 400 000 units
   (c) 1 200 000 units
   (d) 2 000 000 units.

3. In a rheumatic heart disease patient injection benzathine penicillin is given as secondary prophylaxis
   (a) Once in 10 days
   (b) Once in 2 weeks
   (c) Once in three weeks
   (d) Daily.

4. Which of the following laboratory test is most useful in the diagnosis of rheumatic fever (RF):
   (a) Blood culture
   (b) ASO (anti-streptolysin O)
   (c) RBC count
   (d) Urine culture.

5. Site of injection benzathine penicillin is
   (a) Abdomen
   (b) Right arm
   (c) Left arm
   (d) Gluteal region.
BACKGROUND INFORMATION

Children and adolescents have frequent attacks of sore throat. Some of the sore throats are caused by Group A beta haemolytic streptococcus (GAS) which may lead to rheumatic fever and rheumatic heart disease (RHD). The likelihood of rheumatic fever is ten times higher during epidemics of streptococcal sore throat. The consequences of RF and RHD include continuing damage to the heart, increasing disability, repeated hospitalizations and premature death. RHD is a common preventable chronic disorder of the heart among children and adolescents.

Magnitude of the problem of RF/RHD

Globally, about 470,000 new cases of RF and 282,000 cases of RHD occur each year; and approximately 233,000 people die due to RHD. Most of this disease burden lies in developing countries. In developed countries, the burden of RF/RHD had declined during the second half of the last century, but outbreaks of RF have been reported even from developed countries during the 1980s and 1990s.

How can RF/RHD be prevented?

Preventive measures can be categorized as under:

- Prevention of risk factors such as poor living conditions, overcrowding, etc. (termed as primordial prevention).
- Improved living conditions reduce likelihood of epidemics of streptococcal infections.
- Detection of streptococcal pharyngitis among children followed by adequate treatment with appropriate antibiotics (termed as primary prevention).
- Early diagnosis and management of rheumatic fever/rheumatic heart disease, and administration of penicillin regularly to prevent recurrences of GAS infection to prevent further occurrence of RF/RHD (termed as secondary prevention).
- Management of RHD by medical and surgical intervention (termed as secondary prevention).

Primary prevention: Group A streptococcal infections of the throat, if inadequately treated, or not treated can lead to acute rheumatic fever which can cause rheumatic heart disease. Appropriate treatment of sore throats (pharyngitis/tonsillitis) can prevent rheumatic fever and rheumatic heart disease.
# Diagnosis and treatment of streptococcal sore throat

**Health centres and hospitals**

Apply the clinical and/or bacteriological criteria to diagnose sore throat cases among children and adolescents

<table>
<thead>
<tr>
<th></th>
<th>Streptococcal pharyngitis</th>
<th>Non-streptococcal pharyngitis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>5–15 years</td>
<td>all ages</td>
</tr>
<tr>
<td><strong>Mode of onset</strong></td>
<td>sudden</td>
<td>more gradually</td>
</tr>
<tr>
<td><strong>Initial symptoms</strong></td>
<td>sore throat with pain or swelling</td>
<td>mild sore throat</td>
</tr>
<tr>
<td><strong>Fever</strong></td>
<td>high grade &gt;38° c</td>
<td>not so high</td>
</tr>
<tr>
<td><strong>Characteristics of streptococcal sore throat</strong></td>
<td>redness, tenderness of anterior cervical lymph nodes, hyperaemia, petechiae, scaby, erosion on the edges of the nostrils</td>
<td>redness of the pharynx, cough, hoarseness of voice, watery nasal secretions and conjunctivitis</td>
</tr>
</tbody>
</table>

**Injectable benzathine penicillin**

A single injection of intramuscular benzathine benzylpenicillin (BPG), a long-acting repository form of the antibiotic, is the most effective treatment in eradicating group A streptococci, probably due to its long duration of action. It can also be used for mass prophylaxis. For each injection of BPG, a test dose of 0.1 cc is given intradermal first and the patient is made to wait for half an hour.

For patient weighing under 30 kg, use BPG 600 000 units x 1 dose IM

For patient weighing 30 kg and over, use BPG 1 200 000 units x 1 dose IM

**Symptomatic treatment**
When to refer to hospital?

Clinical features which may suggest the infant or child is suffering from a serious condition include:

- stridor or respiratory distress
- muffled voice
- drooling
- torticollis
- asymmetric pharyngeal swelling
- grey white pharyngo-tonsillar membrane
- bruising, petechial or other rash.
- toxic appearance
- dehydration
- cervical lymphadenopathy > 2 cms
- child with persistent fever > 48 hours
- trismus
- hot potato voice.

How to diagnose acute rheumatic fever?

Acute RF should be suspected when a child, adolescent or young adult presents with fever and joint pain, rashes, abnormal movement or heart murmur. Such a patient should be referred to hospital for blood testing (ASO, ESR, CRP, throat swab). The guidelines for clinical diagnosis of RF as per the Jones Criteria are given below. The presence of two major criteria, or one major and two minor criteria, indicates a high probability of acute rheumatic fever, if supported by evidence of preceding Group A streptococcal infection.

The following conditions do not require to be supported by evidence of preceding Group A streptococcal infection:

- isolated carditis
- isolated chorea
- rheumatic recurrence.
Revised Jones criteria (2015); American Heart Association and World Heart Federation for moderate and high risk populations

**Initial episodes of ARF**: Two major or one major + two minor criteria

**Recurrent episodes of ARF**: Two major, one major + two minor, or three minor

Essential criteria: Previous evidence of group A beta haemolytic streptococcal infection*

**Major criteria**

- Carditis: clinical or subclinical (echocardiography)
- Arthritis: polyarthritis, or monoarthritis
- Polyarthralgia
- Chorea
- Erythema marginatum
- Subcutaneous nodules

**Minor criteria**

- Mono or polyarthralgia
- Fever (>38.0 °C)
- ESR ≥30 mm in the first hour and/or CRP ≥3.0 mg/dL
- Prolonged PR interval, after accounting for age variability (unless carditis is a major criterion)

*ASO: A four-fold rise in titre at a gap of three weeks or a titre of >250 units is significant/ a positive culture for streptococcal Group A infection/ positive rapid strept. antigen test

**Antibiotic regimens for secondary (continuous) prophylaxis for RF/RHD**

<table>
<thead>
<tr>
<th>Mode of administration</th>
<th>Penicillin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intramuscular</td>
<td>Benzathine benzyl penicillin, single injection once in three weeks*</td>
</tr>
<tr>
<td></td>
<td>- for children &lt;30kg: 600 000 units</td>
</tr>
<tr>
<td></td>
<td>- for children ≥30kg and adults: 1 200 000 units</td>
</tr>
<tr>
<td>Oral</td>
<td>Phenoxyethyl penicillin 250 mg twice daily</td>
</tr>
</tbody>
</table>

*In special circumstances or for high-risk patients (e.g. during epidemics or when environmental conditions are not conducive), one injection may be given every three weeks).

*For patients who are allergic to penicillin, erythromycin 250 mg is recommended twice daily.
How to diagnose rheumatic heart disease?

**Symptoms**
- palpitation
- dyspnea
- easy fatigability
- cough
- chest pain
- haemoptysis.

**Signs**
- prominent precordial pulsations
- heart murmurs, both systolic and diastolic
- diastolic murmur of mitral stenosis exaggerated by activity.

**Note:** Indications for referral of the following categories of patients to secondary/tertiary care centres:
- symptomatic RHD
- asymptomatic patients with clinical evidence of severe heart valve disease
- pregnancy in RHD patients irrespective of symptoms.

How to diagnose RHD in pregnancy?
Commonest cardiac lesion in pregnancy is rheumatic in origin, and of these mitral stenosis is most common (approximately around 80%).

**Signs and symptoms**
- dyspnea and fatigue
- cough
- diastolic murmur
- signs of heart failure indicates severe disease
- irregular rhythm suggests atrial fibrillation.

**Criteria for diagnosis**
- presence of diastolic murmur
- cardiac enlargement
- loud systolic murmur with a thrill
- presence of arrhythmia.

Refer the pregnant woman case with suspected heart disease to hospital.
Instructions for referral of RF/RHD patients

The referral card should be used by the primary health worker for referring high-risk cases to the PHC. It includes children with history of repeated sore throat (one or more than one sore throat episode per month) and children with complaints suggestive of RF/RHD (pain in joints, breathlessness, pain in chest, swelling in feet, etc.)

- The primary health care worker will examine the child and enter his/her remarks and diagnosis.
- The PHC worker will also mark the reason why a referral is being made and write his/her name and date of referral in the space provided at the end of all the three parts of a referral card.

Additional reading resource

Prevention of rheumatic heart disease (RHD)

Activity 1: Step 4

Rheumatic heart disease – An overview

- RHD is damage to the heart that remains after the acute rheumatic fever (ARF) episode has resolved
- RHD is caused by an episode or recurrent episodes of ARF where the heart has become inflamed
- The heart valves, most commonly, the mitral and aortic valves can be damaged
- Over time, the valves may become stretched and scarred – normal blood flow is interrupted
- This may result in the need for cardiac surgery.
Prevention of Rheumatic Heart Disease (RHD)

Burden of Group A Streptococcal (GAS) diseases

- Approximately 616 million new cases of GAS pharyngitis occur each year
- GAS diseases are responsible for over 500,000 deaths each year

Natural history of disease if adequate secondary prevention is not given

Which valves are affected?

**Mitral** valve is affected in over 90% of cases of RHD
- Mitral regurgitation most commonly found in children & adolescents
- Mitral stenosis represents longer term chronic disease, commonly in adults
- Most common complication of mitral stenosis is atrial fibrillation

**Aortic** valve next most commonly affected
- Often occurs with disease of the mitral valve
- Stenosis tends to develop as a long term complication of aortic regurgitation

**Tricuspid** and *pulmonary* valves are much less commonly affected
- Usually affected in very severe RHD when all valves are affected.
Prevention of rheumatic heart disease (RHD)

**Signs and symptoms**

Symptoms of RHD may not develop for many years
- A murmur but no symptoms suggests mild or moderate disease
  - Patients may not realize they need medical help; may think symptoms are normal
- Symptoms usually suggest more severe disease

Symptoms depend upon the type and severity of disease e.g.
- Breathlessness with exertion or when lying down flat
- Waking at night feeling breathless
- Tiredness
- Leg swelling (peripheral oedema)
- Palpitations if atrial fibrillation or other rhythm problem develops

Sudden onset of symptoms may occur
- New ARF episode with carditis
- Pregnancy/labour
- Rupture of valve cord.

**How is RHD diagnosed?**

- Using echocardiography (ultrasound of heart)
- Required for
  - anyone who has had ARF
  - anyone in high risk group with a murmur even if they never had known ARF
  - for investigation of breathlessness etc
- RHD needs to be detected early, before symptoms start
- Listening to the heart with the stethoscope is not accurate
  - RHD can be present even when you can’t hear a murmur.

**What if early diagnosis is missed?**

- ARF is often not diagnosed
- May miss the opportunity to start secondary prophylaxis and to prevent further ARF and progression to RHD
- RHD may become more advanced, and start causing symptoms
- Extra demands on the heart may make the RHD come to light
  - Pregnancy or labour
  - High-level physical exertion.
**Does ARF always lead to RHD?**

No. RHD is more likely if:
- Heart is affected in ARF (carditis)
- ARF is severe
- ARF occurs at a young age
- Recurrent ARF episodes occur

However, you can’t accurately predict who will go on to develop recurrent ARF and RHD
- hence everyone who has had ARF, even if there was no carditis, needs secondary prophylaxis with long-term penicillin.

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**Global burden of RHD**

![Map showing global burden of RHD]

*Number of Cases: 3,319,940,000*

*Number of Deaths: 3,19,400*

*Source: Global Burden of Disease (GBD) 2015 estimates*

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**RHD geographic distribution: DALYs**

![Map showing RHD geographic distribution: DALYs]

Prevention of *rheumatic heart disease (RHD)*
Prevention of rheumatic heart disease (RHD)

Causal pathway and preventive strategies

Causal pathway
- Group A Streptococcal Transmission
- Group A Streptococcal Infection
- Acute Rheumatic Fever
- Rheumatic Heart Disease

Preventive strategies
- Primordial prevention
  - Housing, hygiene, vaccine (unavailable)
- Primary Prevention
  - Treatment of GAS with antibiotics
- Secondary Prevention
  - Secondary Prophylaxis with Inj. Benzathine Penicillin
- Tertiary Care
  - Medication-heart failure
  - Valve surgery
  - Anti-coagulation

Tertiary care
- Medical management of heart failure
- Surgery for valve repair/replacement
- Huge burden of RHD cases; limited facilities for follow-up; monitoring of anticoagulants
- High cost of prosthetic valves

Tertiary prevention of RHD

Prevention of rheumatic heart disease (RHD)
Secondary prevention and prophylaxis

- Coordinated programme using registry of patients
- More cost effective than primary prevention
- Ensuring compliance to secondary prophylaxis - challenging task
- Secondary prophylaxis:
  - Benzathine penicillin G (BPG):
    - I. M. injections every 3 weeks
    - Dose: 600 000 IU (<30 Kg), 1 200 000 IU (≥30 Kg).
  - Phenoxymethyl penicillin
  - Erythromycin.

Duration of secondary prophylaxis

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Primordial prevention

- Improve quality of primary health care
- Improve socio-economic status of the poorer strata
- Ensure proper housing to reduce overcrowding
- Address malnutrition
- Strep vaccine (not yet available).
Primary prevention

- Awareness in community about treatment of sore throat
- Improve access to primary health-care
- Antibiotic treatment of GAS pharyngitis – single intramuscular injection of benzathine penicillin
- Training health providers - early diagnosis and treatment of strep pharyngitis
- Antibiotic therapy.

Tertiary prevention of RHD

**Treatment of heart failure:**
- Heart failure medication
- Valve repair
- Valve replacement

1. Medications  
2. Repair  
3. Replacement

Management of arrhythmias

- Arrhythmia management
  - Ablation
  - Medication – digoxin
  - Anticoagulation
Tertiary prevention of RHD

Prevention of endocarditis

- Brushing teeth twice daily
- Dental review 6 monthly
- Endocarditis prophylaxis at time of dental procedures

Maternal mortality due to RHD

- Several studies confirm RHD as a significant cause of maternal deaths.
- In Senegal, 36% of pregnant women with RHD admitted to a tertiary cardiac department died during pregnancy, at an average age of 29 years.
- In South Africa, 41% of indirect obstetric deaths were found to be associated with heart disease, overwhelmingly from RHD.
- In Brazil, 33% of women who died of heart disease during pregnancy had RHD.


Why does RHD get worse in pregnancy?

- Normal pregnancy:
  - 30-50% increase in blood volume
  - Increase in heart rate by 10-15 beats per minute
    - therefore ‘hyperdynamic circulation’; major extra cardiac work needed.
  - Labour – further major increase in cardiac work needed
- If heart capacity is reduced due to RHD, then breathlessness and heart failure can occur
Pregnancy: careful planning, careful management

- Contraception to allow for careful planning
- Education: risks for mother/risk for baby
- Advice/decision on anticoagulation

Role of the primary health care workers

Coordinate the RHD care plan
  - Secondary prophylaxis
  - Specialist medical and dental appointments
  - Oral medications - making sure prescriptions are up to date, support adherence, monitor for side effects
  - Make sure INRs checked for patients on warfarin

Support, educate, encourage
  - Improve health literacy for patients and their families

Understand the psychological consequences of being labelled with a chronic disease in childhood/adolescence

Role of a RHD Register in RHD care
Objectives of register-based prevention programme

1. Ensure success of secondary prophylaxis by
   - Providing lists of people for secondary prophylaxis
   - Identifying when secondary prophylaxis is not being delivered and feeding information back to clinic

2. Facilitate coordination of ongoing care by
   - Generating regular reports to enable recall and review
   - Ensuring that patients are not lost to follow-up
   - Facilitating health education

3. Provide epidemiological data:
   - To monitor ARF/RHD incidence / prevalence
   - For program evaluation

Take-home messages

Prevent RHD from occurring
Prevent existing RHD from getting worse
Diagnose RHD early, before it starts causing symptoms
Through repeated education sessions with the patient and their family, make sure the patient understands that
   RHD is very serious, but there are good treatment options
   Further worsening can be minimised with regular secondary prophylaxis
   Having a valve replaced doesn’t mean that secondary prophylaxis can be stopped

Activity 2: Step 1
Examination of sore throat

- Always examine in good day light or use torch
- In the head with left hand
- Use tongue depressor
- Ask the child to open his mouth wide

Look for:
- Enlargement of tonsils
- Redness or irriate a red purple colour of post. wall of throat/throat & Uvula
- Patch yellow exudate in posterior wall of throat and/or tonsill

Steps of taking throat swab

Do:
- Collect swab material from both tonsil and pharynx
- Examine in good day light using tongue depressor

Don’t:
- Do not touch cotton portion of the stick
- Do not touch other parts of mouth, tongue or face by ‘swab’

Sending the throat swab in a filter paper

Unwrapping of filter paper:
- Do not touch the filter paper by hand. Use tongs
- Do not touch the strip of filter paper which faces the filter paper

Spreading on the filter paper:
- Roll the cotton swab on the filter paper. Spread uniformly the material cancelled.
- Do not touch the filter paper by hand. Allow it to dry and then hold it.

Activity 4: Step 1

Prevention of rheumatic heart disease (RHD)
Administration of injection benzathine penicillin

**Unwrapping syringe**
- **DOs**
  - Unwrap in field only before giving injection.
  - Use one syringe & needle for one patient.

- **Don’t**
  - Don’t touch the portion shown by arrow.

**Fitting the needle**
- Don’t touch the portions shown by arrow.

**Dissolving the drug**
- Do fit the needle tightly.

Administration of injection

**Do:**
- Give the injection in upper outer quadrant of gluteal region.
- Cleanly on site, dry the area, then the needle at 90 degree to the body.
- Push slowly, for half a minute

**Don’t:**
- Do not touch needle by hand or spirit cotton.

Reactions arising out of fear/nervousness

- Reaction following administration of injection Benzathine penicillin is a rare event particularly in the children in the age group of 5-15 years.
- Though some children may present with certain symptom arising due to the fear of injection or very rarely due to a true reaction.
- This is not a true reaction but a nervous reaction but a nervous reaction arising out of fright. It is characterized by feeling of fainting, face turning pale, sweating and weak or rapid pulse.
- Therefore, skin testing for penicillin sensitivity in children is not a necessary feature of the programme.
Skin testing for penicillin sensitivity

- Prepare the injection with 3 ml of distilled water as in 2:3
- Draw out 0.1ml of this solution diluting this further with 1ml distilled water
- In the left fore-arm introduce one drop subcutaneously (to be demonstrated in the training) as to raise a wheal
- Circle this area and put the time on the fore-arm
- Wait for 10-15 minutes and if there is no fasting, itching at site of the test, sweating, feeling of apprehension or any other unusual symptoms, the person is not sensitive to penicillin and can be given the injection
- In case of doubt repeat on the other arm with double strength test dose.

Management

- Ask the patient to lie down, loosen the clothes the and reassure him/her.
- Talk to the patients and allay his/her fears, by explaining that the condition is transient and he/she would be alright in 10-15 minutes. In case the condition does not improve, seek help.
- It is important to realize that all the symptoms may not be present in cases of a reaction.
- Presence of one or more signs or symptoms should raise doubt and the MPW should takes necessary action.
- Reactions are not common and should not discourage their continued use whenever indicated.

True reactions due to penicillin

**Immediate reactions**
Occur within 30 seconds to two hours after the administration of inj. penicillin. Characterised by:
- Feeling of fainting
- Itching all over the body or at site of injection
- Rashes all over the body
- Sudden pain or swelling on any part of the body particularly on face or below the eyes
- Difficulty in breathing

**Delayed or late reactions**
Occur 5-15 days after the administration of injection Benzathine penicillin. The features are:
- Generalized or localized rashes on body
- Fever
- Pain in joints
- Difficulty in breathing
Principles in management of anaphylaxis

- Key to successful resuscitation is anticipation and the preparedness for this eventuality.
- It is life threatening but is imminently reversible.
- Success depends on the promptness in detection and instituting treatment.
- The key drug is Adrenalin and not steroids.
- Occasional patient will need intubation for airway management

Out patient facility

- Personnel: at least one nurse trained in cardiac resuscitation in addition to the physician.
- Drugs:
  - Adrenalin (1:1000) loaded in 2 ml syringe
  - Adrenalin (1:10,000) loaded in 10 ml syringe
- Venous access: before the test dose is administered is ideal
- Volume replacement: normal saline, Haemaccel, Haestril-6%, 10%

Steps of resuscitation in severe anaphylaxis

- Administer adrenalin:
  - Adults:
    - 0.5 ml of 1:1000 adrenalin-IM
    - 3 to 5 ml of 1:10,000 adrenalin-IM or IV
  - Children:
    - 0.1 ml/kg of 1:1000 adrenalin-IM
    - 0.01 ml/kg of 1:10,000 adrenalin-IV
- Repeat dose can be given at 5 minute interval.
- Administer volume: 1 to 2 liters in adults and 20-40 ml/kg in children intravenously. Colloids are better than crystalloids in the setting of leaky capillaries
- CPR should be initiated as when necessary
Prevention of rheumatic heart disease (RHD)

Steps of resuscitation

- Intravenous adrenalin can produce severe ventricular arrhythmias- Best route in unmonitored patients is IM route.
- Best site would be lateral thigh and can even be given over light clothing to save time.
- Brochospasm: adrenalin, steroids, salbutamol inhalation, IV aminophylline.
- Angioneurotic edema: adrenalin, antihistaminic
- Pulmonary edema: difficult to manage, will need ventilation, diuretics are contraindicated