

LEPROSY



Centurion
UNIVERSITY

Shaping Lives...
Empowering Communities...

By

Ms. RUPALI RUPASMITA ROUT
ASSISTANT PROFESSOR

INTRODUCTION:

Leprosy, also known as Hansen's disease, is a chronic infectious disease caused by the bacterium *Mycobacterium leprae*. It primarily affects the skin, peripheral nerves, mucous membranes of the upper respiratory tract, and eyes. Leprosy is characterized by the development of skin lesions, nerve damage, and various complications that can lead to deformities and disabilities.

ETIOLOGY/CAUSES:

- ✚ **Mycobacterium leprae:** Leprosy is caused by the bacterium *Mycobacterium leprae*, which was discovered by the Norwegian scientist Gerhard Armauer Hansen in 1873. It is an acid-fast, rod-shaped bacterium that primarily affects the skin and nerves. *M. leprae* is an intracellular pathogen, meaning it can invade and survive within cells of the human immune system.
- ✚ **Transmission:** The exact mode of transmission of leprosy is not fully understood, but it is believed to occur through prolonged and close contact with untreated individuals who have active leprosy. Respiratory droplets from infected individuals, particularly through coughing and sneezing, are the main route of transmission. However, leprosy is considered mildly contagious, and the majority of people exposed to the bacterium do not develop the disease.
- ✚ **Genetic susceptibility:** Genetic factors play a role in determining an individual's susceptibility to leprosy. Certain genetic variations in the human immune system can affect the ability to mount an effective immune response against *M. leprae*. People with specific genetic profiles may be more susceptible to developing leprosy or experiencing more severe forms of the disease.

PATHOPHYSIOLOGY:

- ✚ **Entry and invasion:** *M. leprae* primarily enters the body through the respiratory tract, typically when an individual inhales respiratory droplets containing the bacteria expelled by an untreated person with leprosy. The bacteria can also potentially enter through broken skin, although this is less common. *M. leprae* targets specific cells of the immune system, particularly macrophages and Schwann cells (cells that support nerve fibers).
- ✚ **Intracellular survival:** *M. leprae* has evolved unique mechanisms to survive and persist within the host cells. It possesses a waxy cell wall that makes it resistant from destruction by the immune system and many antibiotics. The bacteria can multiply very slowly within the cells, leading to a chronic infection.
- ✚ **Impaired immune response:** In individuals with a weak immune response, known as lepromatous leprosy occurs. The immune system fails to effectively control the bacteria. *M. leprae* multiplies more extensively, leading to the widespread of the bacteria throughout the body.
- ✚ **Tissue damage:** Over time, the presence of *M. leprae* and the associated immune response can cause damage to the skin, peripheral nerves, mucous membranes, and other affected organs. The bacteria have a predilection for Schwann cells, leading to nerve damage and loss of sensation in affected areas. The inflammatory response and tissue damage contribute to the clinical manifestations of leprosy, including skin lesions, nodules, deformities, and sensory impairments.

CLINICAL MANIFESTATION/ SIGN & SYMPTOMS:

- ✚ **Skin Lesions:** Leprosy primarily affects the skin and nerves. One of the earliest signs is the appearance of hypopigmented or reddish skin patches with decreased sensation. These patches may be lighter or darker than the surrounding skin.

- ✚ **Numbness or Loss of Sensation:** Leprosy can cause a loss of sensation in affected areas. This may lead to a decreased ability to feel pain, touch, or temperature changes.
- ✚ **Nerve Damage:** The bacteria can damage the peripheral nerves, leading to various neurological symptoms. This can result in muscle weakness or paralysis, particularly in the hands, feet, and face. It can also cause muscle wasting.
- ✚ **Thickened Nerves:** In some cases, the nerves may become thickened or enlarged, causing visible lumps or nodules, especially around the elbows, knees, and neck.
- ✚ **Eye Problems:** Leprosy can affect the eyes and cause dryness, redness, and a reduced ability to blink. This can lead to corneal ulcers and potentially impair vision.
- ✚ **Nasal and Respiratory Symptoms:** If the bacteria affect the nasal passages, it can cause stuffiness, nosebleeds, and loss of the sense of smell. In advanced cases, leprosy can lead to respiratory problems.
- ✚ **Muscle Weakness:** Leprosy can cause weakness in the muscles, leading to difficulty in performing everyday tasks or holding objects.

CLINICAL EVALUATION/DIAGNOSIS:

- ✚ **Clinical Examination:** A healthcare professional will conduct a thorough physical examination, looking for characteristic signs and symptoms of leprosy, such as skin lesions, loss of sensation, and nerve involvement. This examination helps in determining the extent and type of leprosy.
- ✚ **Skin Biopsy:** A skin biopsy involves taking a small sample of skin from a suspected leprosy lesion. The sample is then examined under a microscope to look for the presence of *Mycobacterium leprae* bacteria. The biopsy can also help determine the type of leprosy and assess the extent of nerve damage.

- ✚ **Slit Skin Smear Test:** This test involves scraping the surface of a skin lesion to collect a sample of skin cells and bacteria. The sample is then stained and examined under a microscope to detect acid-fast bacilli (AFB), which are indicative of leprosy. This test is particularly useful for diagnosing multibacillary leprosy.
- ✚ **Polymerase Chain Reaction (PCR):** PCR is a molecular technique used to amplify and detect the genetic material (DNA) of *Mycobacterium leprae*. PCR can be performed on skin biopsy samples or nasal swabs to confirm the presence of the bacteria.
- ✚ **Skin Sensation Tests:** Since leprosy affects the nerves and can lead to loss of sensation, certain tests can be done to assess the sensory function. These tests may involve using a monofilament (a thin filament) to test the ability to perceive touch or a pinprick test to assess the ability to feel pain.
- ✚ **Nerve Biopsy:** In cases where nerve involvement is suspected, a nerve biopsy may be performed. This involves taking a small sample of affected nerve tissue for examination under a microscope to assess nerve damage and confirm leprosy diagnosis.

PHARMACOLOGICAL MANAGEMENT:

- ✚ **Dapsone:** Dapsone is a bacteriostatic antibiotic that is effective against *Mycobacterium leprae*, the bacteria that cause leprosy. It inhibits the growth and multiplication of the bacteria.
- ✚ **Rifampicin:** Rifampicin is a bactericidal antibiotic that kills the bacteria. It is highly effective against *Mycobacterium leprae* and is used in combination with other drugs for treating leprosy.
- ✚ **Clofazimine:** Clofazimine is a bacteriostatic antibiotic that is active against *Mycobacterium leprae*. It is particularly effective against persistent or slowly multiplying bacteria and is used in the treatment of multibacillary leprosy.

PREVENTION/NON-PHARMACOLOGICAL MANAGEMENT:

- ✚ **Early Diagnosis and Treatment:** Early identification and treatment of leprosy cases can help prevent the progression of the disease and reduce the risk of transmission to others. Individuals showing signs and symptoms of leprosy should seek medical attention as soon as possible.
- ✚ **Contact Tracing and Screening:** Identifying and screening individuals who have had close and prolonged contact with a leprosy patient can help detect new cases early. Close family members and other close contacts of individuals diagnosed with leprosy should be examined for signs of the disease.
- ✚ **Multidrug Therapy (MDT):** The provision of free and effective multidrug therapy is essential for treating leprosy cases and preventing the spread of infection. MDT should be administered according to the recommended treatment regimens and completed in its entirety.
- ✚ **Immunization:** Bacillus Calmette-Guérin (BCG) vaccination, which provides protection against tuberculosis (TB), has shown some potential for reducing the risk of leprosy. BCG vaccination is routinely given to infants in many countries and can provide partial protection against leprosy in some individuals.
- ✚ **Health Education and Awareness:** Raising awareness about leprosy, its signs and symptoms, and the importance of early treatment can help reduce stigma and encourage individuals to seek medical care promptly. Health education programs can also emphasize the importance of completing the full course of treatment.
- ✚ **Hygiene Practices:** Maintaining good personal hygiene and cleanliness can help reduce the risk of leprosy transmission. This includes regular handwashing with soap and water, proper wound care, and avoiding close contact with individuals with active skin lesions.