

Lecture No 2

Mycobacterium tuberculosis(T.B)Medical microbiology theory, second year ,DR thamer

L.D

Acid fast staining of sputum is the initial test .Ziehl Neelsen.

For rapid screening purposes, auramine stained fluorescence microscopy is used after digestion of the specimens by treatments with NaOH and concentration by centrifugation, the organisms cultured on special media. Such as Lowenstein-jensen agar, for up to 8 weeks. It will not grow on blood agar plate. In liquid medium is preferred for isolation because the organisms grow more rapidly and reliably than it does on agar. If growth in the culture occurs, the organism can be identified

M.tuberculosis produce niacin, whereas almost no other mycobacteria do. It also produces catalase. Nucleic acid amplification test can be used to detect the presence of M. tuberculosis directly in clinical specimens are highly specific, such as sputum. Tests are available that detect either the ribosomal RNA or the DNA of the organism. These tests are highly specific, but their sensitivity varies. Because of resistance especially to isoniazid is a problem, susceptibility tests should be performed. The organism grows very slowly, and the susceptibility tests usually take several weeks, which is too long to guide the initial dose of drugs. Molecular tests are available which detect mutation in the chromosomal genes that encode either the catalase gene that mediates resistance to rifampin.

The luciferase assay

Which can detect drug-resistant organisms in a few days. Luciferase is an enzyme isolated from fireflies that produces flashes of light in the presence of ATP. If the organism isolated from the patient is resistant, it will not be damaged by the drug, and the luciferase will produce the normal amount of light. If the organism is sensitive to the drug less ATP will be made and less light produced.

There are two approaches to the diagnosis of latent infections. One is the PPD skin test. Because there are problems both in the interpretation of the PPD test and with the person returning for the skin test to be read a quantifiable laboratory based test is valuable. The laboratory test is an interferon gamma assay (IGRA) and there are two versions available. This laboratory test is an interferon-gamma assay, the test is not influenced by whether a person has been previously immunized with the BCG vaccine.

TREATMENT and RESISTANCE

Multidrug is used to prevent the emergence of drug resistance mutants during the long 6-9 months duration of treatment. An organism that becomes resistant to one drug will be inhibited by the other. These drugs are INH, Rifampin.

Previous treatments for tuberculosis predispose to the selection of these MDR organisms. Non compliance . the failure of patients to complete the full course of therapy is a major factor in allowing the resistance organisms to survive. One approach to the problem of noncompliance is directly observed therapy (DOT) in which health care workers observe the patients taking the medication .