

**SPEAKER 1:** The microbiology of NTM disease is very important. So to begin with, I've mentioned that we need to do an AFB smear. And the reason I say that, it's because it's the most common test performed and it's the most commonly available test that's done. And the reason is, its simplicity. And acid-fast smears are done in a wide variety of public clinics and private clinics and can be done almost anywhere in the world.

However, we have to think about tuberculosis as the most important acid-fast disease. So typically, the first thing that we need to do from a microbiological point of view is to rule out tuberculosis. And luckily, there are several tests that are available that are very helpful in doing that. The most important test is nucleic acid amplification to determine whether the acid-fast organism is TB or nontuberculous mycobacteria.

And it used to be that Gen-Probe was the most commonly used test and it was a very good test, but it's pretty much been supplanted by the GeneXpert. So GeneXpert was approved by the FDA several years ago. And it's a very rapid test that can be performed in a few hours and can tell you up or down, is the acid-fast organism TB or not? And if it's not TB, by definition it's a nontuberculous mycobacteria.

There are over 200 nontuberculous mycobacteria that are available in the environment. And GeneXpert doesn't tell you which one it is, it just tells you TB-- yes or no. And it tells you if it's TB, if it's resistant to rifampin. so those are the two things you get from GeneXpert. The rest of it requires culture.

So the acid-fast organism is plated on a culture medium. And depending on the laboratory, it'll be done on either auger or liquid medium. And that may require a special laboratory facility, because there are many labs that do an acid-fast smear, that don't do a culture. So the sample may need to be sent to a central lab for culture. There, the culture will determine whether it's one of the most common nontuberculous mycobacteria or not.

And by far, the most common is mycobacterium avium complex. So mycobacterium avium complex consists of about 20 or 30 subspecies. We lump them together as complex because it frankly doesn't really matter from a clinical point of view which of the complex it is, it just matters that it's avium. But there are a variety of others.

So various nontuberculous mycobacteria-- some of them are more common to be contaminants and some are more common to be disease-oriented. They don't all cause disease. So it's necessary that the acid-fast organism be speciated by the mycobacteriology laboratory to know what species it is. So that, again, is a problem, because some labs will grow the organisms, but won't speciate it and you have to send it out.

So all of this requires time. And that's OK because most patients with NTM disease are ill, but they're chronically ill and you don't need to start treatment immediately. And in fact, it's a blessing, because it gives the clinician time to work with the patient to have the patient understand what the disease is, what the severity of the disease is, what the treatment options are, what the complications are that go along with those treatment options, and all of that requires a lot of patient communication.

So while the microbiology is being sorted out, the physician gets a chance to start educating the patient and doing the necessary work that's necessary to have your patient accept treatment.