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TB Screening & Prevention Strategies for Patients in Long-Term Care

Announcer:
You're listening to *Tackling TB*, sponsored by Qiagen. Here's your host, Dr. Charles Turck.

Dr. Turck:
Welcome to *Tackling TB* on ReachMD. I'm Dr. Charles Turck. And joining me today to explore TB screening and prevention strategies in long-term care facilities is Dr. Jeffrey Cirillo, Regents' Professor in the Department of Microbial and Molecular pathogenesis at the Texas A&M College of Medicine. He also leads the Center for Airborne Pathogens Research and Tuberculosis Image Resources. Dr. Cirillo, thanks for being here today.

Dr. Cirillo:
Thank you for having me.

Dr. Turck:
To start, let's gain a deeper understanding of the issue. Dr. Cirillo, how prevalent is TB in long-term care facilities? And what are the risk factors we need to be aware of?

Dr. Cirillo:
Well, TB is very prevalent in long-term care facilities. It's one of the biggest problems that we have, particularly because as individuals get to older ages, they have a reduction in their immune response to tuberculosis. And this can cause what we call reactivation. It's when the bacteria goes from a dormant stage to an active stage. And not only is the individual that has the disease undergoing sometimes severe symptoms, they can have a chronic cough and loss of weight. But they also can transmit the infection to other individuals in proximity. And long-term care facilities are oftentimes very close quarters with the same individual. So this offers an opportunity for spread to a large number of individuals in that population. So it's a grave concern when that happens.

Dr. Turck:
Now let's review the joint ATS, CDC, IDSA, and the United States Preventive Services Task Force screening and testing guidelines. What do they recommend for patients in long-term care facilities?

Dr. Cirillo:
They recommend that they be tested to see whether or not there's the possibility that they could reactivate, which normally is done with a test like the QuantiFERON test. We also do a PPD test, which is a skin test. Both of these tests kind of augment what we do normally in the population is monitoring, is what's done in the U.S.

The QuantiFERON type test, which is a blood test, is normally done to evaluate whether or not someone is, by definition by CDC guidelines, considered to be latently infected with TB. And under those conditions, they would recommend prophylaxis. So prophylaxis is where we go in and then we treat with one of the drugs, oftentimes isoniazid or rifampin which are first-line drugs for tuberculosis, for up to like six months with that single drug to eliminate the bacteria from their system. And the big concern is that they could reactivate if they weren't treated with these drugs for that period of time.

Dr. Turck:
Keeping these guidelines in mind, how do they recommend adapting our screening and testing strategies for healthcare workers in these facilities?

Dr. Cirillo:

Well, it's the same sort of thing as recommended, is that we do monitoring of that population as well. And when somebody is positive that we go ahead and look at the blood test, which looks at two specific antigens that are present in tuberculosis and not present in the vaccine strain. And that allows us to avoid those individuals because there is a significant percentage of the population, between 20 and 30%, that may have been BCG vaccinated, which is the vaccine for TB. So, we want to avoid prophylaxing a population that would just have been vaccinated and had not been exposed. But those individuals that would show up on a QuantiFERON test or an interferon gamma release assay, those types of assays differentiate the vaccine from the skin test. And so we would do basically the same sort of thing in healthcare workers that are working in that environment to avoid them having the opportunity to spread the bacteria.

Dr. Turck:
For those just tuning in, you're listening to *Tackling TB* on ReachMD. I'm Dr. Charles Turck, and today I'm speaking with Dr. Jeffery Cirillo about how we can increase detection for TB in long-term care facilities.

Now that we have a better sense of the risk of TB in those facilities, let's review our testing options. Dr. Cirillo, what tests are currently available for these patients?

Dr. Cirillo:
Well in terms of availability, we have a large number of tests available now that can be used. But the primary tests that are used are the skin tests, which is a PPD test that uses an antigen from the bacteria. And it's just a scratch that's given on the skin. And they look at delayed type hypersensitivity reaction, or a swelling; it's a small region of swelling in the area of where the scratch was delivered. And that has to be checked between 24 or 48 hours after the time of the initial test. That test is used pretty much worldwide. But in the U.S., we use a combination of that test with interferon gamma release, or QuantiFERON tests Simply stated, it's a blood test that allows you to look at the cells that are present and whether they respond to specific antigens that are in tuberculosis and not in other bacteria. And so that test is very important, particularly in this setting, because we want to differentiate between those individuals that have just been vaccinated and those individuals that are latent TB carriers that could reactivate at some point. And so those are the primary tests.

There's a number of supplementary tests that are out there now. There are molecular tests for PCR. One of the best known is a gene expert type test, which uses a cartridge, and then looks at the bacteria and can determine some drug susceptibility profile as well. And there are mass spec type tests that are used in conjunction with some of the other tests as well.

In addition, for those individuals that do show up positive and are showing signs of disease, say have a chronic cough, we would look at their sputum. And their sputum, they would expectorate in the morning normally, and then we would do a slide which is called smear microscopy, or an acid-fast stain, that would allow us to look at the number of bacteria that are present in their lungs as well as doing culture. Normally in the U.S., we also do culture, and then mass spec on the surface characteristics of the bacteria.

Culture takes a long time, though; that's one of the biggest problems for those individuals that are sick. It can take as long as six weeks. And we'd like to have something that is faster than that. And so we normally go to the molecular tests, which uses PCR, and amplify the bacteria combined with the acid-fast stain.

Dr. Turck:
And if we focus on two tests, in particular, how did the TST and IGRA tests compare in terms of sensitivity, other indicators of accuracy, and cost-benefit ratio?

Dr. Cirillo:
Well I think overall, the skin test has the best cost-benefit ratio overall because healthcare workers are already in place. We have the public health infrastructure already in place to accomplish that relatively easily. But the specificity is not that great because it also picks up individuals that have been vaccinated. And with a large percentage of the world that has been vaccinated at birth, and sometimes they're even given boosters, they will show DTH response without showing any disease or potential to reactivate.

And so whether or not prophylaxis is the best course of action in those individuals is something that's relatively controversial. People talk about it a lot. But should we go ahead and prophylax because the risk is very low, even if they may have been just vaccinated?

So that's why the tuberculin skin test is still used greatly. And we still oftentimes will go ahead and recommend prophylaxis in that setting. But I would argue that with U.S. infrastructure and capability, the interferon gamma release assays, the IGRAs, are probably a better course of action for a second step in those individuals that are positive.

The problem with doing it with all individuals is that the test is much more sensitive. Tuberculin skin test, many times after 10 years post vaccination, will start to decrease. And so it can be used later and sometimes not pick up individuals that could even have been exposed later in life. Whereas the interferon gamma release assay is very, very sensitive. It has the problem that it can sometimes pick up individuals that have been exposed to other types of tuberculosis, like bacteria that don't cause tuberculosis. There are environmental,

mycobacterial infections, like mycobacterium marinum that's associated with aquaculture, different types of fish species, frogs, other amphibians that can cause that test to come up positive because it's almost too sensitive. It is one of the reasons that the World Health Organization has moved away from IGRAs worldwide. But we still use it in the U.S. because the number of individuals that come up as false positives is relatively low. But yes, that test is extremely sensitive. I would say probably the best course of action overall to prevent people from being prophylaxed that don't need to be is you'd follow up the TST with an IGRA.

Dr. Turck:
Before we close, can you share some strategies that can help prevent the spread of TB in long-term care facilities?

Dr. Cirillo:
Some of the strategies that are probably the best are to monitor all individuals that have any significant involvement in the facility. And we talk about healthcare workers most of the time, but I think there's a lot of other staff that sometimes get overlooked. We need to look at the entire population, kind of take a holistic view of the facility looking at individuals that may go into and out of the facility.

In many cases, also, you want to look at visitation. If there are individuals that are coming from a potentially at-risk environment, which could be coming from other countries where there's endemic tuberculosis, we may want to consider whether or not it would be possible without being too invasive or too intrusive to have testing of those individuals as well.

The testing by itself really does no harm. So I think it's probably good to do testing of as large a population as possible, both with the TST and the IGRA. That will allow us to pick up more of the individuals that may be putting these populations at risk.

But in general, I would argue that any individual that's living in the facility long-term should be tested. And it doesn't necessarily need to be more than once per year or once every few years because it's unlikely that their status would change over time. But it needs to be done. I don't think we have very good coverage at this point. So that would be the primary strategy that I would look at is try to get as comprehensive coverage of the population that's present in the facility as well as potentially those that are transient but have long-term contact in the facility and may be at risk.

Dr. Turck:
Well those are some great strategies to take with us. And as that brings us to the end of today's program, I want to thank Dr. Jeffrey Cirillo for joining us to share his insight on the risk of TB in long-term care facilities. Dr. Cirillo, it's great speaking with you today.

Dr. Cirillo:
Thank you for having me. It was great talking to you.

Announcer:
This was *Tackling TB,* sponsored by Qiagen. To access this episode and others from *Tackling TB,* visit ReachMD.com/tackling-tb, where you can Be Part of the Knowledge. Thanks for listening!