

Sinusitis from Nontuberculous Mycobacteria in Tap Water

[Announcer] This program is presented by the Centers for Disease Control and Prevention.

[Reginald Tucker] Hi, I'm Reginald Tucker, and today I'm talking with Dr. Wellington S. Tichenor, Associate Clinical Professor of Medicine at New York Medical College and in private practice in Manhattan, New York. Our conversation is based on his study about sinusitis from nontuberculous mycobacteria in tap water, which appears in CDC's journal, *Emerging Infectious Diseases*. Welcome, Dr. Tichenor.

[Wellington S. Tichenor] Thank you.

[Reginald Tucker] What are nontuberculous mycobacteria?

[Wellington S. Tichenor] Nontuberculous mycobacteria, which are also known as NTM, are a group of organisms that are in the same family as tuberculosis but are slightly different. Typically they don't cause the severe disease which TB usually causes. They are best known for causing lung disease. More rarely they have been shown to cause sinusitis, but our report is by far the largest series to date of patients with sinusitis and primarily involved patients who did not have other medical problems, such as AIDS or diabetes, which most of the other reports that were previously published involved.

[Reginald Tucker] Is it a serious condition?

[Wellington S. Tichenor] It can be very debilitating in some patients. One of the problems with people contracting this disease is it's very difficult to diagnose, as well as treat.

[Reginald Tucker] Why is it so hard to treat?

[Wellington S. Tichenor] First of all, it's very difficult to find in many patients. We've found that we had to do many cultures in patients with sinusitis in order to find it. These cultures must be directed. In other words, when we do cultures, we do it at the same time we do an endoscopy, which is an examination of the nose and sinuses with a flexible tube. While we're doing that procedure, we take samples of mucus and tissue. It can't be just a small amount of mucus analogous to the amount that might be obtained when a swab is used to obtain a throat culture, because we need a much larger volume in order to be more likely to recover the NTM.

In addition, the doctor has to suspect that it's a problem in the first place. We're among the few doctors in the United States who treat sinusitis who think of the NTM as a potential cause of sinusitis. So as a result, most doctors don't bother to do a culture specifically for it. These organisms are very difficult to culture, and most laboratory technicians don't know how to recognize them. So unless it's specifically ordered as a separate test, most labs won't find it.

When doing the endoscopy, we may have to obtain samples for five or six different laboratory tests. The more tests that are ordered, the smaller amount there is for each test. So if enough of a sample isn't collected, there may not be enough to culture the NTM.

In patients with a lung problem from NTM, it is also difficult to diagnose for similar reasons. It may also take months to get the NTM to grow out in culture, and in the meantime the patient may continue to have symptoms. It may also take several more months to find out which antibiotics might be used to treat these organisms. In addition, most patients have to be treated with multiple antibiotics, often for as long as a year.

There aren't any specific findings in either the history, physical examination, or standard tests which point to NTM as a cause. Likewise, with the endoscopic examinations, or x-rays, that we might do of the sinuses.

[Reginald Tucker] So, what were you looking for in your study?

[Wellington S. Tichenor] First, we primarily see patients who have sinusitis or other nasal symptoms which are difficult to treat. Many patients have already had surgery and still aren't better. As a result, we started looking about 15 years ago for causes of sinusitis that other doctors might not suspect. We look, among other things, for immune system problems, these are separate from AIDS, for allergy to medications or foods, and for exposure to environmental agents, like mold or chemicals. We also look for problems with unusual bacteria or fungi, and in the course of looking for fungi, we also found the nontuberculous mycobacteria. We would then have to find which antibiotics might be used to treat them. We also, by the way, look for unusual medications or delivery systems for medications which might help patients with sinusitis.

[Reginald Tucker] And how was the study designed?

[Wellington S. Tichenor] There were two parts of the study. The first involved finding the nontuberculous mycobacteria and treating the patients. The second was trying to determine how they got the NTM in the first place. We know from other studies regarding lung disease that NTM are in the water supply, and we know that many of our patients had used tap water to irrigate their sinuses, even though we discourage them from using tap water. We found that in several of the patients we were able to establish that it was the same NTM organism in their sinuses as the one that was in the water supply in their house. In many patients with NTM in their lungs, it has been possible to show that the same organisms in the patients' lungs were also in the tap water, and they probably got it in their lungs as a result of aerosolization of water from the shower.

[Reginald Tucker] What methods did you use to identify and isolate NTM?

[Wellington S. Tichenor] The NTM can be cultured in a similar way that bacteria can be cultured, but it is more difficult to identify. After recognizing that NTM is growing on the Petri dish, it can then be identified in several ways, including PCR analysis which is the same technique that is used to identify DNA in human samples.

[Reginald Tucker] How big a public health threat is the possibility of these types of infections being found in the drinking water?

[Wellington S. Tichenor] NTM are commonly found in water supplies. There appears to be a limited number of people in the population who are susceptible to getting NTM. In our study, it was about one percent of the patients upon which we performed these cultures. We suspect that patients who are immune deficient, for example those who have a primary immune deficiency, not AIDS, are more likely to have it, but we are unable to identify other groups at this time. Let me just point out, as a side, patients with AIDS are more likely to get NTM. As a result, we suggest that patients should not be irrigating their nose with tap water. Ideally it should be with sterile water that can be obtained by a prescription from patients' doctors. In addition, filtered water is not a good idea, since we have several patients who had NTM growing in their water filters.

[Reginald Tucker] Do we know why plumbing harbors these kinds of infections and can they be removed?

[Wellington S. Tichenor] NTM are naturally in the water supply, so as a result with being in the tap water, it deposits and can grow in the plumbing. Attempting to remove it is difficult because it would involve both changing the plumbing as well as removing NTM from the water supply. The former might be possible, but the latter is not because NTM is so difficult to kill.

[Reginald Tucker] Thanks, Dr. Tichenor. I've been talking with Dr. Wellington S. Tichenor about his study, *Nontuberculous Mycobacteria in Household Plumbing as a Possible Cause of Chronic Rhinosinusitis*, which appears in the October 2012 issue of CDC's journal, *Emerging Infectious Diseases*. You can see the entire article online at www.cdc.gov/eid.

If you'd like to comment on this podcast, send an email to eideditor@cdc.gov. That's e-i-d-editor at c-d-c-dot-gov. I'm Reginald Tucker, for *Emerging Infectious Diseases*.

[Announcer] For the most accurate health information, visit www.cdc.gov or call 1-(800)-CDC-INFO