

Mycobacterium avium complex (MAC)

Summary

Mycobacterium avium complex (MAC) are bacteria that can cause a life-threatening bacterial infection. The disease is also called MAC and it affects people with HIV who have a severely suppressed immune system and are not taking anti-HIV drugs (ART) or medication to prevent MAC. However, thanks to ART, MAC has become relatively rare in Canada and other high-income countries.

People with HIV whose CD4 counts are below 50 cells/mm³ are at high risk of developing MAC. Symptoms include fever, weight loss, sweats/chills, diarrhea, cramping, unexpected tiredness, and anemia (low red blood cells). Antibiotics are used to prevent and treat MAC.

What is MAC?

MAC is caused by bacteria called *Mycobacterium avium* complex. These bacteria are common in the environment. MAC can be found in soil, food, dust and water, and probably enters the body during breathing or when swallowing food or water.

MAC is one of a number of infections that can develop in people who are living with HIV, called opportunistic infections. These only occur if your immune system is quite weakened and your body becomes vulnerable to infections that would not affect you if you were healthy. Almost everyone has the bacteria that cause MAC in their bodies; however, it is only in people who have very weakened immune systems that these bacteria develop into an infection.

MAC can affect just one part of the body, such as the lungs or the digestive system, or it can spread throughout the body. When it has spread throughout the body it is called a disseminated infection.

FACT SHEET

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Who is at risk for MAC?

People who have a weakened immune system, due to HIV, cancer, long-term use of corticosteroid drugs, or an organ or bone marrow transplant, are at risk of developing MAC.

People with HIV most at risk of developing MAC are those who:

- have a CD4 count below 50 cells/mm³
- have a viral load over 100,000 copies/ml
- have previously had MAC or another opportunistic infection

Symptoms

The symptoms of MAC include:

- fever
- weight loss
- sweats/chills
- diarrhea
- cramping
- abdominal pain
- unexpected tiredness
- anemia (low red blood cells)

These symptoms may be very mild at first. It can take several weeks, even months, before someone with MAC feels ill.

Diagnosis

Because the symptoms of MAC are common to many infections, your doctor may order some tests before diagnosing the disease. These tests may check samples of your blood, tissue, body fluids or bone marrow, for the MAC bacteria. A bone marrow test is usually avoided because of its invasiveness. Levels of the liver enzyme ALP (alkaline phosphatase) in the blood are sometimes elevated in cases of MAC.

MAC can be difficult to diagnose: the MAC bacteria cannot always be identified in people who have the disease.

Treatment

Because MAC can be so serious and so difficult to diagnose, doctors often begin treatment as soon as they suspect a person may have MAC. Two or more antibiotics are usually used because MAC-causing bacteria can quickly become resistant to the effects of one drug alone.

The preferred first drug is called clarithromycin (sold as Biaxin). If you cannot tolerate this drug or it interacts with other medications you are taking, azithromycin (sold as Zithromax) may be used instead. Both of these medications also protect against other respiratory bacterial infections.

Ethambutol (Myambutol) is the recommended second drug. Some doctors prescribe a third, and even a fourth, drug. The third and fourth drugs might include rifabutin or other medications given by injection.

It is important to take these medications exactly as prescribed. If you miss a dose or stop and restart the medication, MAC can become resistant to the medication. If you have difficulty taking your medicines every day exactly as prescribed, tell your doctor or nurse right away.

Side effects from clarithromycin and azithromycin may include the following:

- nausea
- vomiting
- abdominal pain
- an altered sense of taste
- temporary liver injury

If your side effects are bothersome, ask your doctor for advice to manage them.

Symptoms of MAC usually improve within two to four weeks of starting treatment, although it may take longer for a person to feel better if they have more extensive disease or a severely suppressed immune system. If, after four to eight weeks of treatment, there is little or no improvement in symptoms, blood tests may be repeated. If MAC is still present in the blood, your doctor may prescribe a new combination of drugs.

If you are diagnosed with MAC and are not already taking ART, treatment guidelines recommend that you start, regardless of your CD4 count. This should strengthen your immune system and help you fight off the infection. ART should be started after the antibiotic treatment has been taken for two weeks, to reduce the risk of complications and drug interactions. If you are already taking anti-HIV drugs at the time of diagnosis, continue taking them unless your doctor tells you otherwise.

A portion of people develop IRIS (immune reconstitution inflammatory syndrome) shortly after starting ART. Symptoms of IRIS can include fever and worsening symptoms of MAC (or other infections). For people who develop moderate to severe symptoms of IRIS when already taking ART, doctors may prescribe medicines to help reduce the symptoms of IRIS such as corticosteroids.

Prevention

It is not possible to avoid being exposed to the bacteria that cause MAC. The best way to prevent developing the disease is to keep your immune system strong and your CD4 count well above 50. Taking ART every day exactly as prescribed can help keep your CD4 count above 50.

According to treatment guidelines, a person with HIV whose CD4 count is below 50 should also take medicines to help prevent the occurrence of MAC. The antibiotic drugs recommended for preventing MAC are one of the following:

- azithromycin (Zithromax)
- clarithromycin (Biaxin)

The combination of clarithromycin and rifabutin should not be used as it is likely to cause side effects.

If neither azithromycin nor clarithromycin can be tolerated, rifabutin is an alternative; however, this medication interacts with many commonly used medications, including some anti-HIV drugs, birth control pills and antifungal medications.

The medication your doctor prescribes to prevent MAC should be taken until your CD4 counts rise and remain above 100 for at least three consecutive

months. Do not stop taking your prescribed medications until you have talked to your doctor.

If, after stopping preventive medication, your CD4 count drops to below 50 again, talk to your doctor about resuming the preventive medication.

Reference

Panel on Opportunistic Infections in HIV-Infected Adults and Adolescents. Guidelines for the prevention and treatment of opportunistic infections in HIV-infected adults and adolescents: recommendations from the Centers for Disease Control and Prevention, the National Institutes of Health, and the HIV Medicine Association of the Infectious Diseases Society of America. October 19, 2015. Available at: <https://aidsinfo.nih.gov/guidelines/html/4/adult-and-adolescent-oi-prevention-and-treatment-guidelines/0>

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