

# Changing treatments for bacterial meningitis

David Spencer, MD

In their article “Nationwide implementation of adjunctive dexamethasone therapy for pneumococcal meningitis” (*Neurology* 2010;75:1533–1539), Brouwer and coworkers sought to determine whether adults with bacterial meningitis did better when treated with both steroid medication and antibiotics compared with antibiotics alone. When someone is brought to the emergency room with bacterial meningitis, they are quickly given antibiotics while the doctors do more tests to be certain of the type of infection. Recently, it was found that children with certain kinds of bacterial meningitis did better if they were treated with steroid medications along with antibiotics. Some studies have shown that steroids also help adults with bacterial meningitis. In earlier studies in adults, it seemed that adding steroids to antibiotics helped most in a common type of bacterial meningitis called pneumococcal meningitis (PM). In this study, the authors compared a large group of adults with PM who received mostly antibiotics alone to a large group who were treated with steroids and antibiotics. This way, the authors could see which group did better.

**HOW DID THE AUTHORS DO THE STUDY?** The study was done in the Netherlands, where there is a national health care system. This made it easier to do the study for 2 reasons: almost all of the laboratory samples to diagnose PM go to a single national laboratory and there are national guidelines about how to treat PM that are closely followed. Because of this, the authors were able to include almost all confirmed cases of PM in the country. They looked at 2 groups of patients who were treated either before or after there were national guidelines put in place. These guidelines suggest the use of steroids in all adults with PM.

The authors found 352 patients treated between 1998 and 2002 who were treated mostly with antibiotics alone (only 3% were treated early with steroids). They compared them to 357 patients treated between 2006 and 2009 who were treated mostly with antibiotics + steroids (84% were treated early with steroids).

Because there could be other differences between these groups besides the use of steroids, they

carefully compared the 2 groups for other factors (such as age and severity of meningitis). They made adjustments to make sure that the groups were similar and that they were comparing “apples to apples,” with the only difference being whether or not steroids were used. The main measure they used was to decide if patients had a “good outcome” (mild or no disability and able to return to work or school) or poor outcome (greater disability or death).

**WHAT DID THEY FIND?** Patients who received steroids did better. Only 39% of steroid-treated patients had poor outcome, compared with 50% of those who only got antibiotics. Fewer people died if they received steroids along with their antibiotics (20% died) than if they received antibiotics alone (30% died). Hearing loss can be caused by meningitis, and only 12% of the steroid-treated group had this problem, compared with 22% of the antibiotics-only group. These differences were still seen when corrections were made for other differences between the 2 groups. The biggest benefit of getting the steroid treatment was seen in older patients (over age 55) who had signs of severe inflammation on their laboratory tests and who received steroids before antibiotic therapy.

**WHAT DID WE LEARN ABOUT TREATING BACTERIAL MENINGITIS?** People often think that better treatment of infections must come from better antibiotics. This happens sometimes but often there are other ways to make big improvements. In poorer parts of the world, clean water supply, sanitation, and mosquito control may have a much bigger impact than introducing new antibiotics. Better support for very sick patients in the intensive care unit may help. And, as this study shows, using treatments like steroids to reduce inflammation may allow patients to recover better as the antibiotics and body’s responses stop the infection. The use of steroids in adults with PM is still being looked at but this study gives more support for their use. It is exciting to see how a whole country can adopt new treatment guidelines quickly, and this study may convince more doctors that steroids help patients with PM do better.

Section Editors  
David C. Spencer, MD  
Steven Karceski, MD

# About bacterial meningitis

**WHAT IS BACTERIAL MENINGITIS?** Meningitis is an infection or inflammation of the coverings of the brain called the “meninges.” Several types of infections can affect the meninges. Meningitis can be caused by bacteria, viruses, fungi, and other agents. This article focuses on one of the most common and treatable types: bacterial meningitis.

**WHO IS AT RISK FOR DEVELOPING BACTERIAL MENINGITIS?** Just about anyone could develop bacterial meningitis. Some groups of people are at higher risk. This includes people who have trouble fighting infections and those who may have had recent brain surgery or a bad untreated sinus or inner ear infection. This allows the infection to spread more easily. Different types of bacteria cause meningitis in infants, children, young adults, and older adults.

**HOW IS BACTERIAL MENINGITIS DIAGNOSED AND TREATED?** The common signs of bacterial meningitis are neck stiffness, fever, and confused thinking. Not everyone has all of these signs, so it is important for families and doctors to think about the possibility of meningitis even if the symptoms are not “classic.” If someone comes to an emergency room with these symptoms, they are usually treated with antibiotics right away until doctors can do more tests. The tests include blood tests, cultures of the

blood and spinal fluid for bacteria, and often a CT picture of the brain. This article looks at whether adults with bacterial meningitis should also get steroid treatment.

**WHY MIGHT STEROIDS HELP PATIENTS WITH BACTERIAL MENINGITIS?** The body responds to infections with inflammation. This helps to fight infection, but normal tissues can also get damaged in the “crossfire.” Some of the problems due to bacterial meningitis treated with antibiotics may come from too much inflammation. Researchers did studies on animals with meningitis and found that steroid treatment stops excessive inflammation. Children with a particular type of bacterial meningitis who were given steroids showed more improvement. As the current article shows, there are facts to back up the idea that steroids also help adults with bacterial meningitis. However, because not all studies have shown this, it is not settled yet.

## FOR MORE INFORMATION

CDC: Meningitis: Questions and answers  
[www.cdc.gov/meningitis/about/faq.html](http://www.cdc.gov/meningitis/about/faq.html)

Directors of Health Promotion and Education: Bacterial meningitis facts

[www.dhpe.org/infect/bacmeningitis.html](http://www.dhpe.org/infect/bacmeningitis.html)

Meningitis and encephalitis fact sheet

[http://www.ninds.nih.gov/disorders/encephalitis\\_meningitis/detail\\_encephalitis\\_meningitis.htm](http://www.ninds.nih.gov/disorders/encephalitis_meningitis/detail_encephalitis_meningitis.htm)

# Neurology®

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