FOOD-BORNE FRENZY

Serve up listeriosis prevention and treatment

By Mark Harris

I
f you have ever enjoyed a picnic, you might associate the activity with fresh air, sunshine, and perhaps an afternoon of swimming, volleyball, and other activities. And then there’s the food—burgers and hot dogs, hors d’oeuvres with cheese spread, peaches and cantaloupe, and maybe some smoked salmon or other treats.

For some, however, picnic foods could lead to other not-so-pleasant associations if the food was contaminated with Listeria monocytogenes. This bacterium is the source of a rare but potentially serious infectious disease: listeriosis. A diagnosis of listeriosis can translate into the misery of gastroenteritis or worse, with symptoms including fever, chills, fatigue, headache, abdominal pain, and nausea.

Listeriosis is diagnosed in about 1,600 cases a year, and about 16% of those diagnosed will die of the disease.¹ The high mortality rate is caused mostly by invasive listeriosis, a more severe form of the disease in which infection spreads from the intestines to the bloodstream.

This can lead to endocarditis (inflammation of the lining of the heart and its valves), sepsis (systemic and excessive inflammatory response to blood poisoning from pathogenic microorganisms or their toxins), and other serious complications. Pregnant women, people over the age of 65, and those with weakened immune systems, such as cancer or diabetic patients, are especially vulnerable to the risks associated with Listeria exposures.¹

Safety first

As a foodborne disease, listeriosis is an illness in which prevention is part of a larger public health challenge. Every year, an estimated 48 million people get sick from all types of foodborne illnesses. As a result, 128,000 are hospitalized and 3,000 die, according to the Centers for Disease Control and Prevention (CDC).² Overall, there are more than 250 foodborne diseases that have been identified, mostly related to bacterial, viral, or parasitical infections.³
Listeriosis

Prep for prevention
Share these four steps to food safety with patients:

Clean: Wash hands and surfaces often.
• Wash hands for 20 seconds with soap and water before, during, and after preparing food and before eating.
• Clean utensils, cutting boards, and countertops with hot, soapy water.
• Rinse fresh fruits and vegetables under running water.

Separate: Avoid cross-contamination.
• Use different cutting boards, plates, and utensils for raw meat, poultry, and seafood.
• Store raw meat, poultry, and eggs apart from other foods in the refrigerator.

Cook: Prepare to the right temperature.
• Heat food to an internal temperature high enough to kill germs (e.g., 145°F to 165°F).
• Use a food thermometer to ensure foods are cooked to a safe internal temperature.

Chill: Refrigerate promptly.
• Keep your refrigerator below 40°F and know when to throw food out.
• Refrigerate perishable food within two hours.
• Thaw frozen food in the refrigerator, in cold water, or in the microwave—never on the counter.

Today, technology and regulatory standards exist to safeguard sanitary food production. Pasteurization, refrigeration, public awareness of hygienic practices (e.g., handwashing), and other societal changes have gradually contributed to improvements in consumer food safety. Indeed, compared to the days of Upton Sinclair’s famous novel *The Jungle,* which exposed health dangers associated with unsanitary practices in the meatpacking industry during the early 20th century, there has been measurable progress in society’s ability to protect food from contamination.

But progress in public health improvements is not always as fast as desirable. “Food safety generally remains a very large health issue in the United States,” says Patricia Buck, who holds master’s degrees in both arts and science and is executive director of the Center for Foodborne Illness Research & Prevention (CFI), based in Grove City, Pennsylvania. “As the CDC data show, 1 in 6 Americans are sickened every year by some type of foodborne illness, which is a pretty high figure,” she says.

While safe food manufacturing is foundational to preventing foodborne disease, consumer education about foodborne illness and its prevention is also vital. Indeed, one concern of food safety experts is the tendency for many people to underestimate both the prevalence and the seriousness of many foodborne illnesses.

“The first hurdle we’ve discovered, whether we’re talking to the general public or even physicians, is that foodborne illness is kind of looked at as a temporary nuisance disease,” says Buck. “When you have that as an attitude, you don’t realize the impact that foodborne diseases are having on the general population.”

A case in point is the so-called stomach flu, says Buck. “Some foodborne pathogens like norovirus, for example, tend to be more prevalent in the summer when people are more often eating in nontraditional meal situations, such as picnics . . . , where pathogens are more easily transmitted,” notes Buck. “Many people will just think they have the stomach flu, when actually they have a foodborne illness.”

Norovirus is a frequent cause of foodborne diarrhea, vomiting, nausea, and stomach pain and is often described as the stomach flu though the norovirus is unrelated to influenza.

The CDC identifies the following illness-causing germs most commonly found in food:
• Norovirus
• Salmonella
• *Clostridium perfringens*
• Campylobacter
• *Staphylococcus aureus* (staph)

Where do *Listeria* bacteria fit in this register? Like other germs such as *E. coli* and *Clostridium botulinum* (botulism), *Listeria* is a less common source of foodborne contamination. There were 15 documented outbreaks of listeriosis in the United States between 2011 and 2018, according to the CDC.

Bacterium with bite
While listeriosis is rare and can be mild or asymptomatic, a confirmed diagnosis requires careful monitoring, especially in high-risk groups. For pregnant women, prompt treatment is needed to prevent the infection from progressing beyond the gastrointestinal (GI) tract to the placenta and harming the fetus.

“Listeriosis can be a very serious illness,” says Buck. “There are all sorts of possible complications from the *Listeria* bacteria. For a long time, listeriosis was the first- or the second-largest killer among foodborne pathogens. It has now been degraded to the third-largest cause of death, which means it is still a problem.”

To illustrate her point, Buck describes the case of an older man she met who had been sickened by an imported seafood product: “He was basically paralyzed with stroke-like symptoms. At first his doctors thought it was Guillain-Barré syndrome, but it wasn’t. It was from listeriosis. Some of the neurological damage that is done by listeriosis can be serious, even devastating, among those who survive. We’re also just starting to scratch the surface about the long-term health outcomes related to this foodborne illness. Even [for] a baby who survives listeriosis, it can take years for them to get up to speed with children of their own age.”

The more serious complications of listeriosis are associated with invasive listeriosis.
These symptoms can be present in patients with bacteremia (bacteria in the blood), meningitis (infection of the meninges, the membrane surrounding the brain and spinal cord), or meningoencephalitis (infection of the meninges and brain). In pregnancy, invasive listeriosis can cause spontaneous abortions, stillbirth, premature labor, and neonatal disease. Less commonly, listeriosis can pose risks of abscesses of the brain or liver and infections, such as pneumonia, osteomyelitis, septic arthritis, and peritonitis.

Typically, a longer incubation period is associated with the onset of invasive listeriosis. Unfortunately, in such cases there may be no clear-cut connection between the onset of symptoms and exposure to contaminated food.

“The incubation period for listeriosis can be … sometimes up to several weeks,” explains Buck. “This can make diagnosis really hard. A pregnant woman, an elderly person, or someone with cancer may present with ‘I don’t feel well,’ but they don’t immediately have any thought that two months ago they ate a ham sandwich and put some queso fresco [soft cheese often made from unpasteurized milk] on it. They don’t have any idea that’s why they’re now not feeling well.”

By contrast, when symptoms appear within a few days of known exposure to contaminated food, symptoms of this form of listeriosis (i.e., noninvasive) tend to be less serious and limited to the GI tract:

- Fever
- Muscle aches
- Headache
- Stiff neck
- Malaise
- Ataxia (loss of balance)
- Convulsions
- Mental confusion

- Fatigue
- Headache
- Abdominal pain
- Nausea

**Eating for two**

As noted, preventing listeriosis and other foodborne illness during pregnancy is an especially important concern. In 2014 the American College of Obstetricians and Gynecologists (ACOG) published the first guidelines for the medical management of listeriosis during pregnancy. The ACOG Committee Opinion titled “Management of Pregnant Women with Presumptive Exposure to *Listeria monocytogenes*” provides treatment recommendations and guidance on the prevention of *Listeria* exposure during pregnancy.

The ACOG Committee Opinion reflects the seriousness with which listeriosis risks are viewed by the obstetrics community despite its relatively low incidence. “Listeriosis is an extremely rare infection, but it is more likely to be diagnosed related to pregnancy for different reasons,” says Sarah N. Goetz, MD, an ob-gyn with the Marshfield Clinic Health System in Marshfield, Wisconsin. “I’ve seen it cited as about 10 times more likely in the pregnant population. In our ACOG Committee Opinion, they cite it at about 13 times higher than the general population. But we’re still talking about a very rare occurrence.”

Significantly, more than one-quarter of listeriosis diagnoses during pregnancy result in the loss of the fetus or newborn death. Infants with the disease may show signs of fever, lethargy, diarrhea, vomiting, irritability, poor feeding, and respiratory distress. A characteristic skin rash may also be present. Notably, listeriosis can have a serious impact on fetal and newborn health even when the mother experiences only mild symptoms or is asymptomatic.

The ACOG statement provides treatment recommendations based on three categories of *Listeria*-exposed pregnant women: (1) asymptomatic, (2) mildly symptomatic but without fever, and (3) fever with or without symptoms.

**Listen to gut feelings**

“My advice to medical assistants is to always follow precautions when you’re dealing with any kind of gastroenteritis or foodborne disease issues. If the patient has fever or diarrhea or is having bouts with vomiting, you want to make sure to practice the necessary hand-washing when you bring that patient into the room, during the intake, and after you leave the room. … During the intake, pay close attention to what the patient is telling you. Look at them. Listen to them. Listen for the important part of what they’re saying. A small thing they say to you could be really important and even save that patient’s life. I always make sure to speak to the provider about anything important I’ve observed.”

—Lolita Guasp, CMA (AAMA), Duke Gastroenterology Clinic, Durham, North Carolina

“The treatment basically involves antibiotic therapy, similar to the antibiotics we would use in women who aren’t pregnant, but with a few changes, because there are some antibiotics that we are more cautious about using during pregnancy,” says Dr. Goetz.

However, the recommendation is to forgo testing and treatment if a patient has been exposed but is asymptomatic. “Now, if the patient were to develop a fever, then the recommendation would be to test for *Listeria* with blood cultures and start her on IV antibiotics,” adds Dr. Goetz. “A typical first-line choice would be ampicillin, which is a penicillin-type medication. Also, [after delivery], we would want to do cultures of the placenta to see if there are any signs of *Listeria* there.”

The ACOG Committee Opinion advises physicians to use their clinical judgment to decide whether confirmatory testing is needed in patients with some symptoms but no fever, reports Dr. Goetz. “We could consider checking blood cultures in this circumstance, but in general the ACOG Opinion is not to be overly aggressive in treating patients who just have a risk of exposure,” she adds.
While listeriosis may be underreported early in the pregnancy, expectant mothers are still far more likely to be diagnosed with the illness than other groups. This is explained both by risks associated with pregnancy and the nature of medical care during pregnancy. “One reason is the weakened immunity women experience in pregnancy,” says Dr. Goetz. “But another potential factor is that listeriosis can have impacts upon the pregnancy. For example, if the listeriosis was a self-resolved illness with fever and a GI bug and you’re a nonpregnant 40-year-old person, you’re not going to go in to get tested. Unless you got extremely sick, you wouldn’t seek out testing. But if you’re a 30-year-old pregnant woman who has a stillbirth, we’re going to be doing more testing. We’re just going to be more attentive if you’re having significant illness during pregnancy.”

Notably, the obstetric community focuses more on listeriosis prevention than the improvement of an early listeriosis diagnosis. There are a few reasons for this. “First, the fact of the matter is a lot of people with listeriosis are asymptomatic, or there could be a significant delay in when they have symptoms,” notes Dr. Goetz. “If they do have symptoms, they may have a fever and some GI symptoms, but they get better. Thus, getting effective antibiotic treatment with good outcomes is often not very realistic. If we do end up prescribing antibiotics, it’s usually for someone who has a very severe bacterial disease [that is] present in their bloodstream, which is uncommon. This is why our focus is more on trying to decrease exposure.”

As such, prenatal care will typically cover dietary advice on healthy nutrition and preventive food safety practices, says Dr. Goetz: “During pregnancy, the guidelines advise women to avoid foods like lunch meat, cold cuts, and hot dogs unless they’ve been heated to an internal temperature of 165 degrees Fahrenheit, or steaming hot. It’s also important to be really cautious with produce, even when you’re not going to be consuming the rind or the skin, making sure even that produce is washed before you cut it, because of the risk of transmission. At our very first prenatal visit, we always stress the importance of avoiding foods with a high risk of Listeria contamination. We do this, along with talking about other food issues, like avoiding large quantities of fish that could be high in mercury, avoiding alcohol, and other concerns.”

**Turn the tables on Listeria**

An issue of recent concern to public health experts is the emergence of antibiotic-resistant strains of infectious diseases. While antibiotic drugs are important tools in the fight against disease, their widespread use (or overuse) in both medicine and food production over the years has gradually led to emerging strains of antibiotic-resistant bacteria.

Consequently, when effective antibiotic therapy is not available, the risks of foodborne illnesses leading to more severe health outcomes can escalate considerably. “We’ve seen the development of antibiotic-resistant strains of Salmonella, Campylobacter, and E. coli, which is extremely worrisome to everyone in food safety,” says Buck. “If these germs get into a food product that causes widespread illness, they can be very hard to treat. This is a huge threat not only for food safety but also for all sorts of other infections. In hospital care, for example, everyone’s concerned about new antibiotic-resistant types of tuberculosis. This is actually a global problem. In my estimation, food safety is going to continue to be a challenge until we can get better control of antibiotic resistance.”

These concerns underscore why both food industry production standards and consumer awareness of safe food practices are more important than ever. Indeed, prevention remains the public health watchword for reducing the incidence of foodborne illness, including listeriosis.

In this context, health care providers can be key players in promoting the national conversation about safe food practices, says Shauna C. Henley, PhD, a food safety and nutrition expert with the University of Maryland Extension in Baltimore and board member of the Partnership for Food Safety Education. “In women’s health, for example, providers can turn key issues about food safety into...
conversations about what pregnant women are doing in terms of their diets,” explains Dr. Henley. “Are they heating certain types of foods up to a safe minimum temperature? Are they throwing away leftovers in a timely fashion? Do they make sure their refrigerator is at a safe temperature? This could lead to that conversation about making sure pregnant moms have an appliance thermometer in the refrigerator to ensure a temperature of 40 degrees Fahrenheit or lower. These are conversations we should be having to make sure people are keeping to safe food handling practices.”

As Dr. Henley notes, some consumer surveys have shown that in general few people have heard of Listeria monocytogenes or Toxoplasma gondii, the latter of which is linked to infectious toxoplasmosis. “I think just being able to identify a potential issue is half the battle,” says Dr. Henley. Like Dr. Goetz, she emphasizes the importance of educating women about safe food practices in pregnancy, adding that this is a particular concern for pregnant Hispanic women, who are 24 times more likely to get listeriosis than others.

Notably, outreach on safe food handling practices can also be a challenge for another at-risk group—adults 65 years and older, who are about 4 times more likely to get listeriosis than the general population.10 “We see in some of the research that [they are] a slightly harder population to reach,” says Dr. Henley. “Food handling behaviors of the past are so ingrained that it’s sometimes harder to [effect] change. So, how do we reach these older populations? Is it through talking to their … children and encouraging them to be mindful? These are issues we need to be aware of and think about.”

In fact, older individuals can often face unique living circumstances that could potentially increase their vulnerability to contaminated foods. “They could possibly be living alone, and their interest preparing food for themselves might be lacking,” observes Dr. Henley. Also, older individuals may have impaired senses of smell and sight, which may prevent them from noticing that food is spoiled. “If someone is on a reduced or fixed income, that’s another concern,” she adds.

“They might not want to throw certain foods away because [doing so is] ‘throwing money out the window.’ And even just some of the dexterity required, in terms of being able to handle food safely, might become an issue.”

Recipes for success
For health care providers, Dr. Henley emphasizes that the conversation about food safety is one the entire health care team can join. In fact, she says teachable moments can occur not only during time with the physician or other practitioners but also when medical assistants room patients, assist with patient intake, or otherwise interact with patients.

“It can be a very simple conversation to start with that sparks some curiosity in patients about safe food handling,” says Dr. Henley. “This might involve an innocent question about who someone is preparing for dinner [that] night or maybe just letting patients know the office has some educational materials available about foodborne illnesses and safe food handling practices that might be helpful for their household.”

Dr. Goetz agrees: “Our medical assisting staff can be very comfortable explaining some of the food guidelines to patients, if they’re calling in with questions. Of course, some of the more complex medical topics will be addressed by or referred to the physician, but this is a topic where I think we can all be a source of information. Especially if we’re in the midst of a foodborne disease outbreak [and] the topic is in the news and people are concerned, I think it’s good for our staff to be aware of these issues.”

Dr. Henley offers some tips for practices looking to expand their educational resources. “First, in terms of resources, the FDA [U.S. Food and Drug Administration], USDA [U.S. Department of Agriculture], and the CDC have some really helpful brochures that anyone can download for free and print,” she says. “The Partnership for Food Safety Education also has free resources available. If you look into some of the extension publications, like different land-grant universities, you might find some basic fact sheets that would be good to have in a waiting room or even smaller brochures that people can grab and go. A medical practice might even explore whether they can support any food safety campaigns sponsored by their local county health department or other groups.”

When it comes to reporting listeriosis or other foodborne illness, the physician is responsible for promptly reporting such cases to the local city or county public health department, according to the FDA.11 The CDC advises physicians to report potential foodborne illnesses as well when two or more patients present with a similar illness caused by a common food.12

A variety of public health resources exist to help combat foodborne disease outbreaks. Among others, the Foodborne Disease Outbreak Surveillance System (FDOSS), a CDC program, collects and reports data on a range of foodborne disease outbreaks. The Listeria Initiative is a collaboration between the CDC and state and local health departments that asks ill patients to complete a questionnaire about recent food consumption. The information is then analyzed by epidemiologists to help determine the source of the illness. Similarly, PulseNet, a CDC-led national network of public health laboratories, provides scientific support to disease outbreak investigations.13

In recent years, the CDC, FDA, and other groups have also employed a new technology called whole genome sequencing (WGS) to

Quick bites
Centers for Disease Control and Prevention—Food Safety
http://www.cdc.gov/foodsafety/index.html

The Center for Foodborne Illness Research & Prevention
http://www.foodborneillness.org

Partnership for Food Safety Education
http://www.fightbac.org

Food Safety.gov—Federal Food Safety Information
https://www.foodsafety.gov
improve identification of foodborne pathogens during suspected outbreaks. The WGS technology reveals the complete DNA makeup of an organism, genetic information that allows public health authorities to quickly identify the scope of a foodborne illness outbreak.13

Making the most of these public health resources, in addition to taking the appropriate prevention and treatment measures, is essential to an effective public health response to listeriosis and other foodborne illnesses.1

References