Norovirus in Deli Meats Takes Toll on Rafters

BY HEIDI SPLETE
Senior Writer

ATLANTA — Just when you thought that prepackaged deli meat was safe, a gastroenteritis outbreak among river rafters in Colorado was traced to norovirus in prepackaged chicken and beef, Dr. Ezra J. Barzilay said at the International Conference on Emerging Infectious Diseases.

On Sept. 18, 2005, the National Park Service contacted the Centers for Disease Control and Prevention to report an outbreak of 136 cases of gastroenteritis in 3 weeks among rafters who participated in group trips on the Colorado River, said Dr. Barzilay, an epidemiologist at the CDC.

"Norovirus accounts for about 50% of all foodborne outbreaks in the U.S.," he noted.

The cases occurred among participants in 12 of 90 trips conducted by 16 rafting companies during the 3-week period.

Most rafting trips last from 2 to 14 days. Perishable food is carried in cold storage containers on each raft. Typical rafts carry six to eight people as well as a guide, and each raft carries a portable excrement storage container known as an "ammo can."

Dr. Barzilay and his colleagues interviewed rafters who went on trips on which people became ill. An "ill rafter" was defined as a rafter or guide who suffered vomiting or diarrhea while on a rafting trip between Aug. 19 and Sept. 12, 2005. An "ill trip" was defined as a trip with three or more ill rafters. "Cases" were individuals who became ill within the first 48 hours of a trip, and controls were individuals who were not ill within 72 hours of the start of the trip or who were never ill.

"The mean incubation for norovirus is about 33 hours, so we looked at possible exposure to the virus on the launch date of any given trip," Dr. Barzilay said. A review of 57 cases and 96 controls showed that cases were 7.3 times more likely than controls to have consumed deli meat. Deli meat was served for either lunch or dinner on the first day of each of the trips on which people became ill.

Three of five composite stool samples from the "ammo cans" on trips sponsored by two rafting companies tested positive for norovirus, as did two of four individual stool samples from ill rafters; all positive norovirus samples were of the same genetic sequence.

The rafters came from different geographic locations, and the ill trips did not use the same raft guides or equipment. All ill trips were launched by 5 of 16 rafting companies, and these 5 companies shared three food suppliers. Both chicken and beef from a plant that supplied meats to five rafting companies tested positive for norovirus, despite the fact that the meat was vacuum-packed and frozen at –10° F for 7-28 days before shipping.

While visiting the plant where the contamination was thought to originate, the CDC investigators learned that a food handler had become ill around the time that the deli meat for the rafting companies was processed. "He was most likely still shedding virus when he returned to work, and he cross-contaminated that meat," Dr. Barzilay said.

"This is the first report of food product contaminated at the point of processing in a government-inspected plant," he noted.

Physicians who see patients with foodborne illnesses should consider that food involved in disease outbreaks may have been contaminated at the point of processing, rather than the point of service.

"Although we often think of norovirus contamination occurring at point of service, we suspect that contamination can also occur at point of processing for prepackaged and ready-to-eat foods," Dr. Barzilay said.

Norovirus is highly resilient, and it can survive on surfaces for extended periods of time, he noted. Food handlers who become ill should stay home from work for 24 hours after their symptoms resolve, he added. ■

Raspberries Implicated in Outbreaks of Norovirus

BY HEIDI SPLETE
Senior Writer

ATLANTA — As summer approaches, it may be wise to be wary of berries. Five norovirus outbreaks affecting several hundred people in Denmark in 2005 were traced to a single batch of contaminated frozen raspberries, Dr. Gerhard Falkenhorst reported at the International Conference on Emerging Infectious Diseases.

A study confirmed that all the desserts associated with the outbreaks were made with crushed, frozen raspberries from a batch imported from Poland.

The first cases of illness in each outbreak appeared within 24 hours after the patients ate a raspberry dessert, and norovirus was detected in stool samples from all but one outbreak, said Dr. Falkenhorst, of the Statens Serum Institut, Copenhagen.

The outbreaks occurred between May and September 2005, and all of them involved mass catering settings—one hospital, one "meals-on-wheels" service, one restaurant, and two nursing homes. All of the outbreaks involved desserts made with frozen raspberries.

The first outbreak occurred in a hospital, and both patients and staff members reported acute gastroenteritis. Ultimately, nearly 450 cases occurred in this outbreak. Several cases occurred simultaneously, which suggested a foodborne cause, and norovirus was discovered in food tracings that implicated a dessert made with raspberries that were part of a single, large shipment from Poland.

Although the supplier began a voluntary recall of the shipment, the affected raspberries had already been sent to other clients and were linked to several other outbreaks.

The second outbreak affected about 70 residents and staff members at a nursing home the day after a raspberry dessert had been served, and the third outbreak struck several hundred clients of a "meals-on-wheels" service, which reported diarrhea and vomiting among its clients within 2 days after they had received raspberry desserts. The attack rate was especially high among patients aged 85 years and older, Dr. Falkenhorst noted.

A case-control study confirmed that all the desserts associated with the outbreaks were prepared with crushed, frozen raspberries from the same batch imported from Poland. The same norovirus genogroup (II.7) was identified in 24 of 54 stool samples from one outbreak and 9 of 11 stool samples from the second outbreak. Also, norovirus genogroup II.4 was found in 15 of 15 samples from a third outbreak and genogroup II.b was found in 4 of 8 samples from another outbreak.

This series is the first time several norovirus strains were found in stool samples involving the same raspberry vehicle, Dr. Falkenhorst noted. ■

Most Cases of Salmonella *Occurring in The United States Are Isolated Events*

ATLANTA — About 80% of *Salmonella* cases in the United States in 2004 and 2005 were domestically acquired isolated incidents, Dina Hoefer reported in a poster presented at the International Conference on Emerging Infectious Diseases.

In contrast, about 12% of infected patients with known travel status had traveled internationally, and almost 8% of cases were associated with a recognized outbreak, based on data from the Foodborne Diseases Active Surveillance Network (FoodNet).

FoodNet is a program supported by the CDC, the U.S. Department of Agriculture, and the FDA; it seeks to link foodborne illnesses to specific foods and settings based on data from 10 U.S. sites.

Ms. Hoefer, of the New York Department of Health in Albany, and her colleagues reviewed FoodNet surveillance data for 12,159 cases of *Salmonella* infection from 2004 and 2005. Of the 7,500 patients whose travel status and outbreak associations were known, 878 had traveled internationally within 7 days prior to illness onset, and 583 were known to be part of a documented *Salmonella* outbreak.

Overall, the isolated domestically acquired cases were significantly more likely to require hospitalization, compared with travel-related cases (relative risk 1.5) or cases associated with outbreaks (RR 1.4). The most common serotypes among all cases were *S. enteritidis* and *S. typhimurium*, but *S. enteritidis* accounted for a significantly higher proportion of travel-related cases, compared with *S. typhimurium* (35% vs. 9%).

In addition, isolated domestically acquired cases were more likely than outbreak-associated cases but less likely than travel-related cases to have *Salmonella* isolates in the blood or cerebrospinal fluid.

—Heidi Splete

Proxy Clinical Markers for Shiga Toxin Disease Identified

WASHINGTON — The severity of disease caused by Shiga toxin–producing bacteria may be tracked with a new scale in development that uses clinical markers of disease rather than direct measurement of toxin load, Dr. Martin M. Bitzan reported at a biodefense research meeting sponsored by the American Society for Microbiology.

"While the clinical diagnosis of hemolytic uremic syndrome appears straightforward, there are no defined criteria to describe and grade the severity of hemolytic uremic syndrome or of the preceding gastrointestinal disease," Dr. Bitzan of the department of nephrology, Montreal Children's Hospital, said in a poster.

Measurement of Shiga toxin in body fluids or tissue is currently not feasible, which makes it necessary to develop proxy markers of Shiga toxinemia, he and his colleague noted.

Sporadic cases or outbreaks of infections involving Shiga toxin–producing bacteria mostly occur in children in community settings. The majority of these infections in North America are caused by *Escherichia coli* serotype O157:H7.

The researchers developed a disease severity scale comprising four distinct facets of Shiga toxin–producing *E. coli* infections: enteropathy, inflammation and vasculopathy, thrombotic microangiopathy, and nephropathy.

They tested the scale on a database of 146 consecutive patients aged 1-16 years with Shiga toxin–producing *E. coli* who had bloody (85%) or nonbloody (15%) diarrhea that resulted in partial (5%) or complete (13%) hemolytic uremic syndrome (HUS). The scores of patients with HUS on all of the scale's components except enteropathy became significantly worse 3-5 days after disease onset than those without the syndrome. The scale is being validated in another study.

—Jeff Evans