Trichinellosis Outbreaks -- Northrhine-Westfalia, Germany, 1998-1999

From November 1998 through January 1999, 52 cases of trichinellosis were identified by the public health surveillance systems in 11 cities and districts of the state of Northrhine-Westfalia (NRW), Germany. In comparison, zero to 10 cases were reported annually in Germany during 1987-1997. This report summarizes the investigation of these cases, which indicated the existence of two simultaneous outbreaks--one caused by contaminated ground meat and the other by a commercially prepared raw smoked sausage.

A case of trichinellosis was defined as a positive serologic test for Trichinella antibodies (IgG and/or IgM) in a NRW resident after September 1, 1998. Preliminary investigations indicated that 22 of 23 case-patients from 10 cities and districts in NRW had eaten a specific brand of raw smoked sausage made by company A; however, none of eight case-patients in Mettmann-Langenfeld (ML) had eaten this product. To identify the cause of each outbreak, two separate case-control studies were conducted. Case-patients and controls were interviewed by telephone using a standardized questionnaire. For case-patients, information about food consumption was gathered for the 4 weeks before onset of illness; for controls, information was gathered from September 1, 1998, to the date of the interview. For each case-control study, controls were selected randomly from the same town using random-digit dialing. Analyses by individual cases and family clusters yielded similar results. Only data by individual cases are presented in this report.

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**Case-Control Study**

Eight case-patients from ML were compared with 29 controls from the same area. Case-patients included a resident of another town who had eaten with ML case-patients. The seven symptomatic case-patients became ill during November 4-24, 1998 (Figure 1). Symptoms included myalgia (six patients [75%]), fever (five [63%]), headache (five [63%]), facial edema (four [50%]), and diarrhea (two [25%]). Seven case-patients received medical care; none was hospitalized. One control reported symptoms consistent with trichinellosis (i.e., myalgia, fever, and fatigue). Among the eight case-patients and 28 controls who had histories of eating ground pork, seven case-patients (88%) and 11 (39%) controls reported having eaten ground pork (odds ratio [OR]=10.8; p=0.02). Among the seven case-patients and 29 controls who had histories of eating ground mixed meat (beef and pork), all case-patients and 21 (72%) controls reported having eaten the product (OR=∞, p=0.3). No
case-patients or controls reported having eaten raw smoked sausage produced by company A. The location where the mixed meat and ground pork had been bought was available for six case-patients; all had obtained meat from supermarket A. In comparison, nine of 21 controls who had eaten mixed meat (OR=infinity, p=0.02) and three of 11 controls who had eaten ground pork (OR=infinity, p=0.009) had bought it from supermarket A.

Environmental Investigation

Frozen samples of ground meat bought in early November at supermarket A were collected from three case-families in ML. Larvae of Trichinella were detected in one sample of ground mixed meat. Supermarket A belongs to a chain of supermarkets with a central meat distribution station. During the week in which the contaminated meat was processed, the company had bought pork from nine different abattoirs in Germany, Belgium, and the Netherlands that had received pigs from approximately 40 producers. It was not possible to determine which producer provided the contaminated meat.

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Case-Control Study

Forty-four cases were identified from 10 cities in NRW other than ML. The 38 symptomatic case-patients with known dates of symptom onset became ill during October 6-December 8, 1998 (Figure 1). Additional data were obtained from 39 of the 44 case-patients and from 44 controls from the same area. Symptoms included myalgia (30 [77%]), fever (28 [72%]), headache (21 [54%]), diarrhea (19 [49%]), and facial edema (17 [44%]). One control reported typical symptoms of trichinellosis (i.e., diarrhea, headache, fever, myalgia, and leg edema). Of 39 case-patients, 32 (82%) received medical care, and 15 (38%) were hospitalized for a median of 13 days (range: 1-64 days). Among the 38 case-patients and 43 controls who had histories of eating smoked sausage, all case-patients and 30 (47%) controls reported having eaten raw smoked sausage (OR=infinity; p less than 0.0001). Of 38 case-patients, 34 reported having eaten raw smoked sausage produced by company A (OR=infinity; p less than 0.0001); no controls reported eating the product. Case-patients were more likely than controls to have eaten ground pork (OR=6.2; p=0.001), mixed ground meat (OR=7.0; p=0.0002), and sandwiches with raw ground meat (OR=4.7; p=0.002). To control for possible confounding by smoked sausage consumption, a stratified analysis was conducted using only case-patients and controls who had eaten smoked sausage. The strength of association between consumption of ground pork (OR=2.6; p=0.2), ground mixed meat (OR=2.7; p=0.2), or sandwiches with raw ground meat (OR=2.0; p=0.3) and illness was lower among these persons.

Environmental Investigation

Because the usual incubation period of trichinellosis is 8-15 days, the environmental investigation focused on the meat that had been used for sausage production during the last week of September. During this week, company A had produced its sausages from deep frozen pork from Belgium and Germany and from 1650 lbs (750 kg) of fresh pork neck from Spain. Samples from neither the meat nor the sausages remained for investigation. Samples from later production lots were negative for trichinellosis.
The meat from Belgium and Germany had been frozen at 5 F (-15 C) for at least 20 days. The trichinellosis control certificates for the fresh pork neck provided by the abattoir in Spain had control numbers that did not match the control numbers on the meat. Further investigations are ongoing.

Reported by: S Rehmet, G Sinn, O Robstad, A Ammon, Dept of Infectious Disease Epidemiology, Robert Koch Institute; K Noeckler, National Veterinary Reference Laboratory for Trichinellosis, Federal Institute for Health Protection of Consumers and Veterinary Medicine, Berlin; D Lesser, Ministry of Women, Youth, Family and Health; H David, Ministry of Environment, Environmental Planning and Agriculture, Northrhine-Westfalia; G Scherholz, Health Dept; D Stegemann, Veterinary Dept, Bonn; K-D Erkrath, Health Dept, Bottrop; D Pechmann, Health Dept, Düsseldorf; R Kundt, Health Dept; W Lotz, Veterinary Dept, Essen; G Oltmans, Health Dept, Gelsenkirchen; R Lange, Health Dept; M Steigert, D Franke, P Hagelschur, Veterinary Dept, Mettmann-Langenfeld; J Laumen, Health Dept, Neuss; U Nogay, Health Dept, Recklinghausen; M Dixius, Health Dept, Rhein-Sieg-Kreis; J Eichenberg, Health Dept, Solingen; F Dinse, Health Dept, Viersen. Office of the Director, National Center for Infectious Diseases, CDC.

Editorial Note:

The findings in this report indicate the existence of two outbreaks of trichinellosis. Because the exact source of the meat from either outbreak could not be determined, it is unclear whether the outbreaks were related. The large outbreak from the smoked sausage could have heightened awareness of trichinellosis in NRW, which resulted in the identification of the small outbreak that may have been otherwise unnoticed.

The 52 cases identified in these outbreaks may represent only a fraction of persons actually infected. The severity of trichinellosis varies from asymptomatic infection to death; however, only persons ill enough to seek medical care or their family members were identified in this investigation. In addition, the approximately 1650 lbs (750 kg) of fresh pork was sufficient to produce an estimated 10,000-40,000 sausages (W. Lotz, Veterinary Department, Essen, personal communication, 1999), which were distributed in at least 10 cities and districts with approximately 2 million inhabitants. As a result, hundreds of persons potentially were exposed. Approximately 2% of controls had symptoms compatible with trichinellosis.

Trichinellosis outbreaks in Europe typically are caused by meat or meat products distributed locally from a single infected animal (1-6). In comparison, the smoked sausage outbreak described in this report was caused by a widely distributed commercial product made from domestically produced meat and meat imported from several countries. The nature of this outbreak reflects a new foodborne outbreak scenario in which localized outbreaks are replaced by diffuse outbreaks spread over wide areas (7). These diffuse outbreaks, which result from low-level contamination of commercial food products, may not become apparent immediately unless the pathogen is unusual, such as occurred in this outbreak, or unless specific surveillance systems are designed to detect them (7).

In Germany, trichinellosis screening of all pork has been mandatory since 1937. The extremely low prevalence of Trichinella in pigs--three or fewer infected pigs identified among approximately 40 million pigs slaughtered each year in Germany--has led to debate about the need for continued routine testing of all slaughtered pigs. This outbreak indicates that it may be difficult to maintain a sufficient sensitivity of screening to prevent all outbreaks.
under routine conditions. Screening of meat for Trichinella involves visual identification of the larvae. The extremely low prevalence of trichinellosis among pigs may lead to a lack of experience in identifying positive samples, worker fatigue, and complacency. Nevertheless, this outbreak demonstrates that modern mass food production can produce large outbreaks of trichinellosis when screening is absent or fails.

References

FIGURE 1. Cases of trichinellosis, by week of symptom onset — Northrhine-Westfalia (NRW), Germany, weeks beginning October 5–December 20, 1998*

*Dates of illness onset were known for 45 of 46 symptomatic persons.

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