

**Laboratory and Epidemiology Communications**

**Enterohemorrhagic *Escherichia coli* O26 Outbreak Caused by  
Contaminated Natural Water Supplied by  
Facility Owned by Local Community**

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Clinical manifestation of food poisoning caused by enterohemorrhagic *Escherichia coli* (EHEC) O157 usually requires 4-8 days of incubation. As a result of this long incubation, the suspected foods have often been discarded by the time the investigation takes place, and identifying the culprit food is difficult. In a recent EHEC O26 outbreak in Shimane Prefecture, however, we were able to trace the source of the infection to natural water supplied by a water facility run by a local community.

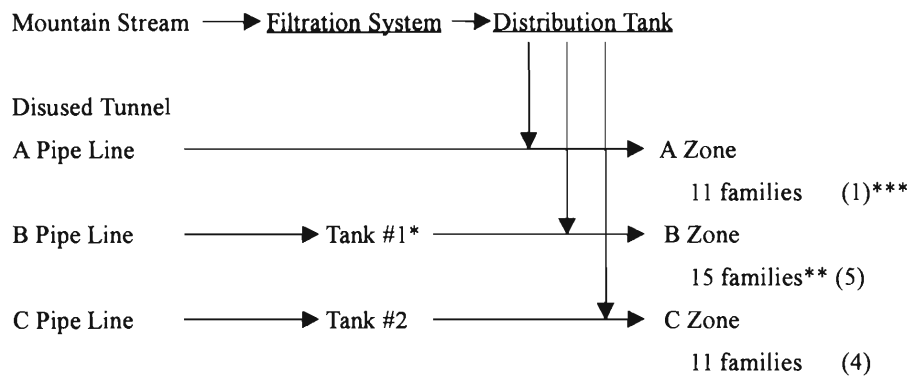
On 28 June 2001, the local health and welfare center received a report of isolation of EHEC O26 in the case of a 2-year-old girl with hemorrhagic diarrhea. An epidemiological investigation was initiated immediately. It was found that the patient's family used the city service water as potable water, and used natural water supplied by a water facility run by the

local community for other uses such as bathing, washing dishes, etc. Two sources of water were used for the community facility; a mountain stream and a disused tunnel. Water from the mountain stream was filtered through a simple style filter system using sand and pebbles, combined with water from the tunnel, and distributed to the community of 37 families, comprised of 141 residents including the patient (Fig. 1).

Water specimens from the source-point of the mountain stream and from tank #1, where water from the tunnel was stored (Fig. 1), were positive for EHEC O26. Water specimens taken from the mountain stream, upstream of the source-point, from the water in tank #2, from the inflow of the filtered mountain stream water to the distribution tank, and from the water stored in the distribution tank (Fig. 1) were negative.

A community gathering was called, and information on the incidence was distributed. The residents were asked not to use the community-supplied water. The water sources were immediately disinfected to prevent further spread of infec-

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\* Positive for EHEC O26  
 \*\* Zone in which the patient's family lives.  
 \*\*\* Figures in parentheses indicate the number of EHEC O26 carriers.

Fig. 1. Distribution of water supplied by the community water facility.

tion. Investigation of the use of the community water and bacteriological examination of fecal specimens of the residents were also conducted.

For detection of EHEC, 6-24 h culture in TBS broth (Tryptosoy broth) at 42°C followed by culture on the CTR-Mac and DHL selection plates was adopted. The suspected colonies were further submitted to biochemical tests, PCR amplification of the genome, and serological diagnosis.

There were no diarrheal patients other than the above-mentioned patient among family members of the patient or the residents of the community. EHEC O26 was isolated from fecal specimens of five (three adults and two children) among nine family members and from fecal specimens of five among 116 residents who used the mountain stream water. All 12 isolates, one isolate from the patient, 10 isolates from the carriers, and one isolate from tank #1, were EHEC O26:H11.

Antibiotic sensitivity was tested by the KB method (1) by using kanamycin, ciprofloxacin, tetracycline, gentamicin, fosfomycin, sulfamethoxazole-trimethoprim, nalidixic acid, chloramphenicol, cefotaxim, ampicillin, trimethoprim, and streptomycin. The isolates were resistant to kanamycin, tetracycline, ampicillin, and streptomycin. Not many incidences of multi-antibiotic resistant EHECs have been previously reported.

Pulsed-field gel electrophoresis analysis was performed according to the method recommended by the National Institute of Infectious Diseases (2) on *Xba*I-digested DNA materials. All isolates showed an identical pattern.

The source of the EHEC O26:H11 that caused the present outbreak remained obscure, as in previous water-borne cases (3,4). Given that human access to the water source facility was rare, contamination of the water by wild animal excrement

was a possibility. Actually, Sudo et al. (5) reported isolation of EHEC from two among 53 antelopes examined (3.8%). It should be noted that there was a heavy rainfall in the region of the outbreak several days before the incidence. Inflow of a large amount of contaminated water to the facility may have resulted in water treatment failure.

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