CASE REPORTS

Escherichia fergusonii Bacteremia in a Diabetic Patient with Pancreatic Cancer

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Although Escherichia fergusonii has been identified for decades, it has rarely been recovered from clinical specimens and its clinical significance remains unclear. We describe a case of E. fergusonii bacteremia in a diabetic patient with pancreatic cancer. The isolate was confirmed by three commercial identification systems and 16S rRNA gene sequence analysis. The patient’s clinical condition gradually improved, and repeated blood cultures were negative after antibiotic treatment with an in vitro active agent (ceftriaxone).

CASE REPORT

A 73-year-old man who had a history of diabetes mellitus and pancreatic cancer presented with fever, vomiting, and abdominal discomfort for 1 day. On arrival at the emergency department, his body temperature was 38.6°C, and blood pressure was 98/51 mm Hg. Physical examination was unremarkable except for abdominal tenderness without rebounding pain. The laboratory findings were as follows: white blood cell count, 6,920/µl with predominance of neutrophils (93%); C-reactive protein level, 10.7 mg/dl (normal reference, <0.8 mg/dl); lactic acid level, >12 mmol/liter (normal reference, 0.5 to 2.2 mmol/liter). Chest radiography did not show pneumonia patch, and urinalysis did not reveal pyuria. Computed tomography (CT) of the abdomen showed narrowing of celiac artery, superior mesenteric artery, and inferior mesenteric artery; dilatation of bowels; and edema of bowel wall. Under the impression of ischemic bowel diseases with severe sepsis, intravenous piperacillin-tazobactam (4.5 g every 8 h) was administered after collection of two sets of blood cultures. Four days later, two sets of blood cultures both grew Klebsiella pneumoniae and Escherichia fergusonii. These two isolates were susceptible to amoxicillin-clavulanic acid, piperacillin-tazobactam, cefuroxime, ceftriaxone, cefepime, imipenem, ciprofloxacin, gentamicin, and amikacin but resistant to ampicillin by the disk diffusion method. Antibiotic was shifted to ceftriaxone (1 g every 12 h) thereafter, the patient’s fever gradually subsided, and repeat blood cultures 7 days after ceftriaxone use were negative. However, another episode of nosocomial infection with candidemia occurred on the 30th day after admission, and acute respiratory failure and shock developed then. Despite intravenous fluconazole being added for fungemia, the patient finally died on the 37th day after admission.

The E. fergusonii isolate was identified by using three commercial identification systems: Enterotube II (Becton Dickinson Diagnostic Systems, Sparks, MD) (biocode 36640), PMIC/ID-30 (Becton Dickinson Diagnostic Systems) (confidence value, 97%; sequence number 420070812594), and Vitek 2 system GN card (bioMérieux Inc., La Balme les Grottes, France) (probability of identity, 94%; bionumber 660510160542611). The organism was positive for fermentation of amygdalin and cellobiose but negative for melibiose and sorbitol. This organism was further confirmed to the species level by partial 16S rRNA gene sequence analysis as previously described (7). The amplification products, obtained by PCR with primers 8FPL (5'-AGAGTTTGATCTCGGCTCAG-3') and 1492RPL (5'-GGTACCTTGTTACGACTC-3'), were sequenced, and the sequences were compared to known 16S rRNA gene sequences in the GenBank database of the National Center for Biotechnology Information by using the BLAST algorithm. The species with the best match was Escherichia coli (accession number HQ169124.1; identity, 99% [863/865 nucleotides]) and E. fergusonii (accession number HQ259938.1; identity, 99% [873/879 nucleotides]). The organism was confirmed to be E. fergusonii by positive reaction to adonitol revealed by the Enterotube II system.

E. fergusonii, a Gram-negative rod and a member of the Enterobacteriaceae, was formerly known by the vernacular name enteric group 10 (EG 10) and was further proposed as a new species by Farmer et al. in 1985 (1). Although this pathogen was identified decades ago, it has only seldom been recovered from clinical specimens, including blood, urine, wound,

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bile, and stool (1–6). The clinical manifestations of *E. fergusonii* included bacteremia, acute cystitis, urinary tract infection, and diarrhea (1–5). In this report, *E. fergusonii* and *K. pneumoniae* bacteremia was thought to result from intra-abdominal infection due to ischemic bowel disease. It is the first reported case of *E. fergusonii* infection in Taiwan and further expands the disease spectrum of *E. fergusonii* diseases.

In this case, the patient’s underlying pancreatic cancer and diabetes mellitus and his immunocompromised status might have been the risk factors for *E. fergusonii* sepsis. It is consistent with the finding by Funke et al. (2) that *E. fergusonii* was isolated from the bile, blood, stool, and abdominal wound of a patient with pancreatic cancer. Although experience with this pathogen is limited, *E. fergusonii* infection should be considered one of the enteric pathogens in immunocompromised patients. Our patient had a true and polymicrobial bacteremia due to *E. fergusonii* and *K. pneumoniae*, as shown by recovery of these two organisms from multiple positive blood cultures; however, the dominant role of the two organisms remained unclear.

Optimal treatment of infections caused by *E. fergusonii* remains undetermined, mainly because of the rarity of infections caused by this pathogen. Multidrug-resistant or extended-spectrum β-lactamase-producing *E. fergusonii* strains were found in patients with acute cystitis (5, 6). The *E. fergusonii* isolate found in our patient was resistant to ampicillin alone. Because of the difficulty in drawing inferences about optimal antibiotic treatment based on these limited experiences, more clinical isolates of *E. fergusonii* are urgently needed to investigate its antibiotic susceptibility results.

In conclusion, our report demonstrates that an immunocompromised patient developed intra-abdominal infections caused by *E. fergusonii* and suggests that *E. fergusonii* is a rare but emerging pathogen.

**REFERENCES**