CMJ
www.cmj.ac.kr

A Case of Resembling Hemolytic Uremic Syndrome Caused by *Escherichia fergusonii* in an Immunocompetent Adult

Soyoon Hwang[1], Hyun-Ha Chang[1,*], Sohyun Bae[1], Yu Kyung Kim[2], and Jungmin Kim[3]

[1]Division of Infectious Diseases, Department of Internal Medicine, School of Medicine, Kyungpook National University, Departments of [2]Clinical Pathology and [3]Microbiology, School of Medicine, Kyungpook National University, Daegu, Korea

Escherichia fergusonii, a gram-negative rod and a member of the *Enterobacteriaceae*, was formerly known by the vernacular name enteric group 10 and further proposed as a new species by Farmer et al.[1] in 1985. Within the genus *Escherichia*, *E. fergusonii* is the closest relative of *E. coli*, as shown by DNA hybridization (64% similarity).[2] This makes it difficult to diagnose infections caused by these species, depending on the diagnostic method used.[3] We report the case of a patient with a case resembling hemolytic–uremic syndrome (HUS) caused by *E. fergusonii* mimicking Shiga toxin-positive *E. coli*.

A 57-year-old man with fever (39.4℃) and myalgia for 2 days was admitted to our hospital. Three days earlier, he had undergone prostate biopsy at a primary urology clinic for urinary frequency; he had no other diseases. Laboratory results revealed the following: white blood cell count, 560/μL (normal: 4,800-10,800/μL); hemoglobin, 14.3 g/dL (normal: 13.0-18.0 g/dL); platelet count, 60,000/μL (normal: 130,000-400,000/μL); creatinine (Cr), 1.28 mg/dL (normal 0.70-1.20 mg/dL); and C-reactive protein, 22.19 mg/dL (normal: 0-0.5 mg/dL). A computed tomography scan of the abdomen/pelvis showed inflammation of the prostate gland without abscess, and urinalysis showed pyuria. Two hours later, he developed shock and immediately received intravenous meropenem and vancomycin, corticosteroid, and continuous infusion of an inotropic agent.

After 24 h of hospitalization, the patient recovered from hypotension. Following the detection of gram-negative bacilli in the patient's blood and urine culture on day 2, the antibiotics were changed to meropenem and aztreonam. The hemoglobin levels (13.6 g/dL) remained unchanged from days 2 to 4; however, the platelet counts gradually dropped to 12,000/μL and Cr levels increased to 6.62 mg/dL on day 4.

On day 4, his blood and urine cultures revealed *E. coli* via the Vitek2 system (BioMérieux, Marcy l'Etoile, France) and matrix-assisted laser desorption–ionization-time of flight mass spectrometry (Brüker Daltonik, Bremen, Germany). Antibiotic susceptibility testing for the following antimicrobial agents revealed these minimum inhibitory concentrations (MICs): ciprofloxacin, MIC>2, resistant; ceftriaxone, MIC≤0.5, sensitive; and extended-spectrum beta-lactamase, negative. Owing to the exacerbation of renal failure, the patient received hemodialysis from day 6 to 10. Severe anemia was absent, but a peripheral blood smear revealed schistocytosis. His lactate dehydrogenase level was 587 U/L (reference range ≤250). Secondary HUS was suspected owing to marked thrombocytopenia, acute renal failure, and microangiopathic hemolytic anemia. We requested a microbiological test again for the cultured bacterium and Shiga toxin detection, suspecting *E. coli* O157:H7-related HUS. However, a quantitative polymerase chain reaction assay for Shiga toxin was negative, and as a result of 16S rRNA sequencing, *E. fergusonii*, not enterohemorrhagic *E. coli*, was confirmed as the causative pathogen. The patient recovered from thrombocytopenia, and acute renal failure did not progress even after stopping hemodialysis on day 11. His platelet count was within the normal range, and serum Cr recovered from 3.16 mg/dL at discharge to 1.57 mg/dL at day 19 after discharge.

So far, only a few cases of *E. fergusonii* bacteremia have been reported, and to the best of our knowledge, no previous study has reported this infection in an immunocompetent adult. Moreover, only one case of HUS caused by *E. fergusonii* has been reported in a 76-year-old elderly patient with a history of diabetes and stroke.[4] HUS is a condition that affects the blood and blood vessels, and infection-related HUS is the most frequent form of HUS that occurs mainly following intestinal infection due to the Shiga toxin-producing *E. coli*. However, an atypical form of HUS due to an acquired or constitutional dysregulation of complement alternative pathway or secondary HUS due to coexisting diseases may also occur.[5] Therefore, it is necessary to further study the techniques for accurate pathogen identification, and clinicians should consider HUS caused by *E. fergusonii* as well as *E. coli* and *Shigella* spp. even in immunocom-

Corresponding Author:
Hyun-Ha Chang
Department of Internal Medicine, School of Medicine, Kyungpook National University, 680 gukchaebosang-ro, Jung-gu, Daegu 41944, Korea
Tel: +82-53-200-6553, Fax: +82-53-424-5542, E-mail: changhha@knu.ac.kr

Article History:
Received August 17, 2021
Revised September 10, 2021
Accepted September 15, 2021

https://doi.org/10.4068/cmj.2022.58.1.64

petent adults.

CONFLICT OF INTEREST STATEMENT

None declared.

REFERENCES

1. Farmer JJ 3rd, Fanning GR, Davis BR, O'Hara CM, Riddle C, Hickman-Brenner FW, et al. Escherichia fergusonii and Enterobacter taylorae, two new species of Enterobacteriaceae isolated from clinical specimens. J Clin Microbiol 1985;21:77-81.
2. Lawrence JG, Ochman H, Hartl DL. Molecular and evolutionary relationships among enteric bacteria. J Gen Microbiol 1991;137: 1911-21.
3. Gaastra W, Kusters JG, van Duijkeren E, Lipman LJ. Escherichia fergusonii. Vet Microbiol 2014;172:7-12.
4. Baek SD, Chun C, Hong KS. Hemolytic uremic syndrome caused by Escherichia fergusonii infection. Kidney Res Clin Pract 2019;38: 253-5.
5. Bally S, Fourcade J, Frémeaux-Bacchi V. Haemolytic uraemic syndrome associated with non shiga toxin-producing Escherichia coli bacteraemia: a case report. BMC Nephrol 2019;20:157.