Enteric Fever-like Syndrome caused by *Raoultella ornithinolytica* (*Klebsiella ornithinolytica*)

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*Raoultella ornithinolytica* (formerly *Klebsiella ornithinolytica*) is a gram-negative aerobic bacillus in the family *Enterobacteriaceae*. This species has been related to histamine produce histamine with subsequent fish poisoning (5). *R. ornithinolytica* has also been isolated from dentin of infected root canals (8). However, human infections caused by the genus *Raoultella* are infrequent and spontaneously occurring bacteremia cases has not been reported. Here in, we present a case of enteric fever-like syndrome and bacteremia caused by *R. ornithinolytica*.

An 82-year-old woman with a history of arterial hypertension and degenerative arthropathy attended the emergency service suffering from fever (38 °C) and hypotension (84/48 Hg mm). Previously, she has been complaining of subjective fever, hypogastric pain, dizziness and profuse sweating. The patient's white blood cell count was 11,500 cells/mm$^3$, her erythrocyte sedimentation rate was 30 mm/h, and her C-reactive protein level was 0.95 mg/ml. During her stay, she had a diarrheic episode aroused. Blood and fecal samples were cultured and antimicrobial therapy with oral ciprofloxacin 500 mg bid po x 10 d. was begun. After 24 hours, blood cultures become positive and a gram-negative bacillus was isolated. The isolated bacteria from blood was lactose, indole, and ornithine positive and the identification by the Wider automatic system (Dade Behring, Sacramento, USA) was *R. ornithinolytica* with a biotype 77755370. Stool cultures yielded mucous colonies of a lactose positive gram-negative bacillus identified as *R. ornithinolytica* by the API 20E strip (Biomerieux, Balmette-les-grottes, France) with the code 5355773. CLSI standards were used for microdilution testing. Nalidixic acid and ciprofloxacin MICs were > 16 mg/l and 1 mg/l, respectively. Treatment was changed to oral amoxicillin-clavulanic (875 mg and 125 mg, respectively, every 8 hours for 10 additional days. After four days of her the admittance symptoms resolved, the patient was considered cured and antibacterial treatment was completed at home.
R. ornithinolytica has been isolated from gut of fish, ticks and termites, and from estuarine water (2,4,7) and it has been shown to produce histamine contributing to fish poisoning (1,5,6). Fish poisoning (scombroid syndrome) has been associated to consumption of scombroid fish, such as tuna, bonito, sardine and mackerel. Klebsiella pneumoniae and Klebsiella oxytoca are the best-known histamine-producing bacteria in fish. However, many histamine-producing bacteria from fish first identified as K. pneumoniae or K. oxytoca by commercialized systems were later correctly identified as Raoultella planticola by additional tests (11). R. planticola and R. ornithinolytica strains were equal in their histamine-producing capabilities and were determined to have the hdc genes, encoding histidine decarboxylase (5). Histamine (scombroid toxin) poisoning occurs when persons ingest fish in which the bacteria have converted histidine to histamine, a process that usually can be controlled by storage at low temperatures (1,9). The scombroid syndrome has an incubation period of 1 min to 3 hours after eating tuna or other fish and manifests with facial flushing, dizziness, vomiting, diarrhea and other gastrointestinal symptoms, dyspnea, headache, burning of mouth, urticaria, and generalized pruritus (1,9), but the symptoms usually resolve in a few hours. The patient could present a scombroid syndrome as dizziness, hypogastric pain and profuse sweating were present in the previous 48 hours to admittance in the hospital and diarrhea appeared during her stay at the emergency room. Although fish is normally part of the Spanish diet, a direct relationship between ingest of fish and symptoms was not proved for this case.

In patients with the enteric fever syndrome, it is advisable to consider empirical antimicrobial therapy for typhoid fever before the diagnosis is confirmed by culture. R. ornithinolytica has been shown to be in vitro resistant to ampicillin and other commonly used antibiotics (3). This resistance can be associated to the presence of betalactamases (10). The current isolates showed in vitro resistance to nalidixic acid (MIC > 16 mg/l) and a marked decrease in sensitivity to ciprofloxacin (MIC 1 mg/l), respectively.
*Raoultella ornithinolytica* bacteremia appeared to be limited and did not recur during therapy, and a course of treatment with antibiotic for 10 to 14 days with amoxycillin-clavulanic acid seemed to be curative.

One limitation was that probably some of the less common *Enterobacteriaceae* species can be misidentified and the real importance of *R. ornithinolytica* as enteric pathogen underestimated. Invasiveness associated with the presence of this bacterium in the blood stream has not been described previously.

In conclusion, *Raoultella ornithinolytica* is an uncommon cause of enteric fever-like syndrome characterized by fever, headache, and abdominal pain that may be clinically indistinguishable from enteric fever caused by *Salmonella typhi* or other salmonellae and should be included in the differential diagnosis of enteric fever.

Certain epidemiologic data may be of value in the diagnosis of this syndrome as it is an association to fish consumption and should be suspected as foodborne disease syndrome for microbial agents or their toxins.

**Reference**


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