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Vibrio albensis: An unusual urinary tract infection in a healthy male

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ABSTRACT

Infections with non-O1 non-O139 *Vibro cholerae* strains have been reported to affect different extra intestinal sites including the urinary tract infection. We report the first case of UTI due to *Vibrio albensis* in an immunocompetent patient from Lebanon, where the organism was also recovered from water at his home.

Introduction

Vibrio species are bacteria that inhabit a wide variety of marine and aquatic environments [1]. They usually cause gastroenteritis and extraintestinal infections in human beings. Among them is *Vibrio cholerae* that has more than 200 serogroups [2]. Only two of these serogroups have epidemic potential: Serogroup O1 and serogroup O139. All other serogroups are together known as "Non-O1 and non O-139 *V. cholera*" [3].

Since the year 2000, around 40 cases of non-O1 and non-O139 infections have been reported to the Center for Disease Control (CDC) yearly. These infections mostly occur in late summer or early fall when the water is the warmest [3].

Vibrio albensis, also known as "non-O1 serovar *Vibrio cholerae*" was studied by Shewan and Véron in 1974, it is a luminescent organism that biochemically resembles *V. cholerae* [4]. Despite the fact that *V. cholerae* non-O1 and non O-139 human infections are regularly reported [2], the literature about infections due to *V. albensis* remains relatively scarce. To the best of our knowledge the current case report is the first to label *V. albensis* as a cause of urinary tract infection in an immunocompetent male patient.

Case presentation

A 27-year-old man, previously healthy, presented to the Emergency Department (ED) in October 2018 for 1-day history of abdominal pain, nausea, vomiting, and decreased oral intake. He also reported chills and dysuria. The patient denied respiratory symptoms and change in bowel habits. In the ED, the patient was afebrile with stable vital signs. His physical exam was unremarkable except for mild lower abdominal tenderness.

On presentation, blood was drawn for laboratory tests, and urine was sent for analysis and culture. During his stay in the ED, the patient received 1 L of normal saline intravenously, hyoscine (Scopinal) and metoclopramide (Primperan) to relieve his symptoms.

The complete blood count showed leukocytosis with a white blood cell (WBC) count of 18,100 cells/mm^3 (89% neutrophils). The urine analysis was significant for the presence of numerous WBCs, 10–15 red blood cells per high power field, and positive leukocyte esterase (500/μL). Other laboratory tests including electrolytes and creatinine were within normal.

Considering a urinary tract infection high on the differential diagnosis, the ED physician discharged the patient on Ciprofloxacin 500 mg twice daily for a week empirically, while the result of the urine culture was still pending.

In 24 h, the urine culture on cysteine lactose electrolyte deficient (CLED) medium grew *V. albensis* 100,000 organisms/mL as identified by Matrix-Assisted Laser Desorption/Ionization Time of Flight (MALDI-TOF) system (Bruker Daltonik, GmbH, Bremen, Germany) with a score of 1.85 (yellow flag).

Testing for antimicrobial susceptibility of this pathogen was done based on the CDC recommendation for *V. cholerae* [5], which included testing for: chloramphenicol, ampicillin, trimethoprim-sulfamethoxazole, tetracycline and nalidixic acid. In addition, disk diffusion was performed with a battery of antimicrobials used for *Enterobacteriaceae*, and interpreted according to the Clinical and Laboratory Standards Institute (CLSI) guidelines, which showed

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susceptibility to all the tested antimicrobials: amikacin, aztreonam, cefixime, ceftazidime, imipenem, norfloxacin, trimethoprim/sulfamethoxazole, cefamandole, levofloxacin, tetracycline, amoxicillin-clavulanate, cefepime, cefuroxime, ciprofloxacin, gentamicin, nitrofurantoin, piperacillin/tazobactam, and ampicillin. The susceptibility testing was controlled using the quality control *Escherichia coli* strain, ATCC 25922.

The patient follow up 3 days after discharge indicated the resolution of symptoms along with a negative urine analysis and culture.

To try tracing the source of this pathogen, a detailed history was taken, and the patient denied exposure to marine animals, water activities, and eating raw fish. The patient was asked to deliver water being used at home for culture. Two samples were presented and examined: A normal home tap water and a well water (salt water) at the building where he resides in the southern suburb of Beirut close to coastal area. *V. albensis* was recovered from both analyzed water samples, in combination with mixed microorganisms: *Pseudomonas otidis*, *Aeromonas hydrophila*, *Enterobacter cloacae, Escherichia coli*, and *Shewanella putrefaciens.*

Discussion

V. albensis is a non-O1 Vibrio bacterium. It is a luminescent organism possessing a high level of DNA similarity with *V. cholerae* reaching more than 80% homology [4]. Although the estuarine waters are vibrios' usual habitat [4], *V. albensis* was first isolated in 1893 from fresh river water in Hamburg, Germany, and named as *Elbvibrio*, then its name was changed to *V. albensis* by Lehmann and Neumann [6]. Later on, its biochemical properties were studied by Shewan and Véron in 1974 who investigated the characteristics of eight luminescent Vibrio strains in different geographic locations [4].

Non-O1 vibrio seroroup was reported to cause sporadic cases of gastroenteritis and extraintestinal infections [2], including septicemias in immunocompromised patients and patients with underlying liver disease, wound infections [3,7,8], and some case reports describing them as a cause of ocular infections [9], and urinary tract infections [10–12]. However, *V. albensis*, per se, was reported to cause post-operative endophthalmitis in India [9,13] and a case of septic shock due to deep skin infection in a patient with tuberculosis, and marijuana and alcohol use [14]. However, it was not reported to be a culprit in urinary tract infections. The transmission of *V. albensis* remains to be delineated, unlike other Vibrio organisms infecting humans through ingestion of raw sea food products, mainly oysters, or through the exposure of skin lesions to contaminated water [3].

The identification of *V. albensis*, a motile bacterium usually follows that biochemical or automated systems used for identification of non-O1 Vibrio bacterium. The fact that this pathogen was rapidly (within 24 h) recovered on the CLED routine medium used for detection of urinary tract infection, as well as its growth on MacConkey agar and blood agar plates indicates its non-fastidiousness. The Gram stain revealed Gram-negative bacterium having slightly curved rod cell morphology.

The virulence factors of *V. albensis* are not known as was described for other non-O1Vibrio bacteria, making the entry and pathogenesis mechanism of urinary tract invasion unclear.

The contamination of the patient's house water is not an unusual finding in Beirut city. The expanding urbanization in the city has led to an increase in water demands and a shortage in public water. Hence, households are relying on man drilled well water at the building or purchased water tankers in an attempt to compensate their need for water supply. Moreover, the water tankers sector works without regulations or close supervision from the government jeopardizing the quality of the distributed water. A study done to investigate the quality of the water provided by tankers in Beirut revealed a remarkable level of salinity as well as contamination with different infectious organisms exceeding the quality standards of water [15]. The consequences of such a water contamination situation were also earlier noted in a female suffering from urinary tract infection due to *V. fluvialis* [12].

Conclusion

This case report highlights *V. albensis* as a causative agent of urinary tract infection in the absence of a clear mechanism of invasion in an immunocompetent male. Nonetheless, it raises a red flag on the quality of potable and utilized water consumed by many Lebanese people in the absence of good sanitations and supervision.

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Competing interest

None declared.

Ethical approval

Not required.

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