

Urinary tract infection associated with bacteremia caused by vancomycin-resistant enterococcus following continent urinary diversion

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Abstract

Introduction: Vancomycin-resistant enterococcus is rare in Japan. However, as there is a risk of in-hospital outbreak, this infectious disease is clinically important. **Case presentation:** The patient was a 49-year-old Japanese female living in the United States. At her previous hospital in the United States, total pelvic exenteration for cervical carcinoma, Miami pouch

Introduction

Vancomycin-resistant enterococcus (VRE) is a primary type of hospital-acquired bacteria in the United States; however, it is rare in Japan. In this study, we report a patient with VRE urinary tract infection associated with bacteremia following continent urinary diversion. In the field of urology, few studies have reported infection with VRE. As there is a risk of in-hospital outbreak, this infectious disease is clinically important.

Case presentation

The patient was a 49-year-old Japanese female who was living in the United States. She complained of fever and abdominal pain. Her medical history was not contributory. Total pelvic exenteration for cervical carcinoma, Miami pouch formation, and ileostomy were performed in the USA (SCCpT3bN1aM1). She returned to Japan to undergo postoperative adjuvant chemotherapy. Fever and abdominal pain occurred 42 days after surgery, and she consulted the fever outpatient clinic of our hospital. Abdominal computed tomography (CT) revealed enlargement of the Miami pouch, bilateral mild hydronephrosis, and right renal atrophy. Furthermore, bilateral ureteral stents had been placed (Figure 1). Blood biochemistry showed severe nephropathy and severe infection (Table 1). A diagnosis of urinary-retention-associated acute renal failure and pyelonephritis was made based on topical findings and pyuria/bacteriuria.

The patient was urgently admitted. On admission, consciousness was clear and blood pressure, pulse, and body temperature were 129/76 mmHg, 112 bpm, and 40.0, respectively. Her abdomen was flat, and there was a surgical wound in the midline. In the right lower abdomen, a urinary stoma was present, and a stent had been placed; moreover, pressure pain was noted at the site. Ileostomy on the left abdomen had been performed.

We attempted to insert a catheter into the pouch, but insertion was difficult. This may have led to incomplete self-catheterization, resulting in urinary retention. There was no stenosis; therefore, we inserted an endoscope. Intra-pouch urine was markedly turbid, and two stents were observed. The margin of one stent

was placed in the pouch. The two stents were left, and a catheter was inserted into the pouch. To treat pyelonephritis, twice-a-day ceftriaxone administration at 2 g/session was started. Despite an improvement in drainage from the pouch, there was no marked improvement in hematological data (Table 1). We detected *Enterococcus faecium* (VRE) on urine/blood culture 5 days after admission. Once-a-day daptomycin was administered (600 mg, 12 mg/kg) at 48-hour intervals. On Day 8, bilateral ureteral stents were exchanged, leading to the resolution of hydronephrosis. The blood flow data gradually improved (Table 1), and the pain was resolved on Day 9. On Day 11, erythematous eruption appeared on the trunk and the upper limbs. Considering the possibility of an adverse reaction to daptomycin, administration was discontinued, and linezolid (300 mg) was administered twice a day. A blood culture test on the same day was negative. On Day 18, pyretolysis was achieved (Figure 2). The patient was discharged on Day 35.

Ureteral stents were removed, and an intra-pouch catheter alone was placed. In the bilateral kidneys, grade 2 hydronephrosis was noted, but, subsequently, there was no urinary tract infection-related fever. Cervical carcinoma gradually progressed, and the patient died 24 months after surgery.

Discussion

According to the Centers for Disease Control and Prevention in the United States, VRE accounts for approximately 30% of all types of enterococci compared to 0.8% by the Japan Nosocomial Infections Surveillance, Ministry of Health, Labour and Welfare in Japan in 2021; thus, VRE in Japan is rare^{1, 2}.

In 2019, 80 patients were reported throughout Japan. The male-to-female ratio was 1:1, and the median age was 79 years. Of samples in which bacteria were detected, urine, blood, and ascites accounted for 38, 31, and 9%, respectively. Concerning clinical diagnosis, urinary tract infection was observed in 26 patients (33%), and bacteremia in 20 (25%)¹. Although urologists are often responsible for the treatment of urinary tract infection, there have been few clinical reports on VRE from the field of urology.

The pathogenicity of VRE is low; however, surgical site infection, urinary tract infection, and bacteremia may occur in patients with underlying diseases; thus, caution is needed. A study showed that the admission period was 5 days longer than patients infected with vancomycin-susceptible enterococcus, and the mortality rate was 1.8 times higher³. For the treatment of VRE infection, daptomycin is the first-choice drug⁴. In our patient, combination therapy with daptomycin and a beta-lactam was started, and an adverse reaction to daptomycin was suspected; therefore, it was switched to linezolid.

VRE is highly transmissible, and readily causes contact infection. However, its onset is rare, and it may not be readily diagnosed. Therefore, nosocomial outbreaks may occur, and this type of bacteria is important for medical facilities involving a large number of high-risk patients from the viewpoint of infection control. Standard preventive measures alone are not sufficient; thus, contact prevention strategies should be adopted⁵.

Hayakawa et al.⁶) reported that 56.5% of patients with a history of hospitalization abroad had drug-resistant bacteria, including ESBL-producing bacteria and MRSA, and that these bacteria included highly resistant bacteria such as MDRA and VRE. When admitting patients with a history of medical exposure in other countries, caution is necessary, and private room isolation/contact infection control must be performed until the presence or absence of carriage is confirmed¹.

Our patient was hospitalized in a private room from the time of admission, considering severe infection and potential for transmission of COVID-19. After VRE infection became clear, standard preventive measures were taken for in-hospital infection control. The inpatient ward was closed after consultation on effective pathogen management by the Department of Infection Control and a health center. A fecal culture test of all inpatients in the ward was conducted to confirm VRE-negative status. The ward closure period was 3 days.

In a urological ward, many patients are treated by catheter-insertion; furthermore, there are many cancer and elderly patients. The risk of nosocomial infection has been reported to be high⁷. Even in areas where VRE is rare, attention should be paid to patients who have received treatment in other countries.

Conflict of interest

The authors declare no conflict of interest.

Approval of the research protocol by an Institutional Reviewer Board

This study was approved by the Ethical Institutional Review Board of Shinshu Ueda Medical Center (Receipt No. 03-32).

Consent

Written informed consent from the patient's parent was obtained to publish this report in accordance with the journal's policy.

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Figure Legends

Figure 1. Plain CT on the initial consultation. Bilateral mild hydronephrosis, right renal atrophy, and marked dilation of a pouch were observed. A ureteral stent (arrows) had been placed.

Figure 2. Fever, laboratory data, and course of antimicrobial drug administration

Table 1. Changes in hematological data

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