



Case Report

Acute Cholangitis Caused by *Rhizobium Radiobacter*

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Abstract

Rhizobium radiobacter infrequently causes human infections. Most of reported cases developed in immunocompromised patients with indwelling foreign devices. Herein, we documented the first case of biliary tract infection caused by *R. radiobacter* in a patient with gall bladder cancer with obstructive jaundice received percutaneous transhepatic cholangiodrainage. By this demonstration, we expand the disease spectrum of infection caused by *R. radiobacter*.

Keywords: Cholangitis; *Rhizobium radiobacter*.

Introduction

Rhizobium radiobacter is an aerobic, motile, and non-spore-forming gram-negative bacillus (Young 2001). *Rhizobium* species was proposed in 2001 by Young et al., who made the three genera *Agrobacterium*, *Allorhizobium*, and *Rhizobium* into one genus—*Rhizobium*, and *R. radiobacter* should include the former species *Agrobacterium radiobacter* and *Agrobacterium tumefaciens*. *R. radiobacter* infrequently causes human infections, and most of infections developed in immunocompromised host or patients with indwelling foreign device, such as intravenous catheters or peritoneal dialysis catheter (Amaya 2003; Auoulat 2011; Edmond 1993; Lai 2004; Lui 2005; Melgosa 1997; Minguela 2006). Based on the limited

knowledge of *R. radiobacter*, acute cholangitis caused by *R. radiobacter* is never reported. Herein, we report one case of biliary tract infection caused by *R. radiobacter* in a patient with gall bladder cancer with obstructive jaundice receiving percutaneous transhepatic cholangiodrainage (PTCD).

Case Presentation

A 76-year-old woman presented with fever and change of consciousness for two days. She had gall bladder cancer undergone with several courses of chemotherapy and palliative radiotherapy, and obstructive jaundice received PTCD. In addition, she had hypertension, coronary artery disease, and diabetes mellitus. She denied productive cough, rhinorrhea, abdominal

pain, diarrhea, nausea, vomiting, dysuria, or frequency. On admission, the vital signs were body temperature of 38.8°C, pulse rate of 92/min, respiratory rate of 17/min, and blood pressure of 92/57 mmHg. Physical examinations were unremarkable except for mild abdominal tenderness over right upper quadrant. Laboratory examination results were as follows: white blood cell count, 20,700/mm³ (91% neutrophils); hemoglobin, 8.4 g/dL; platelet count, 237,000/mm³; total bilirubin, 3.47 mg/dL; direct bilirubin, 3.12 mg/dL; creatinine, 1.8 mg/dL; fasting glucose, 231 mg/dL; and C-reactive protein, 74.7 mg/L (normal reference < 6 mg/L). Chest radiography did not reveal active lung lesion. Urine analysis and stool examination were normal. Computed

tomography of abdomen showed dilatation of intrahepatic duct (Figure 1). All of these findings indicated biliary tract infection and empirical antibiotics with piperacillin (3 g every 8 hours) being administered after collecting the specimens of blood and bile for bacterial culture. Four days later, aerobic bacterial culture of the bile yielded *R. radiobacter* and *Enterococcus* species. Susceptibility testing revealed that *R. radiobacter* is sensitive to amikacin, ceftazidime, ciprofloxacin, moxifloxacin, gentamicin, piperacillin/tazobactam, cefpirome, and imipenem, but resistant to piperacillin and sulfamethoxazole-trimethoprim. Therefore, the antibiotics were shifted to ceftazidime for 10 days and the clinical condition gradually improved.



Figure 1. Computed Tomography of Abdomen Showed Dilatation of Intrahepatic Duct

Discussion

In this report, we documented a case of *R. radiobacter* associated with secondary peritonitis caused by hollow organ perforation in an immunocompetent adult. We have several significant findings. First, the most common causative organisms of cholangitis are *Escherichia coli*, *Klebsiella* spp., *Enterobacter* spp., and *Enterococcus* spp. In the present work, it is the first time to report that *R. radiobacter* can cause biliary tract infections. In another way, *R. radiobacter* causing human infections is rare, and therefore, the knowledge of the clinical significance of *R. radiobacter*

isolates is limited. Till now, *R. radiobacter* was only reported to be associated with several kind of infection types, including bacteremia (especially catheter-related bacteremia), pneumonia, urinary tract infections, prosthetic valve endocarditis, endophthalmitis, and peritoneal dialysis-related peritonitis (Alós 1985; Amaya 2003; Auuoulat 2011; Edmond 1993; Lai 2004; Lui 2005; Mastroianni 1996; Melgosa 1997; Minguela 2006; Pierre-Filho 2003; Plotkin 1980; Rojas 2012). In summary, our report expands the current knowledge about *R. radiobacter* and suggests that a physician should consider *R. radiobacter* as

one of the possible pathogen causing cholangitis.

Second, *R. radiobacter* is considered as an opportunistic pathogen which most affects patients with various immunocompromised conditions, such as malignancies, bone marrow transplant recipient, end stage renal disease, receiving corticosteroid, diabetes mellitus, and HIV infection (Christakis 2006; Lai 2004; Plotkin 1980). In consistent with previous studies (Christakis 2006; Lai 2004; Plotkin 1980), our patient had underlying gall bladder cancer and received chemotherapy, which should cause the immunocompromised condition and be the risk factors for getting *R. radiobacter* infections. In addition, some indwelling devices, such as central venous catheter, peritoneal dialysis catheters, intraocular device, and prosthetic cardiac valves, are other precipitating factors contributing to *R. radiobacter* infections (Lai 2004; Melgosa 1997; Paphitou and Rolston 2003; Plotkin 1980). Our case had PTCD tube in situ and the concomitant biliary tract obstruction caused by progressive gall bladder cancer, which should be the most important predisposing factor for acute cholangitis. In Paphitou et al.'s review of 42 cases of *R. radiobacter* infections (Paphitou 2003), 34 (81%) patients had foreign devices, such as intravascular device, peritoneal dialysis catheter, and nephrostomy tubes, and 39 (93%) patients had underlying immunocompromised status. Our patient had both of these two conditions, including immunocompromised status and indwelling foreign device, which are contributing to acute cholangitis caused by *R. radiobacter*.

Third, the antibiotic susceptibility patterns of *R. radiobacter* isolates in the present case showed that it was susceptible to the 3rd and the 4th generation cephalosporins, carbapenem, fluoroquinolones, extended-spectrum beta-lactams, and aminoglycosides. This finding is consistent with previous studies (Paphitou 2003) that *R. radiobacter* is always susceptible to fluoroquinolones, the 4th generation cephalosporins, and carbapenem. However, data on the antibiotic susceptibility

patterns of *Rhizobium* species are very limited; it is difficult to draw inferences about optimal antibiotic treatment based on current knowledge.

In conclusion, we report a case of biliary tract infection caused by *R. radiobacter* in an immunocompromised patient with indwelling foreign device; the clinical outcome was favorable after appropriate antibiotic and drainage. This case further expands the disease spectrum of infection caused by *R. radiobacter* and raises the possibility of *R. radiobacter* as one of the etiology of cholangitis.

Conflict of Interests

The authors declare that they have no conflict of interests.

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