Pharmaceutical Care in a Patient with Recurrent Infection after Liver Transplant

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Abstract

Case (description): A case of a 57-year-old liver transplant patient with biliary drainage catheter whose recurrent infection was managed by clinical pharmacists. The suggestions about the choice of antibiotic regimen and the monitoring to other related infection factors, such as biliary drainage catheter and concentration of tacrolimus, were accepted and used to the patient. The state of the infected patient was improved.

Conclusion: The antibiotics’ distribution, antibacterial effect, and drug resistance could be taken into consideration for the patients with recurrent infection after liver transplant. The resistance of antibiotics could be deferred by altering suitable antibiotics. Close care to catheter and immunosuppressants could be necessary to prevent infection for the patients after transplant.

Keywords: Pharmaceutical care; Recurrent infection; Liver transplant

Introduction

The recurrences of bacteria and virus infection are common problems in liver transplant recipients because of the biliary drainage catheter and their extended state of immunosuppression. In recent years, gram-negative rods have emerged as the predominant pathogens in solid organ transplant (SOT) recipients [1-3]. Among these gram-negative rods, Klebsiella pneumonia (K. pneumonia) was the most common bacteria identified in some case studies [3], and SOT has been implicated as a factor predisposing patients to K. pneumonia bloodstream infection (BSI) [4]. Carbapenems, which are regarded as effective agents for treating K. pneumonia infection, induce the production and global spread of Klebsiella pneumonia carbapenemase (KPC) [5]. Although polymyxin B combined with tigecycline could be used for carbapenem-resistant K. pneumonia (CRKP) [6], limitations to the application of carbapenems are of great concern in K. pneumonia therapy.

This case report provided a series of therapeutic strategies, from view of the clinical pharmacist, in a patient with recurrent K. pneumonia infection after liver transplant.

Ethical approval: No approval was necessary

Case Report

The patient was a 57-year-old man diagnosed with Hepatitis B virus (HBV)-related cirrhosis and type II diabetes. He underwent liver transplant surgery in December 2009. After his surgery, ursodeoxycholic acid and losartan potassium/hydrochlorothiazide were administered discontinuously and biliary drainage catheter was kept in place because of elevated bilirubin levels and blood pressure. Tacrolimus (FK506) was administered at a decreasing dose and its concentration was within the therapeutic window (Figure 1). He was examined by his physician at the beginning of 2014 because of his recurrent infection in the third year after surgery. The patient was tested for K. pneumoniae and Enterococcus faecium 40 and 35 times, respectively, from December 2012 to March 2014. Most test results were normal. The patient suffered infections for three times (one in December 2012 and two in January 2013) induced by K. pneumoniae. His white blood cell (WBC) count, total bile acid (TBIL), alanine aminotransferase (ALT) and aspartate aminotransferase (AST) varied during this period, and there was no notable increase except for neutrophils (Neut) (Figure 2-6). WBC and Neut were fluctuated. Neut were higher than normal for three times. Although there were only three times abnormal blood chemistry data, he was still administered meropenem intravenously when abnormal bile occurred or when test results were positive for bacteria in his bile. His blood sugar was well controlled in this period. The patient consulted his doctor whether this anti-bacterial dosage regimen was suitable.

Considering the details of the patient and the general condition (pharmacokinetics, efficacy, and drug resistance) of antibiotics, clinical pharmacists provided the following suggestions. These suggestions were accepted by the doctor. By applying the series of therapeutic strategies to the patient, the state of the infected patient was improved.

1. Ensuring that the biliary drainage catheter was still in need. If needed, careful care of the catheter was required, such as inspecting and flushing the catheter twice daily, and emptying collected drainage from the bag daily.
2. Carbapenems, cephalosporins, and broad-spectrum penicillin antibiotics could be used in turn after confirming the infection in the patient.
3. Monitoring tacrolimus concentrations to avoid low immunity which could be result in infection.

Discussion

In special population of liver transplants, bacteria in bile were more frequent. It was important that determining the relationship between bacteria in bile and infection. Besides the antimicrobial spectrum of antibiotics, pharmacokinetic parameters, especially the distribution

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Figure 1: Laboratory data of tacrolimus in the patient.

Figure 2: Laboratory data of WBC in the patient.

Figure 3: Laboratory data of Neut in the patient.
of antibiotics, should be considered while choosing antibiotics for the patients with recurrent infection.

*K. pneumoniae* [7] and *Enterococcus faecium* [8] were common bacteria in the human intestinal tract. Only under certain conditions could infections be induced. For this patient, the liver transplant surgery and extended use of immunosuppressants after surgery, which maintained reduced immunity, made infection easier. Moreover, the biliary drainage catheter and diabetes also increase the incidence of infection.

While infection occurred after liver transplant, antibiotic use should be considered for this patient. Carbapenems such as meropenem were usually used in patients after liver transplant because of their higher
The therapeutic strategy for patients with recurrent *K. pneumonia* infection after liver transplant should be carefully considered. The catheter should be sterilized according to the protocol, immunosuppressant should be controlled and managed, and appropriate antibiotics should be chosen. Anti-*K. pneumonia* antibiotics should be rotated between carbapenems, cephalosporins, and broad-spectrum penicillins by taking the anti-infection effect, drug distribution, and drug resistance into consideration.

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**References**