



Decompensated cirrhosis and antibiotic prophylaxis: striking a delicate balance

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Bacterial infections pose a significant risk for individuals with cirrhosis, often resulting in high mortality rates [1]. These infections can either precipitate the onset of decompensated conditions (e.g., variceal hemorrhage or hepatic encephalopathy) or exacerbate existing conditions in patients who are already decompensated, leading to complications such as variceal rebleeding or hepatorenal syndrome. Notably, infections play a key role in the development of acute-on-chronic liver failure (ACLF) in Western countries; they can even affect patients with compensated cirrhosis [2]. Bacterial infections in patients with cirrhosis significantly increase the risk of in-hospital mortality by 4–5-fold and the risk of death from sepsis by twofold [3].

To mitigate these risks, it is crucial to implement strategies that prevent infections in individuals with cirrhosis. The primary preventive measure currently utilized is the administration of prophylactic antibiotics. This discussion explores the advantages and disadvantages of prophylactic antibiotic use, identifies the specific subset of patients with cirrhosis for whom this approach is recommended, and delineates strategies for infection prevention that also aim to mitigate the development of antibiotic resistance in this patient population.

Antibiotic prophylaxis in patients with cirrhosis can reduce the occurrence of bacterial infections. There are three specific clinical scenarios in which evidence supports the effectiveness of antibiotic prophylaxis in preventing infections. These scenarios are detailed below and summarized in Table 1 [4].

A recent report presented evidence supporting the use of prophylactic antibiotics in patients with ACLF [5]. However, the evidence was weak, and such therapy is not recommended in recently published guidelines from the European

Association for the Study of the Liver [6]. Similarly, a recent randomized study of patients with severe alcohol-related hepatitis demonstrated that prophylactic antibiotics provide no benefits [7]. If any signs of infection are present, however, prompt administration of broad-spectrum antibiotic therapy is recommended to reduce mortality risk. Furthermore, de-escalation to narrow-spectrum antibiotics within a 24–72-hours period is suggested to reduce antibiotic resistance [8].

Multidrug-resistant (MDR) bacteremia is found in 11–45% of patients with spontaneous bacterial peritonitis (SBP), a common complication of cirrhosis [9]. Kim et al. [10] identified MDR bacteremia in 23.6% of all patients with bacterial infection in their study. In another recent study, the use of carbapenems in patients with SBP did not reduce mortality [11]. However, whereas the results of a previous study suggested that carbapenem reduced mortality in patients with a high Quick Sequential Organ Failure Assessment (qSOFA) score, the above-mentioned study [11] showed no association between the qSOFA score and MDR bacteremia. This discrepancy indicates the need for further investigation. Kim et al. [10] suggested that prophylactic use of quinolones in patients with cirrhosis increases Gram-positive bacterial pathogens; however, more research focused on effective coverage for Gram-positive bacterial pathogens and fungal infections is needed, particularly in critically ill patients.

In conclusion, prophylactic antibiotic use should be limited unless there is clear evidence supporting its benefits. Carbapenem use in all patients who have cirrhosis with bacterial infection or SBP is unnecessary. Coverage with carbapenems is advised when there is evidence of infection, particularly in patients with a high qSOFA score, ACLF, or recent use of antibiotics; clinicians should then proceed with de-escalation.

Table 1. Indications for prophylactic antibiotics in patients with cirrhosis

Indication	Antibiotic and dose	Duration
Gastrointestinal bleeding	Norfloxacin 400 mg/12 h PO IV ceftriaxone 1 g/d in patients with advanced cirrhosis ^{a)}	Seven days
Primary prophylaxis in patients with low protein ascites (< 15 g/L)	Norfloxacin 400 mg/d PO in patients with advanced cirrhosis ^{b)}	Not specified
Secondary prophylaxis of SBP	Norfloxacin 400 mg/d PO Bactrim DS PO daily or 5 days/week Ciprofloxacin 500 mg PO daily	Not specified

PO, per oral; SBP, spontaneous bacterial peritonitis.

^{a)}At least 2 of the following: ascites, jaundice, hepatic encephalopathy, and malnutrition.

^{b)}Child-Pugh score ≥ 9 points with serum bilirubin ≥ 3 mg/dL and/or impaired renal function (serum creatinine ≥ 1.2 mg/dL, blood urea nitrogen ≥ 25 mg/dL or serum Na ≤ 130 mEq/L).

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