

Editorial

# Preventing bloodstream infections in children after liver transplantation

**Running title:** Bloodstream infection in children with liver transplantation

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## **Key message**

Liver transplantation (LT) is crucial for children with end-stage liver diseases, yet bloodstream infections (BSI) pose significant risks, despite medical advancements. Immunosuppressants, essential for preventing organ rejection, heighten infection susceptibility. Understanding BSI organisms is vital due to antimicrobial resistance. Pediatric LT recipients have unique risk factors, demanding tailored preventive measures. This systematic review on bacterial BSI emphasizes the urgency of effective prevention strategies, considering the high incidence and distinct organism profile. Further research is vital for optimizing antibiotic management and improving outcomes for this vulnerable population.

Accepted Article

Liver transplantation (LT) is a life-saving procedure for children with end-stage liver diseases.<sup>1)</sup> Bloodstream infections (BSI) are a significant cause of morbidity and mortality in pediatric LT recipients.<sup>2)</sup> Despite advancements in surgical techniques, antibiotic prophylaxis, and infection control, factors such as prolonged hospitalization and catheter use contribute to this challenge. The use of immunosuppressants, which prevent organ rejection, increases a patient's risk of infection.<sup>3)</sup> Due to the heavy burden of BSI, understanding the spectrum of involved organisms is vital to making appropriate antimicrobial choices given the global threat of antimicrobial resistance. Pediatric LT recipients face unique risk factors; therefore, institutions adopt different antimicrobial regimens based on their specific BSI rates and organisms.

The present systematic review by Shieb et al.<sup>4)</sup> highlights the critical issue of bacterial BSI in a pediatric solid organ transplant recipient population, specifically LT recipients. This underscores the importance of identifying the organisms involved in bacterial BSI, a leading cause of mortality and morbidity in this vulnerable population. Preventing BSI in pediatric LT patients is of paramount importance, as underscored by the findings of this review.

Several key considerations emphasize the significance of robust infection prevention strategies in this vulnerable population. First, pediatric LT recipients are at a substantially elevated risk of BSI, with an overall incidence of 14.7%–55%. The heightened susceptibility to infections of young patients, who often have compromised immune systems due to immunosuppressive medication use, underscores the urgency for effective preventive measures. Preventing BSI both contributes to their overall well-being and mitigates the considerable morbidity and mortality associated with such infections.<sup>5)</sup>

Second, the distinctive organism profile observed, including a higher percentage of gram-negative organisms such as *Klebsiella* spp. and *Escherichia coli*, further highlights the need for targeted preventive strategies. This organism distribution, characterized by a relatively high percentage of gram-negative organisms and in line with the findings of a previous Korean study, adds an intriguing dimension to the study's findings.<sup>6)</sup> Tailoring preventive measures to address the specific pathogens prevalent in this population can enhance interventional efficacy. The potential severity and resistance

patterns of gram-negative infections necessitate a nuanced approach to antibiotic prophylaxis and empirical management.

Third, the unique risk factors identified in this review, including postoperative biliary complications, a history of biliary atresia, and younger age, emphasize the importance of a tailored preventive approach.<sup>7)</sup> Understanding these risk factors enables a more targeted and personalized preventive strategy that addresses the specific vulnerabilities of each patient subgroup.

Considering the global threat of antimicrobial resistance, a judicious approach toward antibiotic use is imperative. This review underscores the need for further research to determine the most appropriate prophylaxis and empirical antibiotic management strategies for pediatric LT recipients. This is important for preventing infections and minimizing the selective pressure that contributes to increasing bacterial resistance. The results of the merged data from the 14 selected articles represent diverse geographical regions, including the US, France, Iran, Japan, Korea, South Africa, Thailand, and Turkey. The inclusion of a large number of patients undergoing LT in the final analysis enhanced the robustness and generalizability of the findings.

This review highlights an important concern regarding bacterial BSI in pediatric LT. The notably high incidence and unique organism profile underscore the need for further research to determine the most suitable prophylactic and empirical antibiotic management strategies for this specific population. The diverse geographical representation and identification of key risk factors contribute significantly to the existing knowledge base, thus paving the way for future investigations and targeted interventions in pediatric solid organ transplant populations.

**See the article “Incidence, causative organisms, and risk factors of bloodstream infections in pediatric liver transplant patients: a systematic review” via <https://doi.org/10.3345/cep.2023.01466>.**

## Footnote

**Conflicts of interest:** No potential conflict of interest relevant to this article was reported.

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