



Editorial

Importance of Microbial Etiology and Antimicrobial Susceptibility Testing in Biliary Tract Infections

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Biliary tract infections (BTIs) occur due to obstruction in the biliary tract either due to malignancy, choledocholithiasis, or cholelithiasis. BTIs cause bacteremia in approximately 20 to 80% of cholangitis cases leading to significantly high mortality in elderly and patients with comorbidities. Acute cholangitis can convert from a local infection to sepsis involving multiple organ failure. BTIs are not only the most common cause of community-acquired bacteremia but also hospital-acquired bacteremia. BTIs are associated with 9 to 12% mortality and this varies from 10 to 20% in cases of BTI-associated bacteremia.¹

In addition to clinical procedures, antibiotic treatment is needed to control infections. Most of the times, broad-spectrum antibiotics are empirically started as causative organism identification and antibiotic susceptibility testing takes some time. Mostly, antibiotic treatment in BTIs is directed toward suspected bacterial pathogens depending upon the epidemiological data of a particular region. Mortality rates of BTIs with bacteremia are high even with antibiotic treatment due to increase in the number of antibiotic-resistant pathogens. Multiple studies from different regions of the world have reported bacteria becoming increasingly multidrug resistant in the past few decades and it has been observed that the prominent pathogenic bacteria in BTIs have also become resistant to commonly prescribed antibiotics. During the last decade, extended-spectrum β -lactamase (ESBLs) producing *Escherichia coli* and *Klebsiella pneumoniae* have been reported to be increasingly associated with BTIs.² Drug resistance patterns have variations across different geographic regions because of varying economic conditions and also differences in antibiotic prescription practices.

The study published in the previous issue of this journal by Gupta et al entitled as “Bacteriological and antimicrobial susceptibility profile in biliary tract infections: a retrospec-

tive study” described the Gram-negative bacteria as the predominant organisms in BTIs exhibiting high resistance to cephalosporins and carbapenems. The authors in this retrospective study conducted over a period of 1 year have brought attention to the burning issue of ever-increasing antimicrobial resistance (AMR) particularly against Gram-negative organisms. Authors have discussed the issue of BTIs with increased frequency of ESBLs and carbapenemase-producing Enterobacteriaceae family, making empiric antibiotic therapy ineffective. The study looked into the pathogen profile and antibiotic susceptibility patterns of isolates from patients suffering with BTIs in North Indian population as local data is scarce. The AMR is a global threat; however, the epidemiology of infections and current AMR profiles of different pathogens differ from one geographical region to other and even there is a great difference in antimicrobial profiles of isolated pathogens from developing and developed countries. Like other studies, in this study also Gram-negative bacilli (*E. coli* being the predominant) were more frequent than Gram-positive cocci (*Enterococcus spp.* being the most common) in bile cultures. *Klebsiella spp.* and *Pseudomonas spp.* reported high levels of resistance against cephalosporins and carbapenems. Moreover, approximately 70% of Gram-negative isolates exhibited multidrug resistance and ESBLs as well as carbapenemase producers were in majority.³

This study highlighted that all the Gram-negative isolates exhibited high levels of resistance against β -lactam drugs including cephalosporins, penicillin, and β -lactamase inhibitor combinations, making the antibiotic treatment difficult for these organisms causing BTIs. Penicillin and cephalosporin should be used with utmost caution for treating patients infected with pathogenic ESBLs. This underscores the need to closely monitor the AMR profiles of BTI pathogens.

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As BTIs are associated with high morbidity and mortality particularly in population having underlying comorbidities, an urgent and efficacious treatment is need of the hour in such infections. Therefore, the knowledge about the predominant pathogens and their antimicrobial susceptibility profiles is essential to make right empirical choices. The only drawback of the study is that the details of antibiotics used empirically before receiving the bile cultures were missing. Antimicrobial therapy is must for patients with moderate to severe acute cholecystitis to control local inflammation as well as systemic septic response following cholecystectomy. Appropriate antibiotics should be administered within an hour for septic shock patients and within 6 hours of diagnosis for others. Therefore, initial therapy relies on the effective empiric antibiotics which are already reported and this varies across geographic regions.¹

BTI patients with choledocholithiasis need timely and relevant antibiotics (based on antimicrobial susceptibility considerations) together with adequate biliary drainage as this is the key effective treatment strategy. Therefore, antibiotics should be administered according to local pathogen spectrum and broad-spectrum antibiotics should be avoided or minimized. A recent study from China has demonstrated a significant change in the bacterial profile of bile from patients with choledocholithiasis and BTIs. Contrary to the above discussed study, the study from China showed that the Gram-positive cocci numbers increased annually, whereas Gram-negative bacilli and particularly *E. coli* incidences decreased in BTIs.⁴

This study from North India is an important step toward understanding the characteristic profiles of pathogens causing biliary infections and underlying risk factors in these patients. This would further be useful in guiding clinical decisions to encourage rational use of antibiotics and in controlling multidrug-resistant bacterial infections. In conclusion, utmost care should be taken for antibiotic administration to patients with BTIs and prescription should be tailored according to local bacterial spectrum. The use of third- and fourth-generation cephalosporins for biliary Gram-negative pathogens is an independent risk factor for infection and development of further drug resistance. Hos-

pitals should strengthen the antibiotic resistance prevention and misuse control measures. More studies should be conducted for availability of bile spectrum pathogens as treatment relies on accurate knowledge of pathogens responsible for the infection and their susceptibility for drugs. Better knowledge would facilitate better selection of antibiotics and will improve treatment outcomes in BTIs.

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Not applicable.

Authors' Contributions

Both the authors contributed equally to the article.

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Conflict of Interest

None declared.

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