Extended-spectrum beta-lactamases in Taiwan: epidemiology, detection, treatment and infection cont

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摘要

Abstract

Extended-spectrum beta-lactamases (ESBLs) efficiently hydrolyze extended-spectrum beta-lactams such as cefotaxime, ceftriaxone, ceftazidime, and aztreonam. ESBLs are most often plasmid-mediated. In Taiwan, the prevalence of ESBLs in bacteria has risen, ranging from 8.5 to 29.8% in Klebsiella pneumoniae and 1.5 to 16.7% in Escherichia coli isolates. The most prevalent types of ESBLs are SHV-5, SHV-12, CTX-M-3, and CTX-M-14 in isolates of K. pneumoniae and E. coli, with differences between institutions. SHV-12 and CTX-M-3 have been reported as the most common ESBLs in isolates of Enterobacter cloacae and Serratia marcescens, respectively. Molecular epidemiology studies suggest that the ESBL-encoding genes have been disseminated either by proliferation of epidemic strains or by transfer of plasmids carrying the resistance traits. The current ESBL screen guidelines of the Clinical and Laboratory Standards Institute (formerly National Committee for Clinical Laboratory Standards) are issued for E. coli, Klebsiella spp., and Proteus mirabilis. Owing to the lack of standard methods, it remains difficult to assure the presence of ESBL in an isolate co-harboring an AmpC beta-lactamase, particularly in cases where the latter is produced in larger amounts than the former. Empirical therapy with piperacillin-tazobactam to replace third-generation cephalosporins may help to reduce the occurrence of ESBLs in an institution with a high prevalence of ESBL producers. Carbapenems remain the drugs of choice for serious infections caused by ESBL-producing organisms. To retard the selection for carbapenem-resistant bacteria, 7-alpha-methoxy beta-lactams or fourth-generation cephalosporins can be therapeutic alternatives for mild-to-moderate infections provided that the pharmacokinetic and pharmacodynamic target can be easily achieved.