
INTRODUCTION

Patients hospitalized with lower respiratory tract infections (pneumonia) can acquire their infections from the community, hospital, or other health care facilities. Community-acquired pneumonia (CAP) is often treated empirically with oral cephalosporins (COX) or oral macrolides, while hospital-acquired pneumonia (HAP) is often treated with a broader spectrum ß-lactam antibiotic for COX and/or extended-spectrum ß-lactam antibiotic (ESBL) and/or fluoroquinolone (FQ) drug classes. However, the increasing rates of resistance among common hospital pathogens and the changing susceptibility profiles of organisms are critical elements in guiding empiric therapy and epidemiologic interventions.

MATERIALS AND METHODS

Collection:
The SENTRY Antimicrobial Surveillance Program has collected pathogens from medical centers globally since 1997. The program includes the reporting of pathogens causing community- and hospital-acquired pneumonia, or healthcare-associated pneumonia (CAP) or pneumonia among ventilated patients. The program also tracks the isolation and susceptibility of bacteria from lower respiratory tract sites determined to be the probable cause of pneumonia in hospitalized patients. In North America, 10,485 isolates from lower respiratory tract sites were submitted to the SENTRY Antimicrobial Surveillance Program during the monitored decade. Antimicrobial susceptibility testing was performed using CLSI reference methods at a central laboratory (JMI Laboratories, North Liberty, IA). Results: Selected pathogens with unique or emerging FR characteristics are included in the Table. The 10 prevalent pathogens comprised 58% of all isolates and included: S. aureus, S. pneumoniae (SPN), Klebsiella spp., Enterobacter spp. (KSP), H. influenzae, Enterococcus spp. (EC), and S. maltophilia. Among Gram-positive pathogens, S. aureus and S. pneumoniae were notable for CAZ and CAZ-VFX resistance rates (CAZ-VFX: KSP and EC; ranges 6.7-23.9% and 3.8-11.7%, respectively). Among Gram-negative pathogens, ESBL phenotypes rates were noted for E. coli, K. pneumoniae, E. faecalis, and P. aeruginosa. The rates of ESBL-phenotype were greater than 10% for K. pneumoniae (19.4%) and S. pneumoniae (49.3%) in 2006. Among enterics, CIP-R (30.8% for EC in 2006) and ESBL-phenotype rates (KSP and EC; ranges 6.7-23.9% and 3.8-11.7%, respectively) have increased significantly. Prevalence and susceptibility (S) profiles of bacterial pneumonia pathogens have resulted in increasing reliance upon fluoroquinolones and advanced-antimicrobial agents. The increase of virulent MRSA clones in the community and the increasing rates of hospital-acquired pneumonia require continued monitoring to guide empiric treatment.

RESULTS

There were few changes in the rank order of the 10 most common pathogens (>90%) causing decreases for H. influenzae and S. pneumoniae (6.4% and 6.0%, respectively; Table 1) indicate greater resistance between MRA and decreased hospitalizations for CAP.

- Among S. aureus, significant decreases (10-20%) in susceptibility were noted for oxacillin, erythromycin, clindamycin, levofloxacin, and gentamicin. Gentamicin became more active (susceptible rate) and linezolid and vancomycin remained very active.

- Decreases in the susceptibility rates for broad-spectrum ß-lactams against P. aeruginosa (4-8%) were noted.

- A significant decrease in susceptibility (22.5%) for levofloxacin for E. coli. ESBL rates for E. coli and Klebsiella spp. increased 5.9 and 13.0%, respectively.

- Increases in imipenem resistance among Klebsiella spp. are primarily the result of a continued epidemic of clonal strains expressing carbapenemases (primarily KPC-2 and -3 enzymes) in the New York City area (data not shown).

- Erythromycin and clindamycin susceptibilities decreased for S. pneumoniae. Levofloxacin and ceftriaxone remain highly active. Penicillin was 92.8-96.0% susceptible under 2008 CLSI breakpoint for parenteral usage (non-meningitis; ≤2 mg/L; Table 2).

Table 1. Prevalence of bacterial pathogens causing pneumonia in hospitalized patients (North America 1997-2006) and susceptibility data by year

Table 2. Susceptibility profiles among key pathogens causing pneumonia from patients hospitalized in North America (1997, 2002)

CONCLUSIONS

- While resistances among Enterobacter spp., H. influenzae, SRSA spp. and MRSA have been significantly changed. Acinetobacter isolated from respiratory tract cultures were consistently more resistant in 2006-2007 for most ß-lactams and quinolones (65% susceptible to ciprofloxacin).

- The rank order of pathogens causing lower respiratory tract infections (pneumonia) in North American hospitalized patients has not changed significantly in 10 years.

- Temporary increases in susceptibility were detected for some North American pathogens. However, all monitored pathogens remained decreased to one or more class agents during the monitored decade.

- CAP (especially considering the increase of virulent MRSA clones in the community) and the increasing rates of healthcare-associated pneumonia require continued monitoring to guide empiric treatment.

- Rapid pathogen isolation and identification, and susceptibility testing are critical to treating and monitoring hospitalized pneumonia patients. Global, longitudinal comparisons of these emerging pathogens originating in the community and hospital and the changing resistance profiles are a necessity to guide effective therapies and epidemiologic interventions.

SELECTED REFERENCES


