Using Antimicrobial Susceptibility Testing Data To Identify Possible Carbapenem-resistant Klebsiella pneumoniae in Hawaii, 2005–2010

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Introduction

- Carbapenem-resistant Klebsiella pneumoniae (CRKP) is an increasingly concerning etiology of some healthcare-associated (HAI) infections, with high mortality rates, up to 40 to 50%
- The production of enzyme K. pneumoniae carbapenemase (KPC), the most common method of resistance, confers resistance to carbapenems, penicillins, cephalosporins, and aztreonam
- According to the Centers for Disease Control and Prevention, 37 states have reported KPC organisms
- In Hawaii CRKP infection is not a reportable disease
- This study aims to identify any possible CRKP infections occurring in Hawaii from 2005–2010

Methods

- Antimicrobial susceptibility testing (AST) data are retrospectively collected by the State of Hawaii Antimicrobial Resistance Project (SHARP)
- Data are collected from the state’s 4 major clinical laboratories (95% of AST data statewide)
- K. pneumoniae AST results were compared with the 2011 minimum inhibition concentration (MIC) carbapenems resistance breakpoints determined by the Clinical and Laboratory Standards institute (CLSI)
- A potential CRKP isolate was defined as an AST result which is resistant to one of the carbapenems
- The carbapenems of interest and their respective MIC breakpoints for resistance were:
  - Ertapenem ≥1;
  - Imipenem ≥4;
  - Meropenem ≥4

Results

- 1,038,653 AST results for K. pneumoniae were reported to SHARP from January 2005 through December 2010. 38,704 isolates were tested against carbapenems
- We identified 65 isolates that were resistant to carbapenems, with 46 (71%) originating from an inpatient setting
- Almost 33% (15) of the inpatient isolates originated from the ICU (Table a)
- Oahu had the largest number of cases at 53 (84%) (figure 1)
- The annual median number of isolates for the study period was 10, range 5–18 (Table b)
- Urine was the primary clinical source for the majority of isolates 20 (31%) (Table c)

Conclusion

- The results suggest that some CRKP infections may have occurred in Hawaii during the study period
- As may be expected Oahu, with 70% of the population and all the trauma centers, had the highest percentage of isolates
- These findings are limited in that full clinical resistance is not always observed or consistent with in vitro results, and past CLSI breakpoints varied during the study period
- Using AST data and applying CLSI breakpoints may provide an efficient overall surveillance method to detect potential CRKP infections
- Further investigation to using clinical records is needed to confirm these CRKP and determine the clinical circumstances, evolution, and potential associated trends

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