Prevalence of Extended Spectrum Beta-Lactamase Producing and Quinolone Non-susceptible Enterobacteriaceae in Inpatient and Outpatient Settings in the USA from 2011-2017

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ABSTRACT

Background: Rising rates of resistance to quinolones and cephalosporins have been reported recently amongst E.coli and other gram-negative pathogens that claim urinary tract infection (UTI) as their target. We sought to define the regional prevalence of quinolone-non-susceptible (QNS) and extended spectrum (ESBL) producing gram-negative pathogens in the United States (US).

Methods: An electronic research dataset from 192 US hospitals (BD Insights Research Database: Becton, Dickinson and Company) was analyzed to study trends in prevalence of QNS and ESBL organisms from January 2011 to June 2017. Isolates were categorized as ESBL if confirmed as ESBL-positive per commercial panels or intermediate/resistant to either ceftriaxone, cefotaxime, ceftazidime or cefepime and Quinolone non-susceptible (QNS) if identified as intermediate or resistant to either ciprofloxacin, levofloxacin or moxifloxacin. Isolates were categorized by specimen collection location as follows: (a) isolated in hospitalized patients and (b) isolated in facility patients not admitted during hospital admission.

RESULTS

• The data source was the BD Insights Research Database (Becton, Dickinson & Company) from 192 US hospitals (2011 – June 2017) and 379 facilities in Q2 2017.
• All non-duplicate Enterobacteriaceae, Klebsiella pneumoniae, Klebsiella oxytoca and Proteus mirabilis isolates were characterized as:
  - ESBL if confirmed as ESBL-positive per commercial panels or intermediate/resistant to either ceftriaxone, cefotaxime, ceftazidime or cefepime and
  - Quinolone non-susceptible (QNS) if identified as intermediate or resistant to either ciprofloxacin, levofloxacin or moxifloxacin.
• Isolates were categorized by specimen collection location as follows: (a) isolated in hospitalized patients and (b) isolated in facility patients not admitted during hospital admission.

CONCLUSIONS

• ESBL-producing organisms at these sentinel hospitals have been rising since 2011. Quinolone resistance remains persistently elevated in both inpatient and outpatient settings.
• Oral antibiotics with good activity against ESBL-producing and quinolone non-susceptible pathogens are needed.