

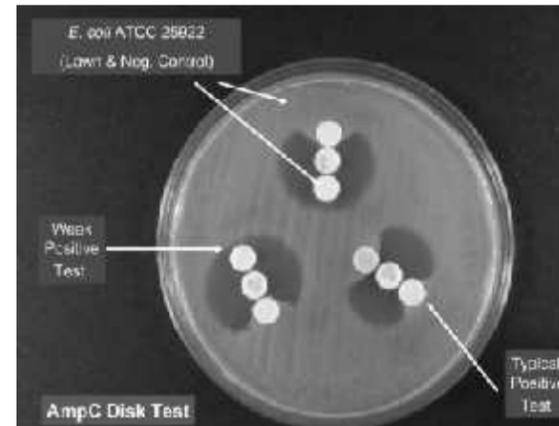
Multidrug Resistant Enterobacteriaceae in A Suburban Community Teaching Hospital; A Retrospective Analysis

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Background: There has been a sharp increase in infections caused by multidrug resistant (MDR) gram-negative organisms, particularly in tertiary care facilities. High rates of colonization and infection caused by these bacteria pose challenges for both therapy and prevention, but little is known about the scope of resistance in community settings.

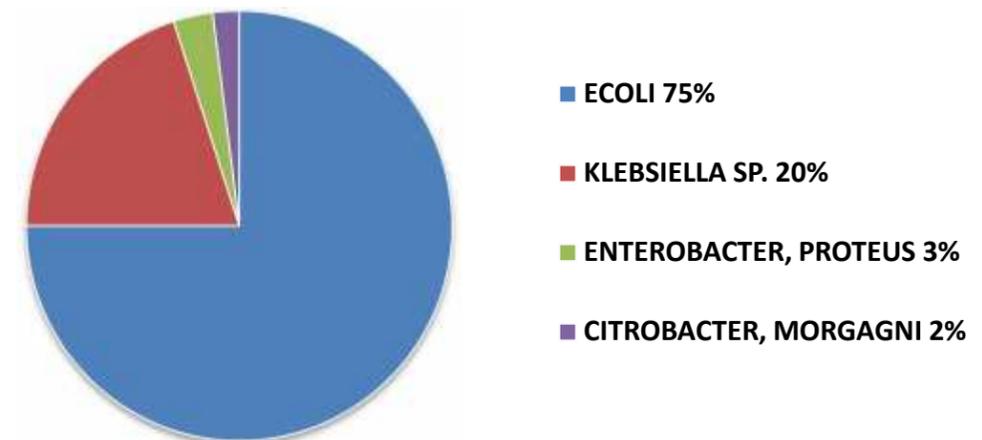
Method: We reviewed the records of patients seen at a suburban community teaching hospital (both inpatients and outpatients) who had one or more cultures positive for MDR Enterobacteriaceae in 2008 and 2012. We examined culture data for three different resistance patterns: ESBL AmpC and Carbapenem-resistant Enterobacteriaceae (CRE) using standard definitions.



TEST RESULT	ESBL	AMPC
Inhibited by Clavulanate?	YES	NO
HYDROLYZES		
1 st , 2 nd , 3 rd generation cephalosporin	YES(R)	YES(R)
Cephmycins (cefoxitin or cefotetan)	NO(S)	YES(R)
Cefepime (4 th generation cephalosporin)	YES(R)	NO(S)

Results: In 2012, 210 patients had positive cultures for MDR- Enterobacteriaceae at the Metrowest Medical Center. Since 2008, there was a doubling of patients who had infection or colonization with ESBL producing organisms. The majority of ESBL and AmpC-producers were Escherichia coli, and all isolates of CRE except one were Klebsiella pneumonia. More than 60% of the patients came from the community, although all of the patients with carbapenem resistance were from nursing homes. The age range was 9-97. Although the majority of patients had one or more co-morbidities identified, 17% of patients with ESBL had no significant underlying diseases. Five percent of the patients with MDR gram-negative bacilli had bacteremia and three quarters of the isolates were from urine. In 2008, 57% of patients with carbapenem resistance presented with severe sepsis or required an ICU admission, and the 30 day mortality was 85%, declining to 0% in 2012. Likewise, mortality in patients with ESBL declined from 15% to 3%, and no patients infected with an AmpC resistance pattern died of infection.

MICROBIOLOGY OF ESBL



ORGANISM	AGE GROUP	CASES FROM COMMUNITY	CHRONIC MED CONDITIONS	RISK FACTOR ASSOCIATION	SEVERITY OF ILLNESS
ESBL	9-97yr	61%	73%	34%	10%
AMPC	20-97yr	60%	64%	28%	4%
CRE	58-97yr	42%	62%	37%	12%

*Chronic medical conditions include congestive heart failure, chronic lung conditions, diabetes mellitus, and steroid use more than 3months, neurological illness like stroke, Parkinsonism, multiple sclerosis, hematological oncology, liver cirrhosis, chronic kidney disease. Severity of illness includes ICU admission and sepsis. Risk factor association include patient with central line, indwelling urinary catheter, G/J tube, tracheotomy tube.

Discussion: MDR infections caused by gram-negative bacilli are increasing in community hospital settings, and occur in patients with significant underlying morbidity and in-hospital mortality. This has important implications, not only for infection control practices, but for initial antibiotic selection in patients who present with severe infection. Somewhat surprising is the significant number of healthy younger patients presenting with infections caused by ESBL producing bacteria bringing into focus the importance antibiotic stewardship.