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Poster Presentation

Outbreaks of Healthcare-Associated Infections in Sao Paulo State, Brazil: Results From a Statewide Monitoring System

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Background: Outbreaks of healthcare-associated infections (HAI) are relevant causes of morbidity and mortality. Healthcare-authorities should monitor them to allow prompt interventions, identify tendencies along the time, and develop large scale strategies to avoid new cases and clusters. According to the Brazilian legislation, any outbreak should be reported to health authorities. Sao Paulo State Health Department (Brazil) has a system in place since 2011 to monitor HAI outbreaks. This study aims at describing the 3.5 last year's results of surveillance system for monitoring HAI outbreaks. **Methods:** *Study design:* Quantitative descriptive study. *Source of information:* Database from HAI outbreak reports, Division of Hospital Infection at Sao Paulo State Health Department. Reports were filled out online by professionals from healthcare settings or regional health authorities according to predefined criteria. Interventions were put in place by the health authorities based on the analysis of each situation in a timely manner. *Variables analyzed:* Number of reports, local, infection site, type of care unit, causative microorganisms, number of cases, and number of deaths. **Results:** The number of reports have been stable for 3 years: 2016 (n = 34, 34.7%), 2017 (n = 28, 28.6%), 2018 (n = 25, 25.5%) and the first semester of 2019 (n = 11, 11.2%). These reports encompassed 712 confirmed cases and 123 deaths. The reports were mainly about infection outbreaks; 6 reports were about colonization of multidrug-resistant microorganisms. The bloodstream was the most frequent infection site in the HAI outbreak reports (n = 37, 37.7%), followed by respiratory tract (n = 25, 25.5%), urinary tract (n = 10, 10.2%), and surgical wound (n = 9, 9.2%). HAI outbreaks happened more frequently in intensive care units, including neonatal, pediatric, and adult ICUs (n = 38, 38.8%), followed by clinical and general wards (n = 20, 20.4%), hemodialysis (n = 6, 6.1%), and surgical wards (n = 5, 5.1%). Among reported outbreaks, 62.2% occurred in the capital and the metropolitan region of São Paulo. Microorganisms causing the HAI outbreaks reports were mainly carbapenem resistant, both *Klebsiella pneumoniae* (n = 28, 28.5%) and *Acinetobacter baumannii* (n = 12, 12.2%), but carbapenem-susceptible *Pseudomonas aeruginosa* (n = 7, 7.1%) was also reported. **Conclusions:** HAI outbreaks reported to health authorities in Sao Paulo may represent only a minute percentage of the total outbreaks, most of which are still not being reported, despite the normative. However, the available data emphasize the importance of developing strategies for intensive care units and hemodialysis units that focus on reducing bloodstream infections caused by multidrug-resistant gram-negative organisms.

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Outcomes for Community-Acquired Extended-Spectrum Beta-Lactamase (ESBL) *Escherichia coli* Urinary Tract Infections (UTIs) in Children Treated With Empiric Noncarbapenem Antibiotic Therapy

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Background: Empiric therapy with a cephalosporin antibiotic is the current standard of care for children with urinary tract infections (UTIs). However, as the rate of UTI due to extended-spectrum β-lactamase (ESBL)–producing organisms rises, there is concern that treatment failures may increase. Carbapenems are the most reliable antimicrobials for treating ESBL organisms, but empiric coverage with carbapenems necessitates hospitalization for intravenous therapy. **Objective:** We evaluated whether empiric noncarbapenem therapy in patients with ESBL *Escherichia coli* UTI is associated with poorer outcomes. **Methods:** We conducted a case-control study of patients with UTIs treated with empiric penicillin- or cephalosporin-based antibiotics from January 1, 2017, to December 31, 2018. We compared outcomes in cases with ESBL *E. coli* UTI with age-matched controls with a cephalosporin-susceptible *E. coli* UTI. Logistic regression was used to compare the odds of clinical failure (persistent symptoms and/or fever) at 48–72 hours. We further evaluated the odds of hospitalization and UTI recurrence between groups. **Results:** Of the 228 enrolled patients, 51 were cases and 177 controls. Cases were more likely to have underlying medical conditions (45% vs 21%). The odd ratio of clinical failure at 48–72 hours after initiation for cases compared to controls was 4.83 (95% CI, 0.94–24.92; $P = .06$). These odds were was not influenced by age, presence of an underlying medical condition, or fever. The overall adjusted odd ratio of hospitalization for cases compared to controls was 12.09 (95% CI, 0.995–4.38, $P = .052$). Most patients admitted at presentation had an underlying medical condition (30 of 64, 47%) and/or fever (54 of 64, 84%). Among 30 cases initially managed as outpatients, only 2 (7%) were later admitted due to clinical failure. There was no difference in the likelihood of UTI recurrence within 60 days for the 2 groups (adjusted OR, 1.34; 95% CI, 0.47–3.78; $P = .58$).

Outcomes for community-acquired extended-spectrum beta-lactamase (ESBL) *Escherichia coli* urinary tract infections (UTI's) in children treated with empiric non-carbapenem antibiotic therapy

Demographics/Clinical characteristics	Cases (n=51)	Controls (n=177)
Age (years), mean	5.14	4.56
<2 mo (%)	3 (6)	8 (5)
2 - <6 mo (%)	3 (6)	13 (7)
6 mo - < 5 yrs (%)	23 (45)	82 (46)
5 - 18 yrs (%)	22 (43)	74 (42)
Underlying medical condition (%)	23 (45)	37 (21)
Urogenital anomaly (%)	16 (31)	16 (9)
Fever at presentation (%)	36 (71)	107 (60)
Documented clinical improvement at f/u (%)	36/39 (92)	174 (98)
Hospitalized at presentation (%)	21 (45)	39 (23)
Hospitalized at 48-72 hours for failure of outpatient therapy (%)	2/30 (7)	2/138 (1)
Recurrence of UTI within 60 days (%)	7 (13)	14 (8)
Recurrent UTI ESBL (%)	4/7 (57)	0

Table 1. Demographic and clinical characteristics of patients.

Fig. 1.

	OR Failure	Confidence Interval	p-value
ESBL *E. coli* UTI	4.83	0.94, 24.92	0.060

Table 2. Univariate regression of odds of clinical improvement at 48-72 hours after empiric therapy with cephalosporin or penicillin-based empiric therapy of cases (ESBL *E. coli* UTI's).

	OR Hospitalization	Confidence Interval	p-value
ESBL *E. coli* UTI	2.09	0.995, 4.38	0.052
Underlying medical condition	5.70	2.67, 12.16	<0.005
Fever	3.46	1.50, 8.01	0.004
Age	0.47	0.30, 0.74	0.001

Table 3. Multivariate regression of odds of hospitalization of cases (ESBL *E. coli* UTI's), adjusted for the presence of an underlying medical condition, fever, and age.

	OR Recurrence	Confidence Interval	p-value
ESBL *E. coli* UTI	1.34	0.48, 3.78	0.581
Urogenital abnormalities	3.31	1.15, 9.51	<0.005

Table 4. Multivariate regression of odds of recurrence of bacteriuria of cases (ESBL *E. coli* UTI's), adjusted for the presence of an underlying urogenital abnormalities.

Fig. 2.

Conclusions: At 48–72 hours, there was no significant difference in the odds of clinical failure for patients with ESBL *E. coli* UTI compared to patients with non-ESBL *E. coli* UTI receiving empiric noncarbapenem therapy. Although we detected a trend toward a higher odds of hospitalization among cases, this result was largely due to a higher clinical complexity among cases at baseline. Only 2 cases required admission for failure of outpatient therapy. There was no increased risk of UTI recurrence among cases. This study suggests that initial discordant antibiotic therapy may not increase the risk of a poor outcome in children with ESBL *E. coli* UTI.

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Outcomes of Extended-Spectrum Beta-Lactamase Gram-Negative Bacteremia Cases Treated With Carbapenem Versus Noncarbapenem Antibiotics

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Background: The rising prevalence of infections caused by extended-spectrum β-lactamase (ESBL)–producing bacteria increases reliance on carbapenems, which intensifies selection pressure for the emergence of carbapenem-resistant Enterobacteriaceae (CRE). Whether noncarbapenem (nC) antibiotics can be safely used in this setting remains incompletely understood. **Objective:** To examine the safety of carbapenem stewardship in this population, we compared outcomes of uncomplicated ESBL bacteremia treated with a carbapenem to those treated with a noncarbapenem regimen. **Methods:** A retrospective chart review of patients with ESBL bacteremia from 2014 to 2018 in a 5-hospital regional health system was conducted. Patients aged <18 years, with polymicrobial bacteremia, whose infections required a prolonged length of antibiotic therapy (LOT), or who died

Table 1.

Characteristic[a]	Carbapenem	Non-Carbapenem	P-value[b,c]
No. of Patients	57	13	
Age, years (median, IQR)	74 (64 – 82)	67 (37 – 72)	0.070
Female, (%)	28 (49.1)	7 (53.9)	0.759
Charlson Comorbidity Index (median, IQR)	5 (3 – 8)	3 (2 – 7)	0.158
Urologic Disease	22 (38.6)	5 (38.5)	0.993
Immunosuppression	9 (15.8)	2 (15.4)	0.999
Nosocomial Infection	5 (8.8)	2 (15.4)	0.606
Pitt Bacteremia Score (median, IQR)	2 (1 – 3)	1 (1 – 3)	0.519
Historical Microbiology			
Prior ESBL in any culture	18 (31.6)	3 (23.1)	0.741
Prior gram-negative bacteremia	7 (12.3)	0 (0)	0.334
Antibiotic Treatment			
Empiric antibiotics ultimately effective against ESBL	17 (29.8)	3 (23.1)	0.774
If empiric antibiotics ineffective, number of days; median (IQR)	2 (0 – 3)	3 (1 – 3)	0.506
Total days of ESBL-active antibiotic therapy; median (IQR)	14 (12 – 15)	14 (10 – 15)	
Total days of all antibiotics	17 (15 – 18)	17 (14 – 18)	0.681
Infectious Disease Consult	31 (54.4)	6 (46.2)	0.592
Length of hospital stay, days; median (IQR)	11 (7 – 18)	6 (4 – 15)	0.055

IQR = Interquartile Range
[a] All statistics are expressed as n (%) unless otherwise stated.
[b] P values were obtained by Wilcoxon rank-sum testing
[c] P value signifies overall χ^2 or Fisher's exact test

Table 2.

Outcome[a]	Carbapenem	Non-Carbapenem	P-value[b]
No. of Patients	57	13	
C. difficile within 90-days	2 (3.5)	2 (15.4)	0.154
30-day all-cause mortality	0 (0)	0 (0)	------
Recurrence of ESBL bacteremia	7 (12.3)	1 (8.3)	0.999
90-day readmission	27 (47.4)	3 (23.1)	0.132
Intravenous line complication	1 (1.8)	2 (15.4)	0.086

[a] All statistics are expressed as n (%)
[b] P value signifies overall χ^2 or Fisher's exact test

on antibiotic treatment or transitioned to hospice, were excluded. Groups were stratified based on the antibiotic regimen with the highest number of treatment days during the treatment course. Outcome measures included empiric and definitive length of therapy (LOT), 30-day all-cause mortality, 90-day readmission, recurrence of ESBL bacteremia, hospital length of stay (LOS), incidence of *Clostridioides difficile* infection (CDI) and adverse drug events, obtained by Wilcoxon rank-sum testing, χ^2 test, and Fisher exact test, as applicable. **Results:** In total, 112 unique patients had ESBL bacteremia; 42 were excluded, leaving 70 for analysis. Of these, 57 were treated with a carbapenem regimen and 13 patients were treated with a noncarbapenem regimen: 9 ciprofloxacin, 3 gentamicin, 1 TMP-SMX. Patient baseline and antibiotic regimen characteristics were similar (Table 1). The most common organism was *E. coli*, and the most common source was urinary. A similar proportion of each group received ESBL-active empiric antibiotics. There were no significant differences in total effective antibiotic LOT, 30-day all-cause mortality, 90-day readmission, or recurrence of ESBL bacteremia (Table 2). A nonsignificant trend in hospital LOS was observed in the noncarbapenem group (11 vs 6 days; $P = .055$). **Conclusions:** Although the sample size was small, these multicenter data suggest that noncarbapenem treatment of ESBL bacteremia may be safe and effective. Pending confirmatory studies, ESBL bacteremia may be an important target for carbapenem stewardship.

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Outcomes of Neutropenic Patients with *Clostridium difficile* Infection

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