Session: 159. Pediatric Bacterial Diseases: Diagnosis and Management
Friday, October 4, 2019: 12:15 PM

Background. Daptomycin (DAP) is lipopeptide that frequently is used to treat infections caused by *Staphylococcus aureus* in adult patients. There are limited data using daptomycin in pediatric patients for the treatment of osteomyelitis caused by *S. aureus*. This study's objective is to describe pharmacodynamic (PD) target attainment of daptomycin in pediatric patients with osteomyelitis.

Methods. Medline was queried to obtain PD targets, pediatric pharmacokinetic models, and bone penetration information to build a model for DAP. A 10,000 subject Monte Carlo simulation was performed to estimate steady-state concentrations in the bone. Simulations modeled 30-minute infusions with using 12 mg/kg/dose IV q24h for patients less than 7 years and 10 mg/kg/dose IV q24h for patients 7 years and older. Goal PD targets were: AUC_{24}: MIC of 666 µg hours/mL for log1 killing and AUC_{24}: MIC for 1,061 for log2 killing. The CLSI breakpoint of 1 mg/L was used as a starting point and MIC's were analyzed below that level.

Results. PD target attainment in percentages is listed for DAP below in Tables 1 and 2 and are separated by age groups of patients.

Conclusion. The studied DAP doses did not reach any PD target attainment at the CLSI breakpoint of 1 mg/L. Based on these data, DAP should not be empirically used to treat SA osteomyelitis unless the exact MIC is known. Furthermore, modern pediatric pharmacokinetic studies of DAP for pediatric osteomyelitis are warranted.

Table 1: Percent target attainment of log1 killing model of DAP in pediatric osteomyelitis

Age group (years)	MIC (mg/L)					
	0.03	0.06	0.12	0.25	0.5	1
0	100.00%	100.00%	65.96%	0.24%	0.00%	0.00%
1	100.00%	100.00%	42.58%	0.00%	0.00%	0.00%
2	100.00%	100.00%	61.07%	1.13%	0.00%	0.00%
3	100.00%	100.00%	63.39%	1.19%	0.00%	0.00%
4	100.00%	100.00%	61.97%	0.32%	0.00%	0.00%
5	100.00%	100.00%	66.55%	0.53%	0.00%	0.00%
6	100.00%	100.00%	61.06%	0.16%	0.00%	0.00%
7	100.00%	100.00%	59.10%	1.26%	0.00%	0.00%
8	100.00%	100.00%	61.31%	1.73%	0.00%	0.00%
9	100.00%	100.00%	62.30%	1.15%	0.00%	0.00%
10	100.00%	100.00%	60.31%	1.89%	0.00%	0.00%
11	100.00%	100.00%	60.70%	1.00%	0.00%	0.00%
12	100.00%	100.00%	100.00%	8.77%	0.00%	0.00%
13	100.00%	100.00%	100.00%	8.85%	0.00%	0.00%
14	100.00%	100.00%	100.00%	9.71%	0.00%	0.00%
15	100.00%	100.00%	100.00%	10.68%	0.00%	0.00%
16	100.00%	100.00%	100.00%	9.55%	0.00%	0.00%

Table 2: Percent target attainment of log2 killing model of DAP in pediatric osteomyelitis

Age group (years)	MIC (mg/L)					
	0.03	0.06	0.12	0.25	0.5	1
0	100.00%	91.73%	10.40%	0.00%	0.00%	0.00%
1	100.00%	94.19%	0.00%	0.00%	0.00%	0.00%
2	100.00%	87.08%	10.66%	0.00%	0.00%	0.00%
3	100.00%	88.98%	11.19%	0.00%	0.00%	0.00%
4	100.00%	89.32%	10.36%	0.00%	0.00%	0.00%
5	100.00%	90.32%	7.92%	0.00%	0.00%	0.00%
6	100.00%	88.62%	9.46%	0.00%	0.00%	0.00%
7	100.00%	83.60%	11.17%	0.00%	0.00%	0.00%
8	100.00%	84.80%	13.47%	0.00%	0.00%	0.00%
9	100.00%	85.41%	10.98%	0.00%	0.00%	0.00%
10	100.00%	83.16%	12.37%	0.00%	0.00%	0.00%
11	100.00%	85.74%	10.95%	0.00%	0.00%	0.00%
12	100.00%	100.00%	55.96%	0.00%	0.00%	0.00%
13	100.00%	100.00%	52.33%	0.00%	0.00%	0.00%
14	100.00%	100.00%	50.94%	0.00%	0.00%	0.00%
15	100.00%	100.00%	54.92%	0.00%	0.00%	0.00%
16	100.00%	100.00%	57.77%	0.00%	0.00%	0.00%

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1508. Carbapenem vs. Non-carbapenem as Empiric Regimens for Bacteremia Caused by ESBL Producing *Escherichia coli* and *Klebsiella pneumoniae* in Children: Preliminary Study

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Session: 159. Pediatric Bacterial Diseases: Diagnosis and Management
Friday, October 4, 2019: 12:15 PM

Background. The clinical efficacy of non-carbapenem for the treatment of extended-spectrum β-lactamase (ESBL) bacteremia in children with underlying comorbidities is controversial. We aimed to compare clinical and microbiological outcomes between pediatric patients received carbapenem and non-carbapenem as empiric regimens for bacteremia caused by ESBL producing *E. coli* and *K. pneumoniae*.

Methods. Pediatric patients aged <19 years who hospitalized between January 2014 to Jun. 2018 at Asan medical center with monomicrobial ESBL producing *E. coli* and *K. pneumoniae* bacteremia were included. Patients were excluded if they did not receive a carbapenem after ESBL production was identified. We compared outcomes between patients who had empirical therapy with a carbapenem to those who had empirical therapy with a non-carbapenem.

Results. Among total 161 *E. coli* and *K. pneumoniae* bacteremia, 46 (28.6%) fulfilled the criteria, of which 25 (54.3%) were caused by *E. coli* and 21 (45.7%) by *K. pneumoniae*. The most common underlying diseases were hemato-oncologic diseases (47.8%) and prematurity (23.9%). The main sources of bacteremia were vascular catheter (37.0%) and necrotizing enterocolitis (10.9%). 25 cases were treated with empiric carbapenem, and the remaining 21 cases with non-carbapenem agents. The all-cause 30-day fatality in the carbapenem group was 32% (8/25) and 5% (1/21) in the non-carbapenem group ($P = 0.023$). Microbiological cure rate at 3 days after the first culture positive day was 75.3% in the carbapenem group and 89.6% in the non-carbapenem group ($P = 0.046$). However, adjusting initial presentation with septic shock, the choice of initial empiric antibiotic was not a risk factor for the 30-day fatality and microbiological cure rate at 3 days (aHR 4.82, 95% CI 0.592–39.231; aHR 0.648, 95% CI 0.333- 1.259, respectively).

Conclusion. For the medically fragile pediatric patients with bacteremia caused by ESBL producing *E. coli* and *K. pneumoniae*, the impact of empiric antibiotics on clinical and microbiological outcomes was not significant if early transition to definitive carbapenem regimen is possible when susceptibility is proven. A large-scale multicenter study will be needed to select the most appropriate empiric antibiotics and minimize the spread of antibiotics resistance.

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1509. Outcomes of Empirical Antimicrobial Therapy for Pediatric Community-Onset Febrile Urinary Tract Infection in the Era of Increasing Antimicrobial Resistance

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Session: 159. Pediatric Bacterial Diseases: Diagnosis and Management
Friday, October 4, 2019: 12:15 PM

Background. Urinary tract infection (UTI) is a common cause of fever in children. Since infections caused by extended-spectrum β-lactamase (ESBL)-producing organism in the community have increased, alternative empirical antimicrobials to carbapenems have been studied. We conducted this study to compare clinical outcomes between group receiving empirical antimicrobials to which organisms were susceptible vs. non-susceptible in community-onset UTI.

Methods. We conducted a retrospective cohort study of pediatric patients with first-episode community-onset febrile UTI caused by *Escherichia coli*, *Klebsiella pneumoniae* and *Proteus* spp. at Ramathibodi Hospital from 2011 to 2017. Patients were classified into group receiving empirical antimicrobials to which organisms were susceptible and non-susceptible. Medical records were reviewed to assess clinical outcomes in both groups.

Results. One hundred and fifty-one eligible patients were enrolled in this study. The most common causative organism was *E. coli* (89.6 and 96.2% in the group receiving susceptible and non-susceptible antimicrobials, respectively). Among causative organisms, 19.8% were ESBL-producing organisms. Ceftriaxone was used in 76.8% of our patients. There was no significant difference in clinical, microbiological, relapse, time to defervescence between two groups of patients. None of patients in both groups developed sepsis after receiving empirical therapy. However, length of stay was significantly longer in group receiving antimicrobials to which organisms were non-susceptible (5.12 ± 3.187 vs. 8.54 ± 5.186, $P = 0.008$).

Conclusion. This study found no significant difference in the treatment outcomes between pediatric patients receiving antimicrobials to which organisms were susceptible and non-susceptible for the treatment of UTI.In the era of increasing antimicrobial resistance, third-generation cephalosporins are still a good choice as an empirical antimicrobial for children with community-onset UTI.

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1510. Improving the Management of Pediatric Complicated Pneumonia

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Session: 159. Pediatric Bacterial Diseases: Diagnosis and Management
Friday, October 4, 2019: 12:15 PM

Background. Pneumonia is a leading cause of pediatric hospitalization in the United States. Our Antimicrobial Stewardship Program (ASP) recognized significant variation in the management of pediatric complicated pneumonia. We developed and implemented a quality improvement (QI) intervention to align the management of complicated pneumonia with national guidelines and compared the medical care and clinical outcomes between a pre-intervention period and two post-intervention periods.

Methods. We queried Webi Universe for all ICD-9 and ICD-10-related admissions for pneumonia at our facility from November 15, 2015 to February 28, 2019. Manual chart review was done to extract clinical points of interest and to ensure that all included patients met inclusion criteria. Our first intervention (period 1) consisted of education to providers to increase use of chest tubes instilled with fibrinolytics and to decrease empiric antistaphylococcal therapy. Our second intervention (period 2) consisted of a care process model which codified the standardized management made by the first intervention, followed by several didactic sessions.

Results. 29 patients were identified in the pre-intervention period, 11 in post-intervention period 1, and 27 in post-intervention period 2. Streptococcal species were the most common pathogens recovered in all periods. Following our interventions the number of video-assisted thoracopic procedures to drain complicated parapneumonic effusions decreased three-fold in favor of chest tubes instilled with fibrinolytics ($P < 0.01$). Our interventions also reduced empiric antistaphylococcal therapy within the first 48 hours of admission ($P = 0.02$) and decreased the use of empiric vancomycin three-fold ($P = 0.01$). Our interventions did not affect the median length of stay, frequency of pulmonary complications, number of 30-day readmissions, or duration of antimicrobial therapy.

Conclusion. Our ASP's QI intervention decreased surgical drainage of complicated parapneumonic effusions and decreased the use of empiric antistaphylococcal agents without an increase in complications or readmissions. Opportunities remain to decrease the use of multiple antimicrobial agents within the first 48 hours of admission and to decrease the empiric use of antistaphylococcal therapy.

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1511. Effect of Discharge Antibiotic Route on Clinical Outcomes in Children with Methicillin-Resistant *Staphylococcus aureus* (MRSA) Osteomyelitis with Bacteremia

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