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Kristen R. Nichols

Butler University, knichols@butler.edu

Katie Andricopulos

Ashley S. Crumby

Elaine G. Cox

Chad A. Knoderer

Butler University, cknodere@butler.edu

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OUTCOMES OF EXTENDED-INFUSION PIPERACILLIN/TAZOBACTAM IN PEDIATRIC PATIENTS

Kristen R Nichols, PharmD; Katie Andricopulos, PharmD; Ashley S Crumby, PharmD; Elaine G Cox, MD; Chad A Knoderer, PharmD
 Butler University College of Pharmacy and Health Sciences,
 Riley Hospital for Children at Indiana University Health, and Indiana University School of Medicine,
 Indianapolis, Indiana

Kristen Nichols
 Butler University CPHS
 4600 Sunset Avenue
 Indianapolis, IN 46208
 317-948-4239
 knichols@butler.edu



BACKGROUND

- Piperacillin/tazobactam (PT) bactericidal activity associated with $fT > MIC$
 - Improve $fT > MIC$ through use of continuous or extended infusions (EI)

Table 1. Clinical outcomes in adults receiving EIPT (4 hour infusion)

	Design	Outcomes
Lodise 2007 ¹	-Retrospective 1-center review -Adults with <i>P. aeruginosa</i> infection -Traditional PT vs EIPT	-Pts with APACHE-II ≥ 17 had \downarrow mortality (31.6% vs 12.2%, $p=0.04$) and \downarrow LOS (38 vs 21 days, $p=0.02$)
Patel 2009 ²	-Retrospective 2-center review -Adults with GNR infection -Traditional PT vs EIPT	-Mortality similar between groups (5.7% vs 8.5%, $p=0.54$) -LOS similar
Yost 2011 ³	-Retrospective multi-center review -Adults with GNR infection -EIPT vs non-EI β -lactam comparators	-In-hospital mortality \downarrow in EIPT group (9.7 vs 17.9%, $p=0.02$) -Multivariate analysis; mortality OR 0.43, $p=0.05$

- Data in pediatric patients are limited
- Courter et al⁴ simulated extended and continuous infusion PT dosing regimens
 - PK data from healthy 2 & 12 year olds
 - 337.5 mg/kg/day divided Q8H, infused over 3 hours provides 98% PTA for MICs up to 8 mg/L
- Since 2011, standard of care for PT dosing at Riley Hospital for Children is 112.5 mg/kg IV Q8H, infused over 4 hours⁵
 - Prior to 2011, standard of care was 84.4 mg/kg IVq6H infused over 30 minutes

STUDY OBJECTIVE

- To determine the impact of an extended-infusion PT dosing regimen, as compared to a traditional dosing regimen, on outcomes in children with gram-negative infections

METHODS

- Retrospective chart review (April 2010 – March 2012)
- Inclusion:
 - Inpatients with ages 1 month – 17 years
 - Documented gram-negative infection
 - Received PT for ≥ 48 hours
- Exclusion:
 - Prior to study regimen, received another PT dosage regimen or more than one dose of another β -lactam with similar activity
 - Concurrent inadequate treatment of gram positive or fungal pathogens
 - NICU admission
 - RRT

Traditional PT 84.4 mg/kg IV q6H infused over 30 min	vs	EIPT 112.5 mg/kg IV q8H infused over 4 hrs
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Table 2. Evaluated outcomes

Primary	21-day clinical cure	Symptomatic resolution, afebrile, WBC normal, negative f/u cultures if available
Secondary	Length of hospital stay (LOS) Duration of PT therapy (DOT) 30-day mortality 30-day readmission $\geq 50\%$ increase in SCr from baseline	

RESULTS

- 85 patients included (1004 screened)

Table 3. Baseline characteristics

	Traditional PT	EIPT	p
n	35	50	
Male % (n)	60 (21)	42 (21)	0.102
Age, mos – median (IQR)	36(17-132)	84(24-132)	0.22
Weight, kg – median (IQR)	14.8(9.6-38.6)	22.6(13-37.4)	0.233
Cystic Fibrosis % (n)	8.6 (3)	22 (11)	0.1

RESULTS

Figure 1. Culture sites in traditional and EIPT groups

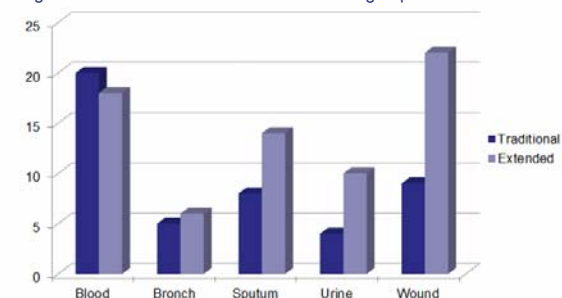


Table 4. Outcome comparison between traditional and EIPT

	Traditional PT	EIPT	p
21-day cure % (n)	85.7 (30)	74 (37)	0.193
LOS, days median (IQR)	11 (7-22)	11.5 (5.75-22.5)	0.844
DOT, days median (IQR)	8 (4-14)	5 (3-8.25)	0.07
30-day readmission	34.3 (12)	32 (16)	0.825
\uparrow SCr	5.7 (2)	10 (5)	0.479

- No 30-day mortality in either group

CONCLUSION

- In our cohort of patients, extended infusions of piperacillin/tazobactam resulted in outcomes similar to Traditional infusions of piperacillin/tazobactam
- Next steps: more patients, stratification of illness severity

REFERENCES

- Lodise TP, Lomaestro B, Drusano GL. Piperacillin-tazobactam for *Pseudomonas aeruginosa* infection: clinical implications of an extended-infusion dosing strategy. *Clin Infect Dis.* 2007;44:357-63.
- Patel GW, Patel N, Lat A, et al. Outcomes of extended infusion piperacillin/tazobactam for documented Gram-negative infections. *Diagn Microbiol Infect Dis.* 2009;64:236-240.
- Yost RJ, Cappelletty DM, et al. The retrospective cohort of extended-infusion piperacillin-tazobactam (RECEIPT) study: a multicenter study. 2011;31(8):767-765.
- Courter JD, Kuti JL, Giroto JE, Nicolau DP. Optimizing bactericidal exposures for beta-lactams using prolonged and continuous infusions in the pediatric population. *Pediatr Blood Cancer.* 2009; 53:379-85.
- Nichols KR, Knoderer CA, Cox EG, Kays MB. System-wide implementation of the use of an extended-infusion piperacillin/tazobactam dosing strategy: feasibility of utilization from a children's hospital perspective