In-Depth Analysis of Oral vs Parenteral Therapy in Pediatric Acute Hematogenous Osteomyelitis

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Background:

- Early transition from parenteral to oral antibiotics for uncomplicated pediatric acute hematogenous osteomyelitis (AHOM) is becoming the standard of care.
- Many questions remain: what is the optimal timing for transition to oral antibiotics? How should we approach more complicated infections? Does the oral route result in decreased adherence to therapy?
- We set out to describe in depth the clinical characteristics, therapy duration and adverse events (AE) in pediatric patients with AHOM at our center, the sole pediatric hospital in Rhode Island.

Methods:

- Children 18 years or younger without comorbidities were eligible.
- We enrolled all children with diagnostic codes associated with osteomyelitis from July 1, 2012 through December 31, 2014.
- We confirmed eligibility criteria by reviewing the medical records, and systematically collected clinical and laboratory data.
- Data was entered into a REDCap database.
- Statistical analysis was performed using SPSS

Results:

	D/C on PO (n=21)	D/C with PICC (n=20)	P value
Demographics			
Median age (years)	10.8	8.3	0.9
Female	38.1%	30.0%	0.8
Ethnicity: Hispanic	33.3%	5.0%	**0.045**
Race: White	61.9%	75.0%	0.5
Race: Black	19.0%	10.0%	
Race: Asian	19.0%	15.0%	
Obese	9.5%	15.0%	0.66
History of Presenting Illness			
Days of Symptoms (median)	5	7	0.487
Fevers PTA	71.4%	90.0%	0.238
Preceding Trauma	38.1%	30.0%	0.939
Prior Evaluation	61.9%	80.0%	0.353
Prior MRSA or SSTIs	0.0%	15.0%	0.107
Preceding Antibiotics	9.5%	40.0%	**0.032**
Markers of Severity			
ICU required	4.8%	15.0%	0.184
Opioid analgesics needed	38.1%	70.0%	**0.041**
Tmax (mean)	101.4	101.8	0.523
Max WBC (median)	8.7	12.35	0.21
Max ESR (mean)	48.5	75.3	**0.002**
Max CRP (mean, mg/L)	87.5	126.6	**0.041**
Septic joint present	14.3%	50.0%	**0.02**
Complicated Osteomyelitis*	33.3%	70.0%	**0.042**

*Cases involving abscess, thrombus, or spinal osteomyelitis.

	D/C on PO (n=21)	D/C with PICC (n=20)	P value
Microbiology			
Organism Recovery	52.4%	80.0%	0.062
Bacteremia	33.3%	55.0%	0.162
Staphylococcus aureus	90.9%	81.3%	0.624
MRSA (% among *S. aureus*)	10.0%	15.4%	1
Treatment Course			
Surgical Intervention	38.1%	75.0%	**0.017**
Length of Stay (days, median)	3.93	5.91	**0.032**
Days to Normal ESR (median)	20.9	36.1	**0.007**
Days to Normal CRP (median)	17.2	19.9	0.178
Days of IV Abx (mean)	3.48	42.4	-
Total Days of Abx (median)	30.5	46	**0.001**
Prolonged Therapy (>6 wks)	0.0%	35.0%	**0.003**
Progression to Chronic Infection	0.0%	10.0%	0.232
Therapy-Related Adverse Events			
GI Adverse Events	9.5%	5.0%	1
Rash or Allergy	0.0%	15.0%	0.107
PICC-related (TPA, dislodged, dermatitis, local infection)	-	**60.0%**	-
CLABSI or Thrombosis	-	0.0%	-
Severe Neutropenia	0.0%	10.0%	0.232
Antibiotic Change due to AE	0.0%	25.0%	0.131
ED Visit due to AE	0.0%	35.0%	**0.003**
Adherence to Therapy			
Medication Adherence Issues	14.3%	0.0%	0.237
Lost to Follow-up	19.0%	5.0%	0.343

Results (continued):

- The MRSA rate was 13%, differing significantly from our institution's MRSA rate during the same period (42%, p<0.01)

Conclusions:

- At our institution, pediatric MRSA AHOM occurs at a significantly lower rate than MRSA infections involving other anatomic sites. We speculate that differences in virulence factors may contribute to variable phenotypes.
- Children discharged with PICCs had more severe and complicated infections at presentation, a fact that should be considered when individualizing management.
- PICCs were associated with more treatment-related AEs, favoring early transition to oral antibiotics when appropriate.
- Discharge with oral antibiotics was safe and effective, but was associated with lower adherence rates and more loss to follow-up. Although this finding was not statistically significant in this small study, parenteral therapy may be advantageous in certain circumstances.

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