196. Clinical Characteristics and Outcomes of Healthcare-Associated Hematogenous Vertebral Osteomyelitis

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Background. The incidence of hematogenous vertebral osteomyelitis (HVO) has increased over recent years, likely due to longer life expectancies, higher prevalence of chronic disease, and more effective diagnostic techniques. Recently, healthcare-associated infections, such as catheter-related and procedure-related bloodstream infections, also increase the risk of HVO. The aim of our study was to evaluate the clinical characteristics and outcomes of healthcare-associated HVO (HCA-HVO).

Methods. We conducted a retrospective chart review of adult patients with microbiologically diagnosed HVO from five tertiary-care hospitals over 8-year period. HCA-HVO was defined as onset of symptoms after 1 month of hospitalization or within 6 months after hospital discharge, or ambulatory manipulations in the 6 months before the diagnosis [Pigrau et al. Medicine (Baltimore) 2015; 94:e365]. We compared the clinical characteristics and outcomes of HCA-HVO with community-acquired HVO (CA-HVO) cases.

Results. In total, 358 patients with microbiologically diagnosed HVO were included in final analysis. Of these 358 cases, 256 (63.1%) were CA-HVO and 132 (36.9%) were HCA-HVO according to the predefined criteria. The main causative pathogens identified were methicillin-susceptible *Staphylococcus aureus* (32%), followed by methicillin-resistant *S. aureus* (MRSA) (26%), aerobic gram-negative bacteria (24%), and *Streptococcus* species (11%). Compared with CA-HVO cases, patients with HCA-HVO had more neoplasm (13.6% vs. 5.8%, $P = 0.01$) and end-stage renal disease (8.3% vs. 2.2%, $P = 0.007$). MRSA was more frequent pathogens in HCA-HVO cases than in CA-HVO (37.1% vs. 17.7%, $P = 0.01$). Patients with HCA-HVO were more likely to be have the higher rates of persistent bacteremia for ≥7 days (24.2% vs. 15.5%, $P = 0.04$), 1-year mortality (18.2% vs. 11.5%, $P = 0.08$) and 1-year relapse (12.1% vs. 6.2%, $P = 0.051$).

Conclusion. In this study, more than one-third of HVO is health care associated. Patients with HCA-HVO were more likely to have underlying illness, and their causative pathogens were more frequently MRSA. Outcomes of HCA-HVO were poorer, which require prevention measures and early diagnosis.

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197. The Spectrum of Pediatric Osteoarticular Infections: A Comparative Study

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Background. There is a paucity of data relating to pediatric subacute or chronic hematogenous osteomyelitis (SCHO), non-hematogenous osteoarticular infections (NHO), and osteoarticular hardware infections (HI). A comparative analysis of the entire spectrum of pediatric osteoarticular infections was conducted to identify distinguishing clinical features and biological markers.

Methods. Using ICD9/10 code searches, we identified pediatric patients ≤18 years of age at Hasbro Children's Hospital (2006–2016) and Nationwide Children's Hospital (2015–2016) with osteoarticular infections. Cases of Lyme arthritis or ENT-related infections were excluded. Eligibility criteria were confirmed by reviewing medical records and clinical and laboratory data were collected systematically.

Results. 428 children met inclusion criteria: 211 (49%) had acute hematogenous osteomyelitis (AHO), 61 (14%) suppurative arthritis (SA), 42 (10%) SCHO, 60 (14%) NHO, and 54 (13%) HI. The age distribution differed significantly across the five infection types: AHO (median, 9.2 years), SA (5.0), SCHO (10.2), NHO (11.5), and HI (14.5); $P < 0.001$. Median initial CRP values were significantly higher ($P < 0.001$) in AHO (65 mg/dl) and SA (44) compared with SCHO (15), NHO (15) and HI (24). An ESR >19 mm/hours at presentation was more sensitive than a CRP >8.0 mg/dl in identifying SCHO (80% vs. 64%; $P = 0.035$). Bacteremia occurred more frequently in AHO (42%) and SA (25%) compared with SCHO (7%), NHOI (5%) and OHI (4%); $P < 0.001$. Patients with HI had significantly more complications as reflected by more ICU admissions (33% vs. ≤3% for other groups), and longer antibiotic treatment durations (median, 65 vs. ≤37 days for other groups); $P < 0.001$ for each comparison. *S. aureus* was the most common organism isolated for all infections, but the proportion of other Gram- and Gram-negative pathogens was significantly higher in SCHO, NHO, and HI compared with AHO and SA ($P < 0.001$). The ratio of MSSA to MRSA among isolates was 3:1, and did not differ significantly across the infection types.

Conclusion. SCHO, NHO, and HI commonly present with minimal evidence of inflammation, and differ in the spectrum of causative pathogens compared with AHO and SA. Further studies are required to optimize the diagnosis and management of non-acute, non-hematogenous osteoarticular infections.

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198. Utility of Diagnostic Bone Biopsies in the Management of Osteomyelitis Through Retrospective Analysis: How Golden Is This Gold Standard?

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Background. Bone biopsy is considered the gold standard for diagnosis and treatment of osteomyelitis (OM), but few studies have investigated the extent to which it influences antimicrobial therapy in non-vertebral bones. The purpose of this study was to evaluate clinician-initiated changes to empiric antimicrobial therapy after obtaining bone biopsy results. A secondary aim was to identify predictors of a positive bone culture.

Methods. We retrospectively reviewed all cases of non-vertebral OM in patients who underwent image-guided bone biopsies between 2009 and 2016. Data on pathologic and microbiologic yield were collected and logistic regression was used to determine potential factors affecting the microbiologic yield. Post-biopsy empiric antibiotics and final antibiotics were compared with determine if there was a change in antibiotic treatment after biopsy results were reported.

Results. We evaluated 203 bone biopsies in 185 patients. Samples from 115 (57%) cases were sent to pathology, of which 33 (29%) confirmed OM. All samples were sent to microbiology and 57 (28%) yielded a positive result. Diabetes (OR=2.39, $P = 0.021$) and white blood cell count (OR=1.13, $P = 0.006$) were significantly associated with positive bone cultures in multivariate analyses. There was no association between positive cultures and number of samples cultured, needle size, prior antibiotic use, or antibiotic-free days. Post-biopsy empiric antibiotics were given in 138 (68%) cases. Therapy was narrowed to target specific organisms in seven cases and changed due to inadequate empiric treatment in three cases. Targeted therapy was initiated in 4/65 cases, in which empiric antibiotics had been initially withheld. While final antibiotics were withheld in 38/146 with negative bone cultures, empiric antibiotics were discontinued in only eight cases.

Conclusion. In patients with non-vertebral OM, bone biopsy cultures rarely yielded results that necessitated changes in antibiotic management. Identified bone organisms were treated by empiric therapy in most patients. While bone biopsy remains the gold standard diagnostic test for OM, further work is needed to identify patients whose management may be impacted by this procedure.

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199. Comparative Analysis of Initial Antibiotic Dosing Among Healthy Weight, Overweight, and Obese Children with Osteomyelitis

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Background. Acute hematogenous osteomyelitis (AHO) is a common infection of childhood. Inadequately treated AHO can lead to significant morbidity. Small studies have demonstrated alterations in the pharmacokinetics of antibiotics among obese children. Consequently, there is no consensus regarding appropriate dosing of antibiotics among overweight and obese children with AHO.

Methods. This is a single center, retrospective, cohort study of children 2–17 years of age with a discharge diagnosis of acute osteomyelitis admitted between 1/1/2012 and 12/31/2015. Complicated osteomyelitis cases were excluded. Variability of the initial mg/kg antibiotic dose was determined and compared between healthy weight, overweight, and obese children.

Results. 142 children were included in the cohort. In total, 83 (58%) were classified as healthy weight, 25 (18%) overweight, and 34 (24%) obese. No difference was found in the variability of mg/kg dosing of vancomycin or clindamycin across the three weight groups. Cefazolin dosing in healthy weight children (median 33.3mg/kg [IQR 32.9–36.7mg/kg]) was significantly higher as compared with obese children (24.4mg/kg [20.0–33.3mg/kg]) ($P = 0.041$). Cephalexin dosing in healthy weight children (33.0mg/kg [30.6–34.5mg/kg]) was also significantly higher than in obese children (23.0mg/kg [20.0–29.9mg/kg]) ($P = 0.013$).

Conclusion. There was significant variability and lower overall dosing of first-generation cephalosporins among obese children compared with healthy weight children. Given the increasing incidence of invasive methicillin-susceptible *Staphylococcus aureus* infections, this study highlights the need for practitioners to