2313. An All-Harm Index Quantifying Central Line Associated Infections and Noninfectious Complications Among Pediatric Oncology Patients

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Background. In contrast to inpatient central line associated blood stream infections (CLABSIs), little attention has been devoted to preventing outpatient CLABSIs or central line associated noninfectious complications (CLANCs). Our aim was to develop and validate a novel index to comprehensively quantify the rates of both CLABSIs and CLANCs among pediatric oncology patients.

Methods. CLABSIs were defined according to CDC/NHSN definitions. CLANCs were defined using a novel classification as noninfectious events resulting in premature removal of the line. 592 oncology patient records (< 24 years; 2006-16) were reviewed. Wilcoxon rank-sum tests were used for continuous and ordinal characteristics and Chi-square or Fisher's exact tests for categorical characteristics.

Results. 656 CVCs were inserted in 368 patients, for a total of 175,941 catheter days (9.6% inpatient). Events included: 108 CLABSIs (42 inpatient and 66 outpatient), and 89 CLANCs (44 inpatient and 45 outpatient). The all-harm event rate was 1.1 per 1000 CVC days; the sum of CLABSI (0.61) and CLANC (0.50) rates. Inpatient rates were: all-harm (4.9), CLABSIs (0.24), and CLANC (0.25). Outpatient event rates were: all-harm (0.72), CLABSIs (0.45), and CLANCs (0.27). For all lines treated independently, risk ratio of an adverse event was strongly correlated with CVC type (tunneled CVCs vs ports; 11.8; <0.001), age at placement per 1 year older (0.89; <0.001), gender (females vs males; 1.6; 0.021), and tumor type (AML vs Non-AML Leukemia/ Lymphoma; 4.0; 0.001). Tunneled CVCs carried greater risk for both CLABSI (10.8; <0.001) and CLANC (13.2; <0.001) than ports.

Conclusion. We have developed an all-harm index to quantify the total harm associated with central line use. Among pediatric oncology patients with CVCs, major noninfectious complications occur at rates similar to those reported for CLABSIs. Although event rates per 1000 CVC days were lower among outpatients, the total number of infectious and noninfectious harm events was similar in the inpatient and outpatient settings. Additional quality improvement efforts are required to reduce the total harm associated with CVC use, and modifiable factors such as catheter choice could significantly impact the rate of both CLABSIs and CLANCs.

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2314. Risk Factors for Bloodstream Infection in Children with Intestinal Insufficiency on Parenteral Nutrition

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Background. Bloodstream infection (BSI) is a major cause of morbidity and mortality in children with intestinal insufficiency, but studies defining risk factors are lacking. We aim to identify risk factors of BSI in children with intestinal insufficiency on parenteral nutrition (PN).

Methods. Retrospective cohort study of children ≤ 18 years of age with intestinal insufficiency dependent on PN, who were followed at Lucile Packard Children’s Hospital (LPCH). The outcome of interest was rate of BSI. We studied proposed risk factors for BSI including sex, age, small intestine length at the time of surgery, diagnosis of short bowel syndrome (SBS), citrulline level (a marker of functioning enterocytes mass), central line (CL) days and CL breaks within 3 months. Data were represented in 6-month-intervals to study time dependent variables. Univariate analyses using t-test and regression analysis were conducted.

Results. Records between 2014 and 2016 were reviewed identifying 43 children who met the inclusion criteria. The rate of infection was 3.39 per 1000 CL days. Younger age increased rate of BSI by 0.23/1000 CL days per year (95% confidence interval (CI): 0.14–0.32; P = 0.015) and shorter small bowel increased it by 0.27/1000 CL days for every 10-cm of small bowel (95% CI: 0.14–0.4; P = 0.045). Recent line breaks are important risk factor for BSI; an opportunity for prevention. BSI rates are higher in younger children likely due to immature bowel and/or difficult compliance with hygienic precautions handling CLs. No association was found between CL days and rate of BSI, which could guide the decision of CL removal vs. salvage.

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2315. Incidence and Outcomes of Endophthalmitis Associated Hospitalizations in Children Aged ≤ 20 Years: A Population-Based Cohort Study

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Background. Endophthalmitis is a rare but sight-threatening condition in children, and is most commonly attributable to surgery, endogenous spread of infection, and trauma. Few population-based studies have examined the epidemiology and outcomes of neonatal and pediatric endophthalmitis.

Methods. Using the 2012 Kids’ Inpatient Database, a stratified random sample of pediatric (<20 years) discharges from community and non-rehabilitation hospitals in the US, we conducted a cohort study to examine the incidence and outcomes of endophthalmitis. The ICD-9-CM search codes included 360.07, 360.13 and 360.19 for endophthalmitis. Our primary outcome was the incidence of endophthalmitis hospitalizations in children, demography of sex, age, race and their outcomes. Outcome of death, length of stay (LOS in days), and total costs were described (with weighting) between neonatal (<4 weeks) and pediatric cases.

Results. A total of 344 hospitalizations (58.1% male, median age 0 years [IQR 0–10 years]) occurred for endophthalmitis corresponding to a national total of 478 cases at an incidence rate of 7.2 cases per 100,000 persons. Of these, 50.3% were neonatal endophthalmitis cases. Endophthalmitis was most common in the Caucasian (51.1%), Hispanic (21.9%) and Black (16.6%) races. The overall mortality was not significantly different between pediatric and neonatal cases (OR 1.46, 95% CI 0.24–8.90). For LOS, neonatal patients with evis/Infusion related infections, significance of LOS by 14.30 days (95% CI 7.97–19.52, P <0.001) compared with pediatric patients. Neonatal cases also had a significantly greater associated cost compared with pediatric cases (difference $77,626, 95% CI $16,703–$138,500, P = 0.01).

Conclusion. Our population-based study demonstrated that neonatal endophthalmitis was associated with similar incidence rates and mortality, but greater LOS and health care costs compared with pediatric endophthalmitis.

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2316. Fever in Infants: Assessing Variability in Sepsis Evaluation

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Background. Fever is a common presentation of infants resulting in frequent medical visits. Since fever may be the sole sign of invasive bacterial infection (IBI) in infants less than 3 months of age, invasive testing is often performed. Many physicians are guided by standardized criterias, which were created to aid in determining those at low risk of IBI.

Though these criteria exist, there is limited guidance regarding appropriate testing in the first month of life and wide variability in practice during the first 90 days. An American Academy of Pediatrics national quality improvement collaboration, Reducing Excessive Variability in Infant Sepsis Evaluation, is standardizing management of these infants. This study evaluates current institutional practice in assessing febrile infants.

Methods. Retrospective chart review of well-appearing previously healthy term infants with no obvious source of fever on initial evaluation between the ages of 0–90 days presenting with documented or reporting fever to either a tertiary emergency department or inpatient hospital, with specific International Classification of Diseases codes over 1 year period. The infants were then separated into three groups: 0–28, 29–60 and 61–90 days.

Results. Of 83 infants meeting criteria, 10 had IBI with 75% of these being viral in nature. Evaluation includes complete blood count (CBC), blood culture, urinalysis (UA) and urine culture varied between groups from 84%, 87% and 29% respectively. Within this latter group, 75% were underimmunized. CBC results were
abnormal in 64% of all infants with leukopenia the most common abnormality. Of those with bacterial infection and where CBC was obtained, 50% had leukopenia and 50% had normal white blood cell (WBC) count. UA collection differed between the groups from 88%, 87% and 68% and lumbar puncture attempts performed in 84%, 30% and 4%. CRX was obtained in 27% of infants and all were negative; 40% of these infants that underwent imaging were asymptomatic.

Conclusion. Most criteria rely on leukocytosis to identify high risk for IBI; infants with IBI in this study had leukopenia or normal WBC counts. Sepsis evaluation in febrile infants varies tremendously and an updated guideline for identifying IBI could minimize unnecessary imaging, laboratory testing and unwarranted antibiotic therapy.

Disclosures. All authors: No reported disclosures.

2317. Outcomes of Children Treated with Short vs. Long Course Parenteral Antibiotic for Acute Hematogenous Osteoarticular Infections

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Background. In pediatric osteoarticular infections (OAI), antibiotics are given intra- venously (IV) until clinical improvement, then completed with oral antibiotics. Adverse events (AE) associated with therapy and specific markers to guide transition are not well studied. We sought to determine the impact on OAI outcome with early transition to oral antibiotic therapy guided by clinical response and use of C-reactive protein (CRP) levels.

Methods. Clinical course and AE were reviewed in a retrospective analysis from 2010 to 2015 at our hospital. CRP level prior to transition to oral antibiotics was ana- lyzed at 3 different levels: <3 mg/dL, <5 mg/dL, and 50% decrease from the peak. Development of long-term sequelae (limp, limb deformities or chronic infection) and re-hospitalization was assessed.

Results. 1004 cases of OAI were confirmed. Subacute presentations or chronic conditions were excluded. 352 cases were identified; median age 7.5 years (IQR 2.5- 11.0); 65% male. 266 patients received <7 days of IV antibiotics vs. 86 that received >7 days. Clinical features are seen in Table 1. 337 patients were discharged with oral therapy. CRP analyses are shown in Figure 1. Transition to oral antibiotics with a CRP <5 mg/dL was associated with a significant decrease in the odds of developing long-term sequelae. No decrease was seen with CRP <3 mg/dL or a CRP decrease by 50%.

Conclusion. Children with uncomplicated OAI who received short-course IV prior to oral transition developed adverse outcomes infrequently. A CRP of <3 mg/dL may be a safe set-point to transition to oral antibiotics. Larger, prospective studies are needed to evaluate the impact of transition to oral antibiotics on the development of sequelae.

Table 1: Clinical characteristics of patients in each cohort

| Characteristic | Length of antibiotic therapy |
|---------------|-----------------------------|
| <7 Days (n = 266) >7 Days (n = 85) | P-value |
| Length of therapy, days (median, IQR) | 3.0 (2.5–4.5) | 10.0 (8.0–13.0) | 0.004 |
| Developed adverse outcomes (n) | 23 (9%) | 20 (24%) | 0.004 |
| Days of symptoms prior to starting | 4.0 (2–6.7) | 4.0 (2–7) | 0.38 |
| ESR at admission, mm/hours | 36 (22–58) | 45 (36–74) | <0.01 |
| CRP at admission, mg/dL | 5.1 (2.7–8.7) | 11.7 (6.4–25.1) | <0.01 |
| Number of surgeries (n) | 0.0 (0–.0) | 1.9 ± 1.7 | 0.38 |
| Number needing intensive care (n) | 5% (2%) | 17% (20%) | <0.01 |

Figure 1: CRP levels and development of long-term sequelae of infection (*P value <0.05)

Disclosures. All authors: No reported disclosures.

2318. Nutritional Status Is Not Associated With Diarrhea Duration or Weight Recovery in Young Children in a Resource-Poor Setting

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Background. Young children in low and middle income countries suffer from frequent acute infectious illnesses that contribute to acute and chronic malnutrition. It is unclear whether malnourished children recover more slowly from diarrhea, due to weakened immunity or a compromised intestinal brush border. Thus, we explored associations between chronic and acute malnutrition, diarrhea duration and weight recovery in young Guatemalan children.

Methods. From March 2015 to January 2016, 301 children age 6–35 months from rural (N = 166) and urban (N = 135) Guatemala who sought clinical care for acute non-severe non-bloody diarrhea were followed prospectively for diarrhoea resolution as part of a clinical study. Severely malnourished children (WHO weight-for-height z-scores (WFLZ) <−3) were excluded. Height, weight, treatments prescribed, and stool tests of 22 diarrhoeal pathogens were collected at enrollment. Height and weight were also collected 2 and 4 weeks after rehydration. Cox proportional hazards regression was used to model the effect of WHO height-for-age z-scores (HAC, chronic malnutrition proxy) and WFLZ (acute malnutrition proxy) on diarrhea duration and weight recovery. Analyses were adjusted for age, treatment prescribed, number of pathogens, and presence of parasi- tes; and stratified by urban vs rural due to demographic and treatment differences.

Results. In the rural site, 33% of children had a HAC below −2, and 22% had a WFLZ <−2 and −3. In the surgery department from January 1, 2016 through January 1, 2017.

We reviewed complete blood counts (CBC) in two groups: Group 1: Febrile children with confirmed viral infection (Diagnosis by FilmArray [multiplex PCR]); Group 2: Febrile children with confirmed bacterial infection (bacteremia, urinary tract infection, meningitis, enteritis). The study was approved by Winthrop IRB.

Results. Table 1: Viral vs. bacterial

|                      | Viral | Bacterial | Total | P-value |
|----------------------|-------|-----------|-------|---------|
| Age (Months)         | 456   | 42        | 498   | 0.004   |
| WBC (1000/KuL)       | 11.6 ± 5.7 | 18.4 ± 7 | 12.1 ± 6.0 | <0.001 |
| Neutrophil Proportion| 45.6 ± 19.8 | 49.7 ± 18.4 | 46.5 ± 19.6 | 0.367 |
| Lymphocyte Proportion| 37.9 ± 18.6 | 16.2 ± 39.5 | 18 ± 18.4 | 0.334 |
| Antibiotics Given (N, %) | 155 (34.0%) | 184 (39.0%) | 144 (39.0%) | <0.001 |

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