1609. Implementation of a Pragmatic Biomarker-Driven Algorithm to Guide Antibiotic Use in the Pediatric Intensive Care Unit: the Optimizing Antibiotic Strategies in Sepsis (OASIS) II Study

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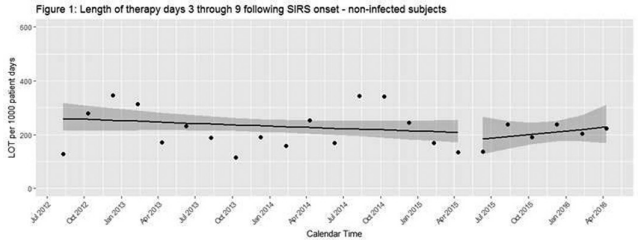
Background. Antibiotic overuse in the pediatric intensive care unit (PICU) is common and reliable approaches are needed to promote safe antibiotic discontinuation. In prior work we developed a biomarker-based algorithm that identified children with suspected sepsis at low risk of bacterial infection. We evaluated the effectiveness of this algorithm to reduce broad-spectrum antibiotic use in the PICU.

Methods. We conducted a quasi-experimental study focused on patients in whom antibiotics were initiated for presumed bacterial sepsis. Antibiotics were given per usual practice during the nonintervention period (T1: Aug 2012 – May 2015). From June 2015 – May 2016 (T2) PICU clinicians were encouraged but not required to stop antibiotics in "low-risk" patients: CRP <4 mg/dL *and* procalcitonin <1 ng/mL at SIRS onset (day 0) *and* no pathogen or signs of bacterial infection identified by day 2. The primary outcome was antibiotic length of therapy (LOT) from day 3 through 9, hospital discharge, or death. CDC NHSN definitions were used to define bacterial infections days 0–2. We reviewed all children ≤18 years with SIRS; those with immune compromise, DNR, or recent SIRS (within 30 days) were excluded. Time series analyses adjusting for significant covariates and confounders compared LOT from T1 to T2 in patients with no identified bacterial infection. We also calculated the incidence rate ratio (IRR) of LOT in the subset of patients who met our low-risk criteria.

Results. 525 eligible episodes of suspected sepsis occurred during T1 and 212 during T2. Bacterial infections were detected in 34% of T1 episodes and 39% in T2 (P = 0.16). Patients in T2 had fewer cardiovascular conditions but were otherwise similar to T1 patients. Broad-spectrum LOT remained unchanged in all patients without bacterial infections following implementation of our algorithm (OR 0.72, 95% CI 0.46 – 1.13; **Figure 1**). Among the subset who met low-risk criteria, LOT decreased from T1 to T2 (197 v. 104 antibiotic days per 1000 patient-days, IRR 0.53, 95% CI 0.30–0.93).

Conclusion. Implementation of a biomarker-based algorithm did not affect broad-spectrum antibiotic prescribing overall in patients without bacterial infections in our PICU, although LOT declined in those defined by our algorithm to be low-risk.



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1610. Decreasing Vancomycin Utilization in the NICU by Optimizing Treatment Decisions in Suspected Late Onset Sepsis

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Background. Late Onset Sepsis (LOS) is frequently suspected in NICU patients in the setting of nonspecific clinical symptoms. Based on institutional antibiogram data, empiric treatment of LOS in our NICU is vancomycin and amikacin with a plan to deescalate or discontinue based on culture results and symptomatology. Baseline data in our NICU revealed vancomycin overuse where vancomycin was continued past 48 hours of culture negativity, after Gram-negative urinary tract infection (UTI) was diagnosed, or for urine cultures reported with multiple organisms or < 10,000 CFU/mL. Our objective was to eliminate inappropriately prolonged empiric use of vancomycin for suspected LOS or UTI.

Methods. To institute timely discontinuation of vancomycin when cultures are negative at 48 hours, group education sessions were conducted for physicians, nurse practitioners, and nurses that included evidence-based criteria for diagnosing "true UTI". Vancomycin indication for use and duration were added to the rounding script for the night shift.

Results. At baseline over a 6 month period, extra vancomycin doses were administered in 39% of LOS courses, typically because late-night doses (past 48 hours culture negativity) preceded the decision to discontinue empiric therapy on morning rounds. After intervention, during a 6 month period, extra vancomycin doses were reduced to 3%. A baseline anonymous survey revealed that some prescribers advocated continuing vancomycin in the setting of urine cultures with < 10,000 CFU/mL (18%) or for Gram-negative UTI until sensitivities are reported (24%). After intervention, these were both reduced to 7%. At baseline over a 9 month review of UTI data, the use of vancomycin past 48 hours occurred in 86% of patients with negative or contaminated urine cultures (< 10,000 CFU/mL or > 1 organism) and in 48% of patients with Gram-negative UTI. In the post intervention phase, this occurred in 0% and 50% ($N = 2$) of cases respectively.

Conclusion. A high incidence of overtreatment with vancomycin was found to be related to inconsistent system processes and knowledge deficiencies. Through improved documentation, staff education and creation of evidence based guidelines for the diagnosis and management of UTI, we successfully minimized vancomycin overutilization for suspected LOS and UTI in the NICU.

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1611. Assessment of Surgical Antibiotic Prophylaxis in Pediatrics (ASAP-P)

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Background. No study to date has rigorously assessed the impact of interventions on improving surgical antibiotic prophylaxis (SAP) compliance in pediatrics. Our study is the first to adequately evaluate the timing criterion and to evaluate the persistence of compliance following the discontinuation of active interventions. Our objective was to assess the impact of a multifaceted intervention on improving pediatric SAP compliance in a hospital without an ongoing antimicrobial stewardship program.

Methods. A multidisciplinary team consisting of clinical pharmacists and infectious disease physicians performed a series of interventions designed to improve pediatric SAP compliance in June 2015. A retrospective, quasi-experimental study was performed to assess SAP compliance prior to and following the interventions. Our study included patients under 18 years of age undergoing surgery in one of seven chosen surgical services (cardiac, urologic, orthopedic, neurologic, otorhinolaryngology, gastrointestinal and plastic surgery) between April and September 2013 (pre-intervention) and between April and September 2016 (post-intervention). A 10-week washout period was included in order to rigorously assess the persistence of compliance without ongoing interventions. SAP, when indicated, was qualified as non-compliant, partially compliant (adequate agent and timing) or totally compliant (adequate agent, dosing, timing, readministration and duration).

Results. A total of 982 surgical cases requiring SAP were included in our primary analysis. The combined partial and total compliance increased from 51.4% to 55.8% (aOR 1.3; 95% CI, 1.0–1.8). Total compliance increased significantly from 29.0 to 38.3% (aOR 1.8; 95% CI, 1.3–2.4). Whereas improvement in correct dosing and readministration were significant, there was no significant improvement in correct timing. Compliance to agent selection and duration was already high.

Conclusion. Our study demonstrated that overall SAP compliance did not significantly improve following a washout period, illustrating the importance of ongoing surveillance and feedback from an antimicrobial stewardship program. Our strict approach in evaluating the timing criterion may also explain the lack of a significant impact on overall SAP compliance.