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Decreasing inappropriate use of anti-reflux medications by standardizing gastroesophageal reflux disease (GERD) management in the NICU

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Problem: Gastroesophageal reflux (GER) is a common functional self-limiting condition in neonates. There are wide variations in management of signs, symptoms, and complications associated with GERD in the NICU, with no evidence to support an empiric trial of anti-reflux medications. Premature infants have weakly acidic reflux rather than acidic reflux, and inappropriate use of acid suppressive medication has been linked to adverse clinical outcomes, like necrotizing enterocolitis and sepsis. Standardization decreases variations in practice, and the risk for medication errors, while improving patient outcomes.

Methodology: Retrospective chart review of EMR data extracted electronically from the clinical surveillance tool TheraDoc, provided baseline data regarding the use and dosage of anti-reflux medications. A multidisciplinary group of providers developed evidence-based GERD management guidelines with an algorithm. The guidelines outlined definitions for GERD symptoms, non-pharmacological measures for neonatal patients until they reach 37 weeks corrected gestational age (CGA) and criteria for appropriate intervention and testing prior to initiation of anti-reflux medications. Our primary outcome was to reduce inappropriate use of anti-reflux medications, related to timing of initiation of medication, dosing and GERD testing in neonatal patients. Secondary outcomes were appropriate timing for GERD testing with PH probe and 24-hour multi-channel impedance test and use of recommended formula change or other feeding strategies as needed. All three classes and doses of GERD medications including H2 receptor antagonist, proton pump inhibitors (PPI) and prokinetics were monitored for all patients admitted to the NICU. Project process improvement measures included, development of GERD management algorithm for preterm infants, GERD order sets and GERD education sheet for staff and parents. Electronic GERD order sets with correct dosing for medication were developed for all providers and GERD education sheets for staff and parents were provided. Multiple Plan-Do-Study-Act (PDSA) cycles allowed for effective implementation, with staff education on use of algorithm at bedside and monthly multidisciplinary group meetings to address deviation from guidelines and removal of barriers. Education and communication plan was developed for physicians, advanced practice providers and bedside nursing. Data shared monthly and drill down conducted if management deviated from algorithm and feedback provided to staff.

Results: Implementation of standardized GERD management guidelines in NICU decreased the overall use of GERD medications in all neonates from 15% to 2.8% and in preterm newborns less than 37 weeks (CGA) from 19.3% to 0% (Figure 1). Individualized use of each class of anti-reflux medications including H2 receptor antagonists, proton pump inhibitors and prokinetics decreased from 7.2%, 12%, and 2.7% to 0%, respectively, for all categories. The PPI lansoprazole was identified as the most frequently used GERD medication for patients under 37 weeks gestational age (GA) at the time GERD medications were initiated. With revision of EMR medication dosing and introduction of GERD order sets, incorrect dosing of lansoprazole was decreased from 55% to 0%. The standardized guidelines and algorithm promoted effective testing and eliminated unnecessary use of anti-reflux medication. The overall rate of NEC and late-onset sepsis also showed significant decrease in trend from 6.4% and 13.8% to 4.3% and 8.9% respectively.

Conclusion: Our project demonstrated that standardizing clinical management guidelines in NICU provided best practice GERD management strategies for a complex patient population and significantly reduced inappropriate use of dangerous anti-reflux medications. Evidence-based guidelines and electronic order sets promoted basic testing, while eliminating incorrect dosing, leading to improved patient safety and outcomes. There was reduced in hospital length of stay from 89 days to 42 days to date with substantial impact on cost savings (85% reduction) from decreased use in PPI.

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Biography

Fauzia Shakeel is a Neonatologist and Assistant Professor of Pediatrics. Johns Hopkins School of medicine and quality lead for maternal fetal neonatal institute at Johns Hopkins all children's Hospital in St. Petersburg, FL Her clinical interest and focus is on Nutritional care for neonates and improve clinical outcomes in NICU. She is Chairman of nutrition sub-committee and also leads the short bowel and intestinal rehabilitation program at Johns Hopkins All Children's Hospital. Her main passion is quality improvement and she is Physician champion for several quality improvement initiatives at local and regional level and led many process improvement opportunities within the NICU and throughout the hospital. She is the hospital faculty advisor for maintenance of certification (MOC) part 4 for American board of pediatrics (ABP) certification. She has received the 2015 Faculty Teacher of the Year Award presented by the Office of Graduate Medical Education, Johns Hopkins Medicine All Children's Hospital; and the 2016 Clinical Excellence Armstrong Award for Excellence in patient quality & Safety from Johns Hopkins School Medicine.

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