

Quality Improvement of Antibiotic use in the NICU

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Antibiotics are the most used medication in the NICU.” The 10 medications reported most for the NICU were ampicillin, gentamicin, ferrous sulfate, multivitamins, cefotaxime, caffeine citrate, furosemide, vancomycin, surfactant, and metoclopramide” (Clark et al., 2006). The overuse of antibiotics is the most common reason for early onset sepsis and late onset sepsis in premature infants that are in the NICU. For the safety and well-being of premature infants to make a full recovery and get to go home with their families there is a critical need for evidence-based quality improvement study to be done to help lower the use of antibiotics in premature newborns.

Quality improvement is data driven studies that enhance patient outcome by refining processes and reducing errors (QSEN, 2020). Quality improvement is a way to enhance the care of patients and improve their outcomes by using evidence-based practice to address errors made in practice and using that info to help prevent future errors. It is important to nursing because it helps us save lives and give the best possible outcome we can. It also helps with lowering costs. QSEN and quality improvement work together to improve patient outcomes and to take data and use it to make more effective and efficient patient care.

Article Summary

According to this article, antibiotics are the most common medication in the NICU. “A significant side effect of early antibiotic exposure during the perinatal period is disruption of the normal development of intestinal microbiota in the newborn. Also, using antibiotics in

premature newborns makes them more susceptible to late-onset sepsis (LOS) (sepsis occurring at or after 72 hours of life) necrotizing enterocolitis (NEC), fungal infections, bronchopulmonary dysplasia, severe retinopathy of prematurity, and higher mortality” (Pantoja, et al., 2023). The goal of this project was to lower the use of unnecessary antibiotic use in the NICU to help lower the LOS. For the results of the study all the newborns admitted to NICU, the antibiotic usage rate decreased, for EOS from 137 to 32 days per 1000 patient days (77% reduction) and for LOS from 277 to 121 days per 1000 patient days (56% reduction) (Pantoja, et al., 2023).

Introduction

This study is a qualitative study done to stop the overuse of antibiotics in the NICU setting. By stopping the overuse of antibiotics, they were able to lower the cases of LOS by 56% and EOS by 77% over the time they were doing this study (Pantoja, et al., 2023). This study used PDSA cycles for newborns at risk of EOS and LOS. This study was done to see how we could decrease the antibiotic usage rate as safely as possible. Using strategies like “antibiotic time-outs” were used in newborns who were stable and had a negative blood test for EOS (Pantoja, et al., 2023).

Overview

This study uses quality improvement strategies to reduce the overuse of antibiotics in the NICU. The study shows that the use of antibiotics so early on in life makes premature babies more susceptible to late onset sepsis. Antibiotic use during infancy is also associated with obesity, asthma, allergic disorders, and inflammatory bowel disease (Pantoja, et al., 2023). Total elimination of antibiotic use in infants is not possible so the goal is to eliminate the overuse of

antibiotics so that as many cases of EOS can be avoided. This study uses evidence-based practice to prevent EOS in the NICU setting following the QSEN standard of care by improving quality of care and safer outcomes of these preterm babies.

Quality Improvement

The research in this study strictly focuses on lowering the number of cases of EOS and LOS in the NICU caused by the use of antibiotics in infants. This specific study could be implemented in other areas of the hospital. EOS is sepsis in the first 72 hours of life, so it is specific to infants. LOS is also specific to infants; those two terms are used to help identify the age when the onset of sepsis starts. For other areas of the hospital to lower their sepsis rates they would need to conduct an entirely new study. Quality improvement aims to improve the over use and complications of antibiotics in the NICU setting. It wants to improve outcomes for the neonates by improving areas such as safety, effectiveness, and efficient patient-centered care, following closely with QSEN (Cantley & Milstone, 2015).

Application to Nursing

The quality improvement used in this article by Pantoja involves discontinuing antibiotics earlier in their initial blood culture analysis, as all the organisms involved in EOS became culture-positive in less than 24 hours (Pantoja, et al., 2023). By doing so, they lower the use of antibiotics. They are still using them, but they just do not use them as often or over-treat babies.

Practice

The best nursing practice for eliminating excessive antibiotic use in the Nicu is using strategies that include discontinuing antibiotics within 24 hours of life when the newborn is stable and can survive without them. Additionally, when the blood culture results are negative

for EOS, you can discontinue antibiotic use. Finally, by taking what they call “antibiotic time-out” during rounds to see if it is possible to take the patient off them (Pantoja, et al., 2023).

Education

Current education for eliminating excessive antibiotic use in the NICU focuses on using infection prevention. Consistent hand hygiene is a key element in preventing the spread of infection. Following standard protocols to reduce unnecessary antibiotic exposure to already vulnerable individuals. Giving antibiotics to patients who do not need them can cause more harm than good. The risk of necrotizing enterocolitis, fungal infections, and the development of multidrug-resistant organisms goes up with every unneeded treatment (Pantoja, et al., 2023).

Research

Future studies on reducing excessive antibiotic use in the NICU will focus on diagnostic techniques, utilizing antibiotic stewardship programs, and gaining a deeper understanding of the long-term effects of antibiotic exposure. Some progress has been made for early-onset sepsis, but a big gap still remains for other conditions. So continuing studies can make more progress in helping with the elimination of excessive antibiotic use (Pantoja, et al., 2023).

Conclusion

Antibiotic overuse is a critical concern in the NICU. Complications like early-onset sepsis, late-onset sepsis, and antibiotic resistance are all caused by the overuse of antibiotics. A reduction of antibiotic use can help reduce complications in the NICU. Quality improvement initiatives, such as evidence-based practice, were used to show early discontinuance of unneeded antibiotics, and using strategies such as “antibiotic timeouts” significantly reduced EOS and LOS. Prioritizing patient safety, minimizing harm, and promoting responsible antibiotic

stewardship, nurses play a big role in improving these outcomes for vulnerable patients. Continued research is essential to further improve and expand these strategies throughout healthcare and other NICU locations.

References

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