Antimicrobial Stewardship in a Pediatric Emergency Department

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In 2012, approximately 18% of children went to the emergency department (ED).[1] Of the approximately 29 million pediatric ED visits between 2009 and 2014, 23% of children received antibiotics.[2] Most (>70%) of antibiotics prescribed in the ambulatory setting are for acute respiratory tract infections (ARTIs).[3] Due to the significant threat of antibiotic resistance to public health, a National Action Plan for Combating Antibiotic Resistant Bacteria was formulated in 2015 with a goal of reducing unnecessary and inappropriate antibiotic prescribing in ambulatory settings by 50% in 5 years[4] Therefore, implementing an antimicrobial stewardship program (ASP) in the ED can contribute significantly towards achieving the goal of reducing inappropriate antibiotic use. To be effective in optimizing antibiotic prescribing for children in the ED, ASP should include representation and active participation from ED healthcare providers.

In a retrospective study, Poole, et al. showed that an estimated 6.7 million ED visits each year involved antibiotic use, with more antibiotics being prescribed in non-pediatric EDs. Of the 6.7 million visits that involved antibiotic use, 32% of them were for conditions in which antibiotics are generally not indicated, such as bronchiolitis, croup, and influenza, resulting in approximately 2 million prescriptions for unnecessary antibiotics. Although non-pediatric EDs more frequently prescribed antibiotics for these conditions as compared to pediatric EDs (33% vs. 26%),[2] both practice sites demonstrate the need to develop strategies for an improved antimicrobial use.

There are several recommendations for implementation of best practices of an ASP in the ED. These include collaboration of pediatric emergency medicine specialists with the antimicrobial stewardship team, development of ED-specific guidelines with integrated clinical decision support (CDS) tools in the electronic health record (EHR), and feedback mechanisms regarding the process, indications for antibiotic therapy, and appropriate antibiotic selection.[5] Collaboration and practitioner "buy in" is crucial to overcome barriers for the overall success of the program. The creation of ED-specific guidelines is necessary to help guide clinicians while providing pertinent information such as local antibiotic resistance patterns. These guidelines should be incorporated into the EHR in a way that does not hinder workflow. Analysis of adherence to these guidelines is essential in assessing the effectiveness of the program. Provider feedback is also imperative for improving antimicrobial stewardship on a continual basis.

The development of antimicrobial resistance occurs not only because of over-prescribing of antibiotics and unnecessary use of broad-spectrum antibiotics but also through inappropriate selection and dosing of antibiotics. A study by Miller, et al. demonstrated a significant decrease in the proportion of patients receiving inappropriate antibiotics when a pharmacist worked collaboratively with the ED nurse and the physician to review patients' cultures and antimicrobial selections compared to when a pharmacist was not involved (14.7% vs. 46.6%, $p < 0.0001$).[6] A study by Randolph, et al. also found that a review of cultures by the ED pharmacist was associated with a significant reduction in readmission rates within 96 hours ($p < 0.001$).[7] Therefore, involvement of clinical pharmacists in the ED will result in further

improvement in antibiotic prescribing in the ED and thereby reduce the emergence of antimicrobial resistance.

ASPs in the ED is a unique emerging area of practice with an importance goal of decreasing antimicrobial resistance. There are many challenges involved in implementation of these programs but collaboration among different healthcare providers is critical for their success. Review of cultures obtained from patients in the ED is an area of practice where pharmacists can make a positive impact in regard to antimicrobial stewardship. Due to the high volume of pediatric ED visits each year that involve antibiotics, ASPs in the ED can play a pivotal role in the fight against antimicrobial resistance.

References:

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