ANTIBIOTIC THERAPY AND PROPHYLAXIS IN GERMAN PAEDIATRIC HOSPITALS: DATA FROM THE GLOBAL ANTIMICROBIAL RESISTANCE, PRESCRIBING, AND EFFICACY IN NEONATES AND CHILDREN (GARPEC) PROJECT

H. Renk¹, M. Hufnagel², M. Steinhauser³, M. Burggraf³, M. Knuf⁴, A. Cook⁵, Y. Hsia⁵, M. Sharland⁵.

¹University Children's Hospital Tuebingen, Department of Paediatric Cardiology, Pulmology and Intensive Care Medicine, Tuebingen, Germany. ²Medical Center - Faculty of Medicine - University of Freiburg, Division of Pediatric Infectious Diseases and Rheumatology - Department of Paediatrics and Adolescent Medicine, Freiburg, Germany. ³Technische Universität München TUM, Children's Hospital Schwabing, Munich, Germany. ⁴Helios Dr. Horst Schmidt Kliniken, Department of Paediatrics, Wiesbaden, Germany. ⁵St. George's University, Paediatric Infectious Disease Research Group, London, United Kingdom.

BACKGROUND

Monitoring of antibiotic prescribing data helps to identify where antibiotic stewardship interventions are most needed. The GARPEC project is a global surveillance network focused on collection of data on neonatal and paediatric antimicrobial prescribing and resistance. This study aimed to assess antibiotic utilisation and prescribing practices through Point Prevalence Surveys (PPS) in 4 German tertiary care hospitals.

METHODS

Detailed antimicrobial prescribing data were collected through 3 PPS in 4 German tertiary care hospitals between May 2016 and February 2017. This analysis included paediatric inpatients receiving at least one systemic antibiotic on the day of the PPS. Data were collected in the web-based database REDCap™ and included age, gender, weight, antimicrobial agents, dose, frequency, mode of administration, and reasons for treatment. We numbered penicillins, aminopenicillins (+β-lactamase inhibitor), 1st generation cephalosporins and metronidazole among narrow-spectrum antibiotics (NS). The following antibiotics were arbitrarily classified as broad-spectrum (BS): tetracyclines, penicillins with extended spectrum, 2nd-, 3rd- and 4th-generation cephalosporins, macrolides, lincosamides; aminoglycosides. Sulfonamides and trimethoprim were counted separately. Carbapenems, polymyxins, fluoroquinolones, oxazolidinones, and glycopeptides were classified as antibiotics of "last resort" (LR).

RESULTS

625 antibiotic prescriptions in a total of 1060 inpatients were recorded covering 110 wards. 37% of all patients were on at least one antibiotic. We analysed 526 prescriptions in 337 children, excluding neonates. The main indication for antibiotic use was medical prophylaxis, which accounted for 168 (32%) of all prescriptions, followed by febrile neutropenia and surgical prophylaxis. In total, 44% of all prescriptions were for prophylactic and 56% were for therapeutic use (Tab. 1). TMP/SMX (46%) was the agent most frequently used for prophylaxis. Penicillins/β-lactamase-inhibitor combinations (23%) were most frequently prescribed for therapeutic indications (Fig. 1). Utilisation of NS-penicillins to cephalosporins ranged from 1 to 2.2-3.0 among the hospitals.

Table 1: Clinical indication for antibiotic use

Clinical indication	n=	%
Medical prophylaxis	168	31.9
Febrile neutropenia	84	16.0
Surgical prophylaxis	65	12.3
Sepsis	50	9.5
LRTI	36	6.9
UTI	21	4.0
SSTI	15	2.8
AOM, URTI	14	2.7
CNS Infection	12	2.3
BJI	5	0.9
Other*	50	9.7

Overall, 16% of all prescriptions were BS and LR antibiotics for prophylaxis. For treatment 8% were NS and 37% were BS or LR antibiotics (Fig. 2).

Figure 1: Type of antibiotic prophylaxis and treatment among children

Figure 2: Utilisation of narrow, broad spectrum and „last resort“ antibiotics

CONCLUSION

This study identified frequent use of cephalosporins, broad spectrum and "last resort" antibiotics in German tertiary care hospitals. A high proportion of antibiotics was prescribed for prophylaxis, including antibiotics not routinely used for this indication. We conclude that improvement of cephalosporin and broad-spectrum antibiotic prescribing practices is most needed. Furthermore, indications for appropriate antibiotic prophylaxis provide a key target for antibiotic stewardship interventions.

ACKNOWLEDGEMENT

GARPEC project is sponsored by PENTA Foundation. We thank the contributing centres of the GARPEC network.