Potential for more rational use of antibiotics in hospitalized children in a country with low resistance - Data from eight point prevalence surveys

Christian Magnus Thaulow (MD)¹, Dag Berild (PhD)^{2,3}, Beate Horsberg Eriksen (PhD)¹, Tor Åge Myklebust (PhD)⁴, Hege Salvesen Blix (PhD)^{3,5}

¹Department of Paediatrics, Møre and Romsdal Hospital Trust ²Institute of Clinical Medicine, Oslo University Hospital ³University of Oslo ⁴Department of Research and Innovation, Møre and Romsdal Hospital Trust
⁵Norwegian Institute of Public Health

Background

Antimicrobial resistance (AMR) is low in Norway [1], but to prevent an increase the Norwegian Government has launched a National Strategy including a 30% reduction of broad-spectrum antibiotics (BSA) in hospitals within 2020. BSA are defined as second- and third-generation cephalosporins, carbapenems, piperacillin/tazobactam and quinolones. The aim of the study was to describe the use of antibiotics with emphasis on BSA in Norwegian hospitalized children and neonates in order to detect possibilities for optimization.

Materials and methods

Data were extracted from eight national point prevalence surveys of systemic antibiotic prescriptions in Norwegian hospitals between 2015 and 2017. The choices of antibiotics were compared with the empirical recommendations given in available Norwegian guidelines [2-4]. In total, 1323 prescriptions were issued for 937 patients

Results

Twenty-four percent of pediatric inpatients were given antibiotics. Adherence to guidelines was 48%, and 30% (95% CI 27%-33%) of all patients on antibiotics received BSA. We identified only small variations in use of BSA between hospitals. One third of the patients on antibiotic therapy received prophylaxis whereof 13% where given BSA. In 30% of prescriptions with BSA, no microbiological sample was obtained prior to treatment.

Figure 1) Proportions of different prescribed antibiotics for children and neonates in Norwegian hospitalized children

Indication	Broad-spectrum antibiotics (%)	Other antibiotics (%)
Sepsis and neutropenia	93	85
Neonatal sepsis	100	70
Intraabdominal infections	42	50
Pneumonia	60	75
Urinary tract infections	95	92
Infections in skin, soft tissue, bone and joint	67	77
Infections in ear, eye, nose and throat	50	52
CNS infections	83	90
All prescriptions	70	75

Table 1) Proportion of prescriptions where a microbiological sample was obtained prior to treatment with antibiotics

Indication	Number of treatments (number of prescriptions)	Broad-spectrum antibiotics, number of treatments (%)	Other antibiotics, number of treatments (%)	Adherence to the guideline, number of treatments (%)
Community acquired pneumonia	87 (106)	22 (25)	65 (75)	34 (39)
Hospital acquired pneumonia	12 (15)	8 (67)	4 (33)	4 (33)
Urinary tract infections	78 (108)	18 (23)	60 (77)	37 (47)
Neonatal sepsis	59 (100)	11 (19)	48 (81)	11 (19)
Sepsis and neutropenia	52 (85)	14 (27)	38 (73)	17 (33)
Intraabdominal infections	32 (43)	23 (72)	9 (28)	26 (81)
Infections in skin, soft tissue, bone and joint	67 (86)	21 (31)	46 (69)	38 (57)
Infections in ear, eye, nose and throat	51 (60)	10 (20)	41 (81)	42 (82)
CNS infections	23 (28)	17 (74)	6 (26)	13 (57)
Other infections	93 (138)	40 (43)	53 (57)	n/a
Other neonatal infections	17 (30)	4 (24)	13 (76)	n/a
All infections	571 (799)	188 (33)	383 (66)	222 (48)

Table 2) Use of broad-spectrum antibiotics and adherence to guidelines for various indications in Norwegian hospitalized children and neonates treated for infections

Conclusion

This study serves as a valuable baseline for antibiotic surveillance in Norwegian hospitalized children and highlights the need for improved antibiotic stewardship in a country with low resistance rates. It reveals an overuse of BSA, low compliance with guidelines for antimicrobial therapy, and failure of obtaining bacteriological samples before starting treatment with BSA. These areas should be targeted in the Norwegian antibiotic stewardship program for children and neonates.

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