Poster #984

Medication Errors Associated with Beta-Lactam Antibiotics in the Russian Federation

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BACKGROUND

A medication error is an unintended failure in the drug treatment that harms or may harm to the patient[1]. Medication errors is the most common preventable cause of adverse events in healthcare practice presenting a major public health burden[2] with an estimated annual cost between €4.5 billion and €21.8 billion[3].
The inappropriate use of antimicrobial drugs accelerates the emergence of drug-resistant strains. Beta-lactam antibiotics is one of the most commonly prescribed drug group.

PURPOSE

The purpose of this study was
(a) to discover the prevalence and types of medication errors (MEs) associated with the use of beta-lactams;
(b) to develop solutions for reduction of MEs

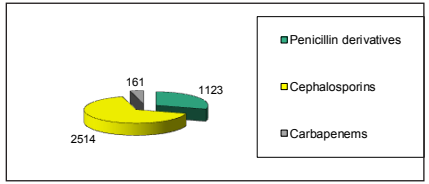
METHODS

We conducted a retrospective analysis of spontaneous reports (SRs) concerning adverse drug reactions associated with the beta-lactam antibiotics.
All the reports were submitted to the Russian pharmacovigilance database between 01.01.2012 and 01.08.2014.
We analyzed initial case safety reports that included at least one identifiable reporter, one identifiable patient, at least one suspected adverse reaction and at least one suspect medicinal product. Follow-up reports were included into the analysis.
Approved prescribing drug information, standards of medical care and practical guidelines for certain conditions were used to identify MEs associated with specific products.

RESULTS

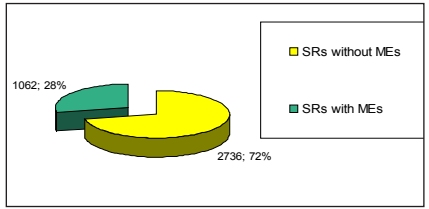
3798 SRs were analyzed.

Figure 1: Total Number of SRs for Different Groups of Beta-Lactams



Medication errors were detected in 1060 (28.0%) SRs.

Figure 2: Prevalence of SRs with MEs



In 168 (15.8%) of these cases two or more errors were discovered:
892 SRs had 1 ME
154 SRs had 2 MEs
13 SRs had 3 MEs
1 SRs had 4 MEs
However, only in 29 (2.7%) SRs medication error-related terms were indicated by reporters as a cause of reaction.

Table 1: Prevalence of Different Types of MEs

Type of medication error	Number of cases	%
Inappropriate indication	395	31,8%
Wrong frequency of administration	184	14,8%
Overdosage	138	11,1%
Underdosage	47	3,8%
Long duration of antibiotic therapy	19	1,5%
Short duration of antibiotic therapy	3	0,2%
Use of contraindicated drug	212	17,1%
Late discontinuation of a drug after adverse drug reaction	80	6,4%
Unjustified switch of antibiotic	59	4,7%
Late switch of antibiotic due to the lack of efficacy	31	2,5%
Wrong drug preparation	27	2,2%
Incorrect assessment of drug efficacy	13	1,0%
Irrational drug combination	8	0,6%
Administration route errors	6	0,5%
Non-adherence to treatment protocols	6	0,5%
Accidental unintended drug use	5	0,4%
Wrong treatment strategy	5	0,4%
Breach of storage conditions/deteriorated drug errors	4	0,3%
Wrong formulation	1	0,1%
Total	**1243**	**100%**

In 31.8% cases of wrong prescription the indication was absent or inappropriate, in 60.3% of these cases antibiotic was used for viral infections.
31.4% MEs resulted from deviations from the recommended dosage regimen. Inappropriate schedule of antimicrobial drug administration, underdosage and inappropriate duration of antibiotic therapy are usually considered serious MEs as they can spoil the effectiveness of treatment (failure to maintain adequate plasma concentration of an agent) and contribute to antimicrobial resistance4.
17.1% MEs were associated with the cases prescription of contraindicated drugs. In most cases (70.8%) the errors were associated with a patient with documented hypersensitivity to administered drug or to other beta-lactams.

Figure 3: Prevalence of MEs in Different Groups of Beta-Lactams

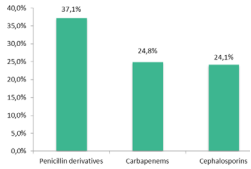
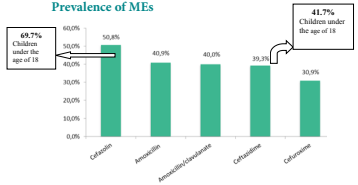


Figure 4: Top-5 Antibiotics with the Highest Prevalence of MEs



CONCLUSIONS

In our opinion, spontaneous reporting is an effective method of identification of MEs.
The most common types of identified MEs were inappropriate indication for the antibiotic, deviations from the recommended dosing scheme and the use of contraindicated drug.
The highest number of MEs was associated with the use of cefazolin, amoxicillin, amoxicillin/clavulanate, ceftazidime, cefuroxime.
Strategies of reduction of the MEs should focus on healthcare practitioners training, as well as on continuous professional development of doctors. We suggest emphasizing the importance of the following aspects:
(a) need to avoid prescribing antibiotics in viral infections, especially in children;
(b) compliance with the dosage regimen;
(c) accurate collection of the history of the medication therapy
(d) to pay attention to the cross-hypersensitivity reactions.

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DISCLOSURE

None of the authors of the poster have anything to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject of this presentation.