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The Frequency of Using Antibiotic Therapy for Acute Nasopharyngitis (J00) Among Preschool Children in Outpatient Conditions in Yakutsk

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Article received: . Accepted for publication: 05.05.2015.

Relevance. *Acute respiratory infections (ARI) are the most prevalent in the general morbidity structure. Ca. 70 000 cases of ARI per 100 000 children are registered in Russia every year. The maximum incidence rate of acute respiratory infections is observed at age range "6 months – 6 years"; children of this age have the highest ARI incidence rate among the preschool children. The most frequent cause of acute respiratory infections is virus infections (up to 90%); bacterial pathogens cause acute respiratory infections very rarely. Nevertheless, pediatricians prescribe antibiotics to their patients with acute respiratory infections in 25-85% of cases.* ***Objective.*** *Analysis of the spectrum of antibacterial drugs used for ambulatory acute nasopharyngitis in preschool children.* ***Methods.*** *The study involved a representative group of 1,848 medical records of preschool children. The article presents nosological forms of acute respiratory infections in order to study the spectrum of prescribed systemic antibacterial drugs for ambulatory acute nasopharyngitis in preschool children.* ***Results.*** *Acute nasopharyngitis was the most prevalent ARI in 2009-2010 (more than 60% of cases). Pharmacoepidemiological analysis helped to determine the ambulatory intake rate of systemic antibiotics in children with acute nasopharyngitis. It appeared that antibacterial therapy was used in 43 (in 2009) and 37% (in 2010) of cases. The most frequently prescribed drugs were aminopenicillins, combined penicillins, macrolides and III generation cephalosporins. Conclusion. Given the domination of acute nasopharyngitis over other nosological forms of ARI, it should be mentioned that most cases are uncomplicated; this may be an equally important reason for rational ambulatory use of systemic antibiotics on the empirical choice.*
Keywords: *acute respiratory infections, treatment, children, acute nasopharyngitis, nosology, antibacterial therapy, ambulatory care.*
(**For citing:** Akimova L. S. The Frequency of Using Antibiotic Therapy for Acute Nasopharyngitis (J00) Among Preschool Children in Outpatient Conditions in Yakutsk. *Pediatricheskaya farmakologiya — Pediatric pharmacology*. 2015; 12 (3): 335–339. doi: 10.15690/pf.v12i3.1362)

INTRODUCTION

Acute respiratory infections (ARI) take a lead in the general structure of Russian population-wide morbidity and is most frequently diagnosed in children, in whom it is 2.5 to 4 times as frequent as in adults. Acute respiratory infection in children is not only the most prevalent infectious disease (accounts for almost 90% of all infections), but is also the most prevalent first registered pathology (>60%). Despite the variety of causative agents, it is believed that up to

95% of all upper respiratory tract diseases in pre-school children are viral. Therefore, viruses are significative when it comes to this pathology [1,2]. The primary care physician should not overestimate the potential role of bacterial flora and avoid prescribing antibiotics in cases where they are not needed. Reasonable antibiotic therapy in pediatrics still remains an non-trivial and topical issue. Despite the significant progress in clinical pharmacology development, the issues of feasibility of treating ARIs with drugs persist. It is due to the lack of coherent treatment regimens, and overestimation of the ARI drug treatment; the causative organisms evolve their sensitivity and responsiveness to antibiotic drugs, which further complicates the situation [3, 4]. The specific gravity of ARIs in the structure of infections in children reaches up to 90%. Multiple authors state that maximum ARI morbidity in children is noted in the age group of 6 months to 6 years, and reaches 4 to 8 ARI cases a year per child. In schoolchildren, the morbidity decreases to 2 to 5 cases per year, and does not exceed 2 to 4 cases a year in adults [5 - 7].

According to Republic of Sakha (Yakutia) statistics, the ARI frequency in children up 14 years old remained high from 2000 to 2009. On average, it was 748.15 cases registered per thousand children. In 2003, 2009, and 2010, there was noted a significant upward trend in the republic-wide ARI morbidity, whereby it skyrocketed to 825.1, 955.3, and 891.4 cases, respectively [8, 9]. According to the World Health Organization, children on average survive 5 to 8 ARI cases per annum, and those are mostly not severe. However, it is the ARIs of viral genesis that is the most frequent reason of various therapeutic approaches and polypragmasy, which in its turn often causes severe iatrogenic complications.

It is, however, known that antibiotics do not affect ARI symptoms and cannot prevent bacterial superinfection; quite the contrary, they boost its development by suppressing the normal flora of respiratory tracts. Improper usage of antibiotics to treat ARIs in Russian children remains frequent at 25 to 85 percent [7, 10, 11].

The empirical choice of drugs to treat acute respiratory infections should be based on initial therapy recommendations with due account of causative agent probability and its vulnerability to drugs in this region. To rationalize treatment of ARI in children, the Union of Pediatricians of Russia collaborated with the International Maternal and Child Health Foundation in 2002 to create the research and practice program Acute Respiratory Diseases in Children: Prevention and Treatment. This program is devoted to the primary manifestations of acute and recurrent respiratory infections, as well as approaches to treatment thereof [12, 3].

PATIENTS AND METHODOLOGY

Research Design

For research purposes, we have formed a representative group by random sampling. The sample included the outpatient cards of 2-to-6-year-old children that sought medical aid at outpatient care institutions of Yakutsk in 2009 and 2010. We evaluated the nosological structure of ARIs and the frequency of antibiotic therapy application. We have also carried out general pharmacoepidemiological analysis of ARI drug treatment. On its basis, we studied the frequency of using systemic antibiotics to treat acute nasopharyngitis in children.

Statistical Analysis

Microsoft Excel was used to carry out statistical data analysis.

RESULTS

In order to achieve the set goal, we analyzed retrospectively the outpatient cards of 1248 2-to-6-year-old children followed up at different outpatient care institutions of Yakutsk, that displayed symptoms of acute respiratory diseases of the upper respiratory tract, such as acute

nasopharyngitis, acute laryngitis, acute tracheitis, acute simple bronchitis, tonsillitis, acute otitis media, acute sinusitis, and aphthous stomatitis. In 2009, 598 children survived ARIs, including 286 (47.8%) boys and 312 (52.2%) girls. In 2010, 650 ARI-affected children were treated and followed-up, including 327 (50.3%) boys and 323 (49.7%) girls.

The analysis of 2009 and 2010 data shows (Fig. 1, 2) that in the general ARI structure, acute nasopharyngitis leads the ranks (974 cases, 64.55%; 1165 cases, 66.98%), followed by acute tracheitis (187; 12.39%; 174; 10.30%), further followed by simple acute bronchitis (125; 8.28% and 118; 6.99%); the top fourth disease was tonsillitis (91; 6.03% and 78; 4.62%).

As of the seasonal nature of ARI morbidity, it peaked in March and April in both 2009 and 2010; gradual increase is noted in October and November, with the same number of doctoral visits in both months.

Fig. 1. Nosological structure of ARIs in children in 2009

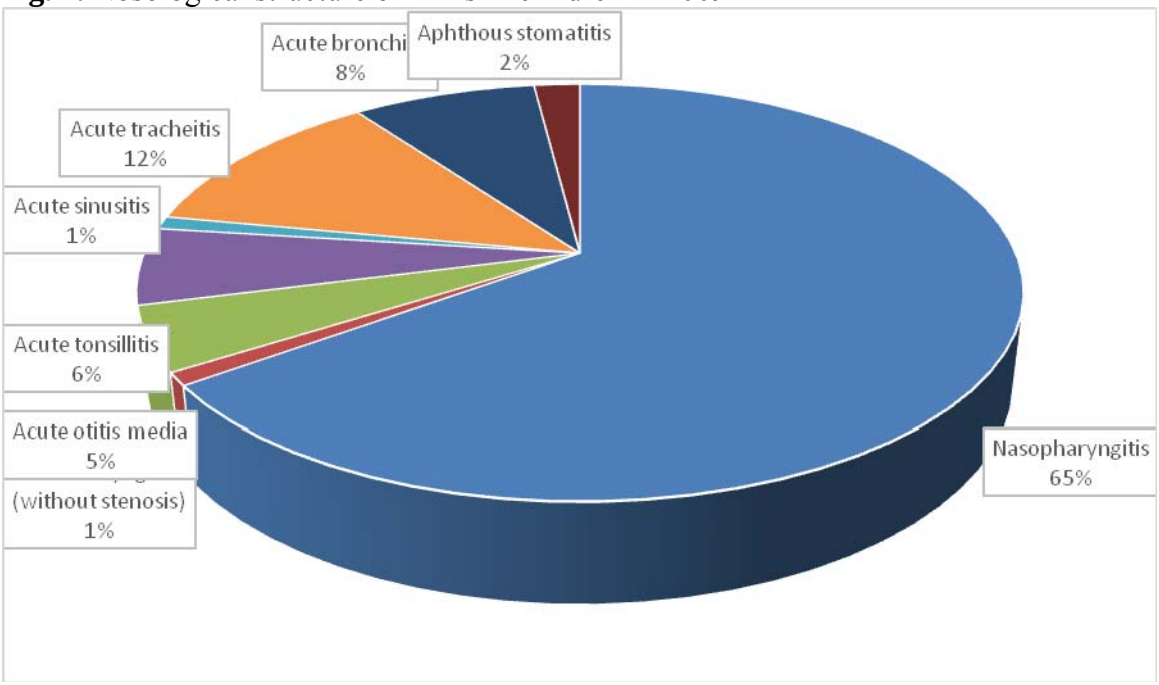
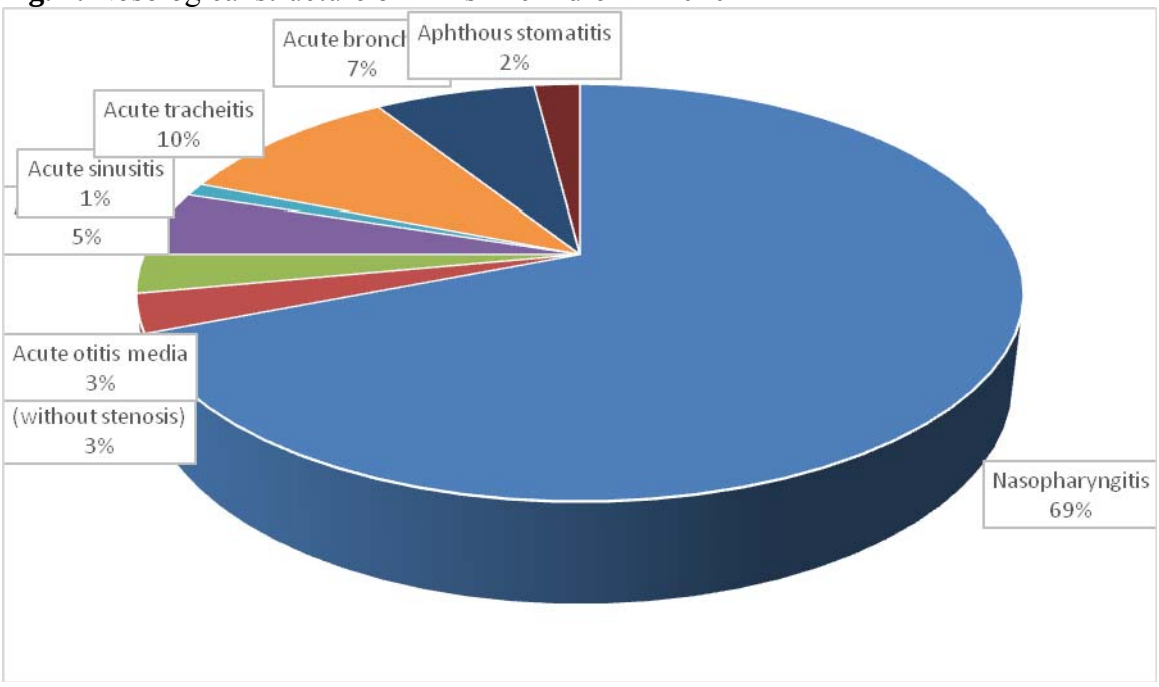


Fig. 2. Nosological structure of ARIs in children in 2010



Graphs show (Fig. 1 and 2) that non-complicated forms like acute nasopharyngitis and tracheitis were predominant in the ARI structure. That being said, ARIs are mostly non-severe, a fact confirmed by many Russian and non-Russian researchers.

Antibiotic therapy was applied in 43% of ARI cases in 2009, 37% in 2010, see. Fig. 3. Fig. 4 shows the percentage share of antibiotic therapy application for each nosology in 2009 and 2010. It has been found out that among the children who had non-complicated ARIs, antibiotic treatment was received by 17 and 16 percent of children with nasopharyngitis, 10 and 8 percent of children with acute tracheitis (percentage given for 2009 and 2010, respectively, and is that of the total number of ARI cases, see. Fig. 4).

It has also been found out that in 2009, 117 (18%) acute nasopharyngitis cases were treated with aminopenicillins (amoxicillin, ampicillin), 69 (11%) cases were treated with combined penicillins (resistant to β-lactamase), 45 (7%) cases were treated with macrolides (azithromycin, macropen), and in 19 (3%) cases, III generation cephalosporins were applied (Suprax in 17 cases and claforan in two cases). In 2010, aminopenicillins were used less extensively. As a result, combined penicillins like amoxiclav and augmentin, which are resistant to β-lactamase, were used in 19 cases (3%) more; III generation cephalosporins were used in 11 cases (2%) more, with Suprax applied in 30 cases; macrolides were used in 5 cases (1%) more; see Fig. 5-7. Nevertheless, antibiotics should not be prescribed to treat acute nasopharyngitis at all.

Fig. 3. Frequency of using antibiotics to treat acute respiratory infections in 2009 and 2010

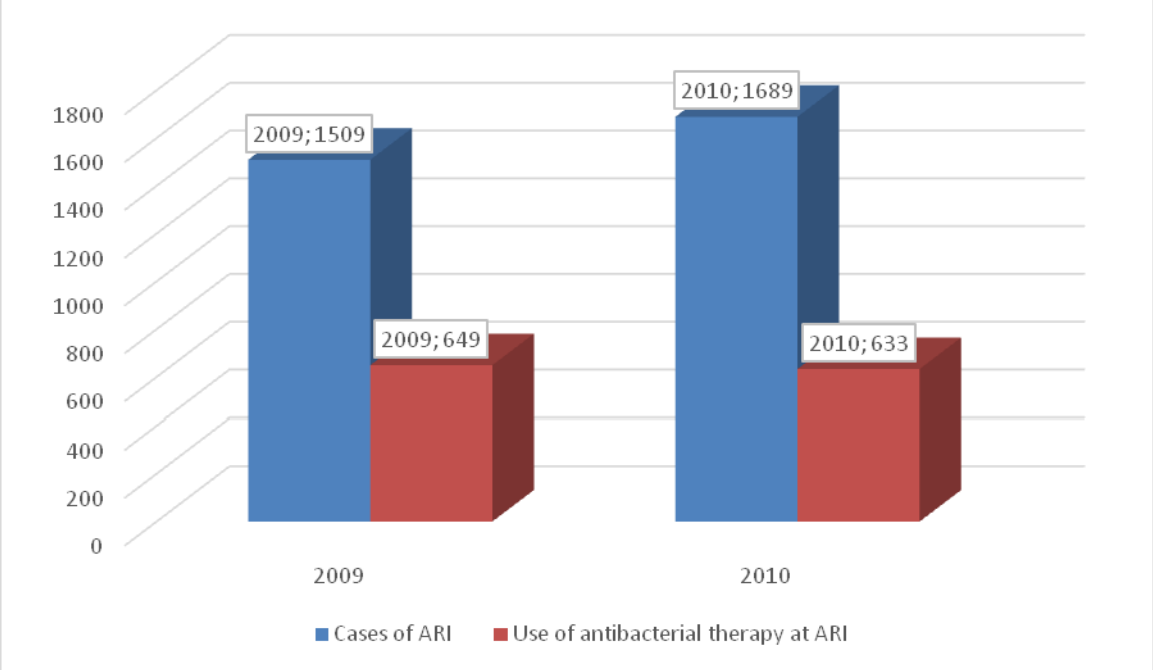


Fig. 4. Use of antibiotic therapy for each nosology in 2009 and 2010, in percent

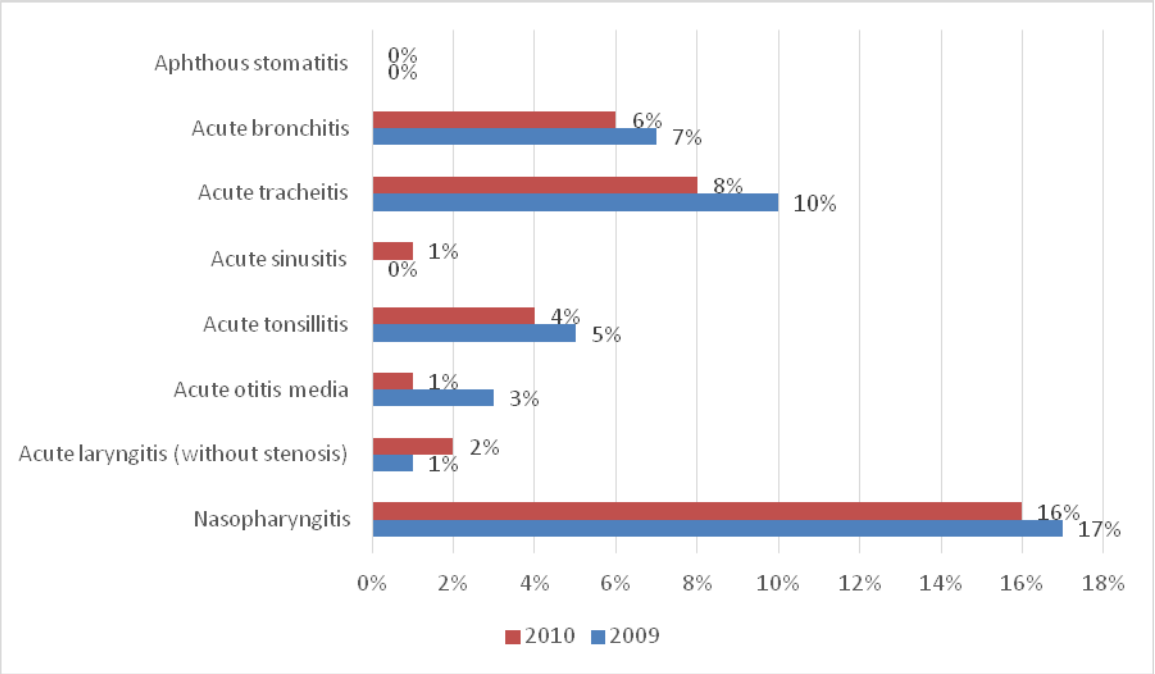


Fig. 5. Frequency of using antibiotics for each ARI nosology in 2009, in percent

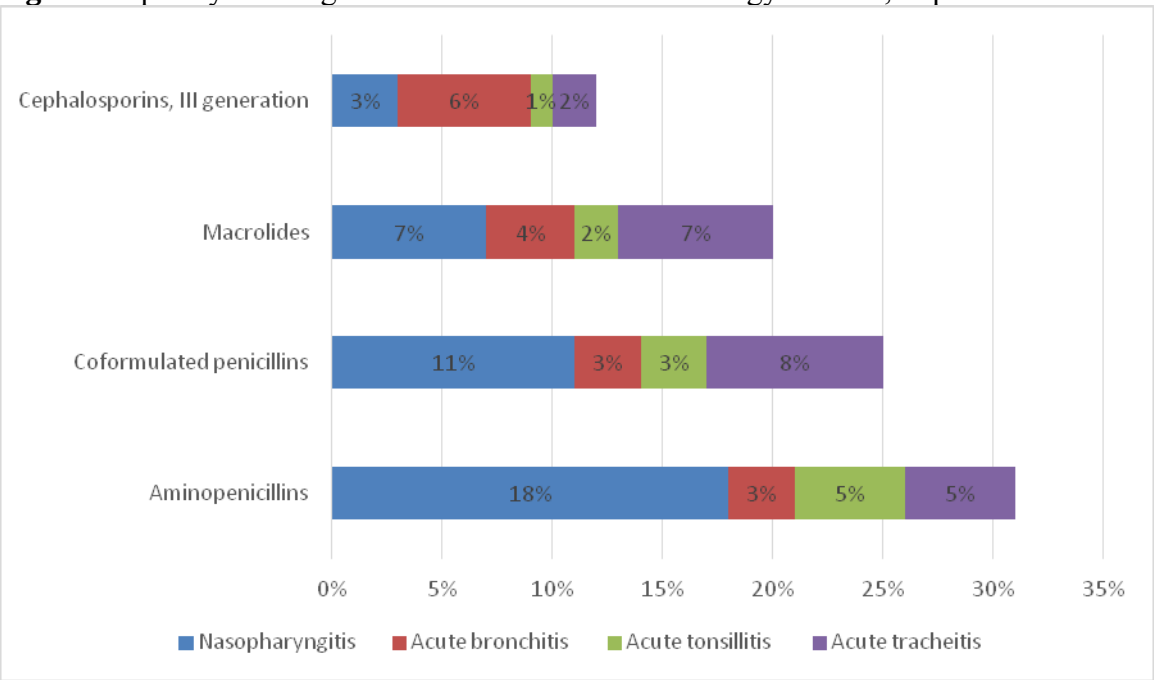


Fig. 6. Frequency of using antibiotics for each ARI nosology in 2010, in percent

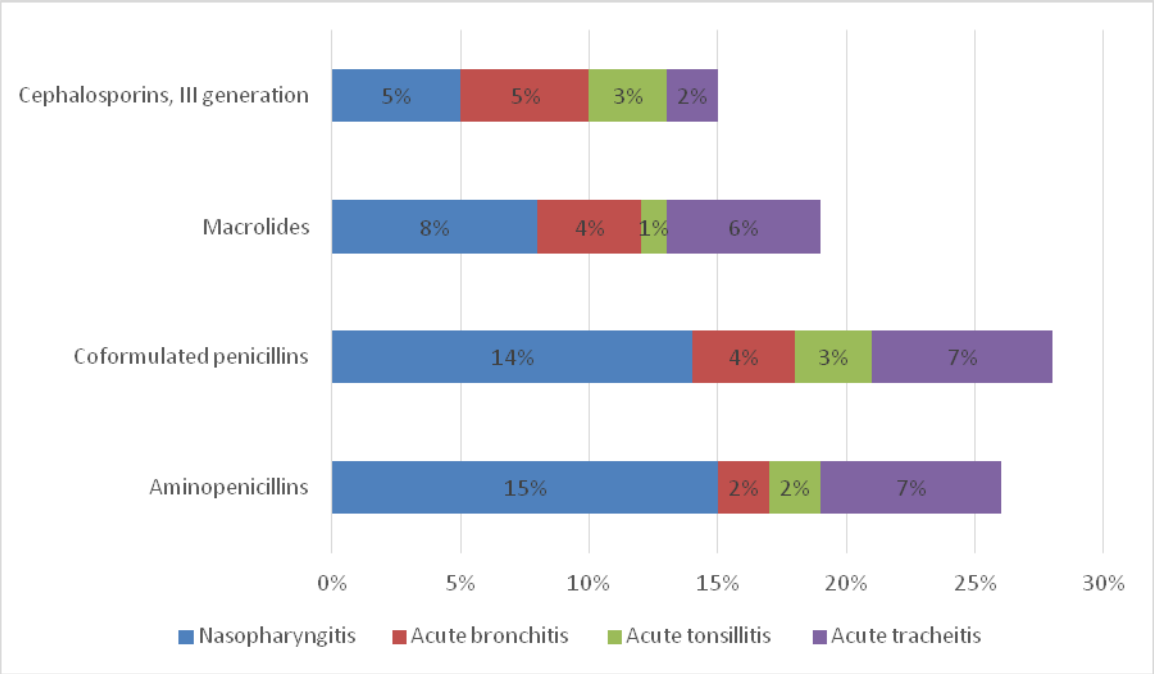
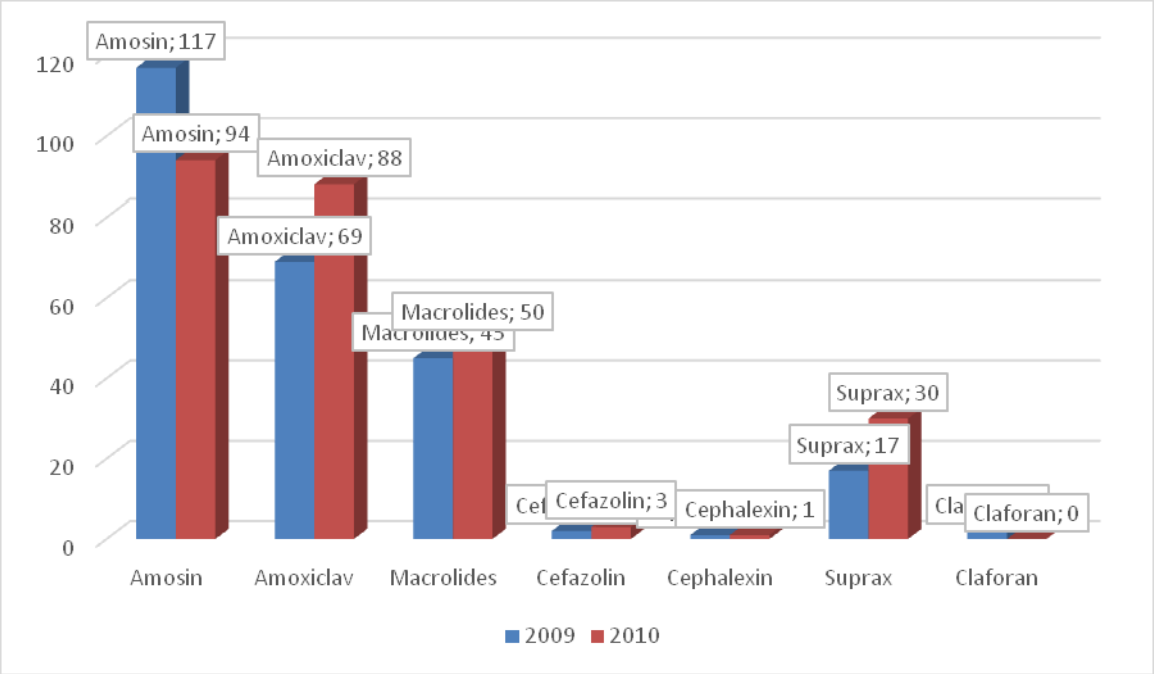


Fig. 7. Use of antibiotics for treating acute nasopharyngitis in 2009 and 2010



DISCUSSION

What humanity has so far achieved in its fight with infections makes many people feel sure antibiotics wield limitless capabilities, and these drugs are therefore used even upon the weakest manifestations of infections. It has become parents' and physicians' habit to prescribe antibiotics in cases of insignificant temperature increase, runny nose, non-intense erythema of the oral pharynx mucosa. This approach allowed the powerful effects of antibiotics, which eliminate bacteria and inhibit their growth, to reduce the number of sensitive strains, making resistant forms thereof more prevalent. We now should beware such strains, for they can become the most prevalent microbial organisms!

It is known that systemic antibiotic therapy is not efficient when it comes to treating ARIs of viral etiology, because it cannot prevent bacterial complications and does not really affect the course of non-complicated acute respiratory process. But despite these undisputable facts, these drugs are still applied by pediatricians on a broad scale [7, 13-16].

The data we have obtained show that local pediatricians prefer not to stick to expectant management and dynamic follow-up when it comes to treating non-complicated forms like acute nasopharyngitis.

The study we have carried out confirms there is a need to further develop clear therapeutic manuals and organize additional training for local pediatricians to implement modern standards of diagnosing and treating ARIs under the outpatient conditions of regions, so as to improve diagnostics of severe acute respiratory diseases. In order to carry out proper antibiotic therapy of acute respiratory infections under outpatient conditions, it makes sense to implement stricter accounting of prescribed antibiotics in each individual case, especially in case of frequently ill or preschool children. Unjustified prescription of antibiotics, as indicated above, increases the risk of adverse events and microbiotic disorders in children, and also boosts drug resistance.

Unfortunately, this article shows only a small part of the real outpatient setting. Who knows how many children else are still subject to aggressive treatment with such improper application of antibiotics?

Based on these data, we can conclude it is often better to prescribe an antibiotic than to risk your reputation, and pediatricians do not even try to convince parents such treatment does not make sense. Yet it is well-known that systemic antibiotic therapy does not prevent bacterial complications and does not really affect the course of the respiratory process. But despite these convincing facts, the drugs are still applied to treat such pathology on a broad scale.

The strategy of treating ARIs in children should be selected based on a detailed analysis of anamnestic data with due account of the child's individual peculiarities, clinical manifestations, dynamic assessment of objective diagnostic methods, and the results of laboratory and instrumental tests. Children should only be treated with such drugs that have been proven efficient and safe by applying the principles of evidentiary medicine.

As of today, there exists a strong need for overall implementation of new methods of laboratory express diagnostics, which will allow to limit improper use of antibiotic therapy and polypragmasy; it will also make it possible to choose optimal drugs from the wide range of medicines for the sake of differentiated approach to ARI etiology.

CONCLUSIONS

1. Antibiotics were applied to treat ARIs in 43% of all cases in 2009, 37% in 2010.
2. In the nosological structure of ARIs, acute nosopharyngitis in preschool children is dominant.
3. In 2009, antibiotics were used to treat in 17% of acute nasopharyngitis cases of all ARI cases. For 2010, the figure was 16%. It indicates improper use of antibiotics in absence of indications therefor, i.e. they are used to treat non-complicated ARI forms. In particular, antibiotics were used to treat 26% of cases of acute nasopharyngitis in children in 2009; for 2010, the figure was 23%.
4. The most frequently used antibiotics were aminopenicillins, combined penicillines, and macrolides, which indicates non-compliance with acute nasopharyngitis treatment standards.

CONFLICT OF INTEREST

The author of this article has declared absence of reportable financial support / conflict of interest.

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