Use of antibiotics in child age – a review

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ABSTRACT

Introduction: The abuse of antibiotics as well as the development of microbial resistance in them is a global phenomenon

Purpose: The purpose of this study is to highlight the rational use of antibiotics and limitation of microbial resistance.

Material and Methods: Extensive review of the recent literature was conducted in electronic database Medline and via the link of the Greek Association of Academic Libraries (HEAL-Link), using the following key words: antibiotics, medicine, and rational use.

Review: The rational use of antibiotics is therefore it should not be random. It requires reflection and thought and should be based on rules. The correct diagnosis, the patient's condition, the location of the infection, the severity of the microbial cause sensitivities to antibiotics, the pharmacokinetics and pharmacodynamics of antimicrobials, the side effects and cost are the main elements which must be supported in every decision for their use.

Conclusions: Doctors and other professionals should prescribe antibiotics only when necessary, based on existing guidelines.

Key Words: antibiotics, medicine, children, and impact

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INTRODUCTION

Rarely in human history has a discovery radically changed the course of events such as the wheel, gunpowder and nuclear energy.

Undoubtedly, in this category, the most important moments in the evolution of human civilization is the discovery of antibiotics. Before the advent of antibiotics, man was almost entirely exposed to infections. Diseases such as pneumonia, meningitis, or tuberculosis were treated with great difficulty or not at all. Humanity lived in fear of major epidemics and specialties such as surgeons, pediatrics and hematology showed high rates of mortality as a result of infections [1].

The discovery of penicillin in 1929 by Sir Alexander Fleming, marked the beginning of a new chapter in medicine: For the first time since the appearance of penicillin on the planet, man was able to tackle infections, which were previously fatal [2].

From that day on, medicine has changed form: without the stress of infection, doctors were able to expand and advance their research. The antibiotic, gradually established itself in the consciousness of the average person as medicine - salvation [2].

In addition, the overuse of antibiotics as well as the development of resistance in microbes is a global phenomenon [3].

It concerns both the World Health Organization (WHO) and individual countries. In recent decades there has been a significant increase in global reports to bacteria resistant which refer to common antimicrobials, specifically multiresistant strains of Pneumococcus and Hemophilus, which are the major pathogens for otitis and pararrinokoplitida [3].

This raised the interest on revaluation of these antimicrobial treatment regimens and promoted the reasonable and medically documented use of antibiotic formulations [3].

In 1998, the Center for Disease Control (CDC) in America, in cooperation with the American Pediatric Society, issued stricter guidelines and diagnostic criteria in order to avoid the over diagnosis and misuse of antibiotics [4].

Programs to limit the use of antibiotics have been developed by most countries, each having different results [4].

The ***purpose*** of this study is to highlight the effects of the overuse of antibiotics in children, as well as how to deal with it.

MATERIAL AND METHODS

The search for the sources of this review was made on the Internet from specific databases such as Medline, PubMed, Google Scholar, and the Hellenic Academic Libraries Association (HEAL-Link). The search included research articles of the last, mainly decades, about antibiotics and medicine, antibiotics and children, factors related to the use of antibiotics and effects of antibiotics. The criterion of exclusion of the articles was language other than Greek and English. The keywords that they used were antibiotics, medicine, children, and impact.

TALKING ABOUT ANTIBIOTICS

Antibiotics again, are substances that destroy the virus without harming the host, human. Etymologically, the word comes from the antibiotic and means anti - against and biotic- used for life.Initially, chemotherapeutic drugs were defined as antibiotics which were produced by the biosynthetic method (microbial cultures). However, the manufacturing sector has gained significant amplitude (microbicides-antibiotics, cytostatic - antibiotics, various antibiotics) prevailed antibiotics called the biosynthetically produced antimicrobial substances [5].

To date, at least 4,000 antibiotics have been isolated from cultures of microbes and 30,000 have been prepared semi synthetic. In every day practice, however, only 100 of these are used.The evaluation of the activity of an antibiotic is vital for the successful outcome of antimicrobial therapy. Basically, antibiotics are classified as bactericides that kill germs, or bacteriostatic, preventing the growth of bacteria. These classifications are based on laboratory behavior of antibiotics [6].

The characterization of the organism and the knowledge of the susceptibility to antimicrobial agents is essential for the election of the appropriate drug. The choice of an appropriate antimicrobial drug depends on [7]:

- The identity of the microorganism
- Sensitivity to certain drugs
- The site of infection
- Drug safety
- Factors associated with the patient.

The duration of antimicrobial therapy is determined microbiologically and clinically [8].

The following play an important role in this [8]:

- The pathogen micro organism
- The position of the infection
- The condition of the patient

Also, the side effects of antibiotics should be considered when administering antibiotics as certain conditions should be considered. So, we do not use antibiotics to which the patient is allergic.The most common side effects of antibiotics also are maculopapular rashes or other allergic reactions. Other toxic effects are [9]:

- Nephrotoxicity (vancomycin - amino glycosides)
- Hepatotoxicity (TB)
- Neurotoxicity (imipenem, penicillin)
- Hypoprothrombinemia (cephalosporin)
- Suppression of bone (chloromfainikoli, trimethoprim-sulfamethoxazole)
- Pseudo membranous enter colitis.

It is important, before taking any antibiotic to read the label for full information on ingredients, side effects and warnings. People with food intolerance, intolerance to gluten or lactose should ensure that their medications do not contain fillers or additives.

ANTIBIOTICS AND CHILDREN

The toddler is constantly in touch with new viruses. To some extent this report in mild adverse factors helps the immune system of young children mature, i.e. legitimate and necessary for building the defence. The child's body has defences, such as antibodies and special cells in the blood that fight any infection.This explains the fact that the baby is sensitive to sickness every time - especially when it starts kindergarten for the first time, and grows a maturing defence so does not get sick easily [10].

Antibiotics also may harm the child. Every drug is a poison with many potential side effects. Each drug given to our child may unnecessarily burden the organization. Therefore, whenever children receive antibiotics, they are at risk of experiencing side effects such as stomach upset, diarrhea or even a possible allergic reaction [11].

Each drug given to our child may unnecessarily burden the organization. Recent studies show that babies often take antibiotics unnecessarily or maybe at risk of developing allergies in the future, such as eczema, asthma. In our body (nose, throat, skin, intestine) live 'good' bacteria that prevent innocent dangerous to invade it [12].

At the same time kill the normal flora, bacteria that live in our bodies and are in harmony with it. In children's body (nose, throat, skin, intestine) live 'good' bacteria that prevent innocent dangerous to invade it. Antibiotics kill all germs without exception, even well. This can damage the body's defences if not needed to open the way to infection more dangerous microbes [13].

Increase the resistance and so the next time the child will really need an antibiotic then likely be required by your doctor to grant a much more "strong" antibiotic. But most importantly, the creation of resistant strains. Microbes find ways to develop resistance to antibiotics. If a child is taking antibiotics often thoughtlessly, might develop germs in the body resistant to medicines. So, in future, a serious infection cannot be treated.Why sometimes make mistakes that can sabotage the course of treatment [14]. The most common mistakes that is committed by parents [15]:

- They pressure the paediatrician to give antibiotics, although it's not needed
- They use a common spoon instead of a dispenser for administering antibiotics
- They forget to shake the contents of the bottle of antibiotics
- They do not check the expiry date on the packaging of the drug
- They are not informed of drug administration in relation to meals
- They dissolve the drug in the milk of the child
- They insist on the same medication, and the child is not getting better
- They stop the antibiotics once the symptoms subside and the child seems well
- They hurry to give antibiotics to the child for recurrent or chronic diseases
- They do not inform the paediatrician about possible allergies or side effects of the antibiotic.

Parents, therefore, can help in preventing and addressing the important problem of overconsumption of antibiotics which leads to the resistance of germs by [11,16]:

- If the paediatrician prescribes you an antibiotic ask him directly: Why? From what is my child suffering? It is a viral or bacterial illness? This way, they will think and will not grant an antibiotic to the child unless it is really needed.
- If the child eventually requires antibiotics, then the parents to follow the instructions of your paediatrician, including:
- To administer the correct dose of antibiotic

- To give the antibiotic at intervals by your doctor (eg every 8 hours and not whenever you remember).
- Do not stop taking the antibiotic once your child is well. To give the antibiotic for as many days as you have been advised by your doctor.

Unfortunately, many parents have a bad habit of having an antibiotic at home for "every eventuality". This is very bad practice because only a doctor can determine whether the child needs antibiotics and of course every illness requires a different antibiotic. Nor is it correct to take the antibiotic on their vacation in case their child becomes ill. If your child gets sick on vacation then you should visit a doctor and he will decide if you need and which antibiotic is appropriate for the disease [17].

CONCLUSION

Modern treatment is privileged to have strong and safe antibiotic formulations. However, over the years, bacteria have acquired resistance to antibiotics. Many bacterial infections are becoming resistant to the treatments most commonly prescribed antibiotics. They all agree though, that the only way to reduce the resistance of antibiotics is through proper use and reducing abuse. We also all agree that in order to reduce the overuse of antibiotics simultaneous training is needed for both doctors and parents. In most studies, the doctor "accuses" the parent of being "persistent" to prescribe an antibiotic. Other studies showed that unilateral intervention either by patients themselves or physicians themselves, have substantial results. So, it is now clear that the only way for the proper use of antibiotics is through intervention programs by both doctors and patients [18].

It is concluded that only by proper educational intervention for both doctors and patients by the right people with the right tools, can improve the problem of abuse of antibiotics sufficiently and to eliminate the risk of antimicrobial resistance gradually which insidiously results in major medical and social problem [19, 20].

REFERENCES

1. Skaltsa E., History of pharmacy. [elect. book] Athens: Association of Greek Academic Libraries. Available in http://hdl.handle.net [cited 21/1/2018]
2. Zikos S. Development of antimicrobial peptides: design, synthesis, conformational and biological studies. Doctoral Thesis, University of Ioannina, Department of Chemistry, 2010.
3. WHO: Global Antibiotic Resistance Action Plan. Available inhttp://healthmag.gr. [cited 17/1/2018]
4. Fauci S, et al. Harrison's internal medicine. Treatment and prophylaxis of bacterial infections. 17thed. 2008.
5. Moellering C, et al. Antimicrobial resistance prevention initiative an update: Proceedings of an expert panel on resistance. Am J Infect Control. 2007; 35: S1-S23.
6. Kourkouta L. History of Nursing. Monograph. B.C. Paschalidis, Athens, 2010.
7. Masterton R, Drusano G, Paterson L, Park G. Appropriate antimicrobial treatment in nosocomial infections—the clinical challenges. Journal of Hospital Infection. 2003; 55: 1-12.
8. Kumar A, Roberts D, Wood E, Light B, Parrillo E, Sharma S, Gurka D. Duration of hypotension before initiation of effective antimicrobial therapy is the critical determinant of survival in human septic shock. Critical care medicine. 2006; 34(6): 1589-1596.
9. Riedl A, Casillas A. Adverse drug reactions: types and treatment options. American family physician. 2003; 68(9): 1781-1794.
10. Finkelstein JA, Davis RL, Dowell SF, Metlay JP, Soumerai SB, Rifas-Shiman S L, Higham M, Miller Z, Miroshnik I, Pedan A, Platt R. Reducing antibiotic use in children: a randomized trial in 12 practices. Pediatrics. 2001; 108(1):1-7.
11. Kotsiftopoulos C, Kourkouta L, Papageorgiou M. The use of Antibiotic Medicine.Monograph. Lap Lambert Academic Publishing. Saarbrucken, Germany, 2014.
12. Perz JF, Craig AS, Coffey CS, Jorgensen DM, Mitchel E, Hall S, Schaffner W, Griffin MR. Changes in antibiotic prescribing for children after acommunity-wide campaign. JAMA. 2002;287(23):3103-9.
13. Konstantopoulou A. (2016). Systematic study and investigation of the use and abuse of antibiotic preparations in public

health. Postgraduate work. University of Patras, Department of Medical Chemistry.
14. Geitona M. (2016). Knowledge and attitudes of health professionals about the administration of antibiotics to pediatric patients. Doctoral thesis, University of Peloponnese, Department of Social and Educational Policy.
15. Johannsen H, Prescott L. Practical prebiotics, probiotics and synbiotics for allergists: how useful are they?. Clinical & Experimental Allergy. 2009; 39(12): 1801-1814.
16. Laxminarayan R, Duse A, Wattal C, Zaidi K, Wertheim F, Sumpradit N, Greko C. Antibiotic resistance—the need for global solutions. The Lancet infectious diseases. 2013; 13(12): 1057-1098.
17. Mangione-Smith R, Mc Glynn A, Elliott N, McDonald L, Franz E, Kravitz R. Parent expectations for antibiotics, physician-parent communication, and satisfaction. Archives of pediatrics & adolescent medicine. 2001; 155(7): 800-806.
18. Mangione-Smith R, Elliott N, Stivers T, McDonald L, Heritage J, McGlynn E. (2004). Racial/ethnic variation in parent expectations for antibiotics: implications for public health campaigns. Pediatrics. 2004; 113(5): 385-394.
19. Standards, Practice Guidelines, and Statements Developed and/or Endorsed by IDSA. Available in www.idsociety.org [cited 20/1/2018]
20. Tsaousoglou A, Koukourikos K. Quality and health services. Stigma. 2007;15(2):18-24