Perspective

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A Meta-Analysis and Systematic Review of Antibiotic Misuse Resistance in Bacteria

Rachel Will*

Department of Internal Medicine, North-eastern Ohio Universities, College of Medicine, Akron, USA

***Corresponding author:** Rachel Will, Department of Internal Medicine, North-eastern Ohio Universities, College of Medicine, Akron, USA, E-mail: Will_R@Ned.US

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Description

A substance that works against bacteria is known as an antibiotic. Antibiotics are widely used in the treatment and prevention of bacterial infections because they are the most important type of antibacterial agent. They can either kill bacteria or stop them from growing. A predetermined number of anti-toxins likewise have antiprotozoal activity. Anti-microbials are not compelling against infections like the normal cold or influenza; drugs which repress infections are named antiviral medications or antivirals as opposed to anti-microbials.

Antibiotics (like penicillin) are those that are produced naturally (by one microorganism fighting another), whereas non-antibiotic antibacterials (like sulfonamides and antiseptics) are entirely synthetic. However, the term antibiotic literally "opposing life" is sometimes used to refer to any substance used against microbes. However, both classes of antimicrobials are included in antimicrobial chemotherapy and aim to kill or prevent the growth of microorganisms. Chemical disinfectants, antiseptic medications and antibacterial soaps are all examples of "antibacterials." On the other hand, antibiotics are a significant class of antibacterials that are primarily utilized in medicine and occasionally in livestock feed.

Sulfonamides and Antiseptics

Antibiotics are used to treat or prevent infections caused by bacteria, sometimes protozoa. Several parasitic diseases can be treated with metronidazole. Empiric therapy, in which a broad-spectrum antibiotic is administered based on the signs and symptoms that are present and is initiated pending laboratory results which can take several days is used when an infection is suspected of being the cause of an illness. Definitive therapy, on the other hand, can be initiated when the pathogenic microorganism that is to blame for the illness is either known or has been identified. Typically, an antibiotic with a narrow spectrum will be used for this. The antibiotic that is given will also be chosen based on how much it costs. Antibiotics may be given as a preventative measure, but this is typically limited to at-risk populations such as those with a weakened immune system (particularly in HIV cases to prevent pneumonia), those taking immunosuppressive drugs, cancer patients and those undergoing surgery. Their use in surgical procedures is to help prevent infection of incisions. Identification is critically important because it can reduce the cost and toxicity of antibiotic therapy as well as reduce the possibility of the emergence of antimicrobial resistance. For they play a crucial role in dental antibiotic prophylaxis, helping to prevent bacteria and, as a result, infectious endocarditis. The use of antibiotics for secondary prevention of coronary heart disease is not supported by current scientific evidence and may actually increase cardiovascular mortality, all-cause mortality and the occurrence of stroke. There are numerous different routes of administration for antibiotic treatment. Antibiotics are also used to prevent infection in neutropenia cases, particularly cancer-related cases. Most antibiotics are taken orally. Antibiotics can be given topically in the form of eye drops applied to the conjunctiva for conjunctivitis or ear drops applied to the ear for ear infections and acute cases of swimmer's ear in more severe cases, particularly deep-seated systemic infections. Some skin conditions, such as acne and cellulitis, can be treated with topical application. The advantages of topical application include achieving a high and sustained concentration of antibiotics at the site of the infection; Topical antibiotics applied over certain kinds of surgical wounds have been reported to reduce the risk of surgical site infections. However, there are certain general causes for concern with topical administration of antibiotics. These include a reduction in the potential for systemic absorption and toxicity, a reduction in the total volumes of antibiotic that are required and a reduction in the risk of antibiotic misuse. There may be some antibiotic absorption throughout the body; it is recommended to administer antibiotics as soon as possible, particularly in infections that pose a threat to one's life because of the difficulty in accurately dosing the amount of antibiotic that is administered and the possibility of local hypersensitivity reactions or contact dermatitis. Antibiotics are screened for any negative effects prior to their approval for clinical use, and they are typically regarded as safe and well tolerated. This is the reason why many emergency departments keep antibiotics on hand. Some antibiotics, on the other hand, have been linked to a wide range of adverse side effects, ranging from mild to very severe, depending on the type of antibiotic used, the microbes targeted and the individual patient. Side effects may reflect the pharmacological or toxicological properties of the antibiotic or

may involve hypersensitivity or allergic reactions. Adverse effects range from fever and nausea to major allergic reactions, including photodermatitis and anaphylaxis.

Antibiotic Treatment

In addition, the efficacy of doxycycline antibacterial-resistant strains and species, also known as "superbugs," now contribute to the emergence of previously well-controlled diseases. There are numerous therapeutic challenges, for instance, posed by emerging tuberculosis bacterial strains that are resistant to previously effective antibacterial treatments. According to the United Kingdom's Health Protection Agency, most isolates with NDM-1 enzyme are resistant to all standard intravenous antibiotics for treatment of severe infections. For instance, multidrug-resistant tuberculosis (MDR-TB) is a newly identified enzyme that transmits bacterial resistance to a broad range of beta-lactam antibacterials. Other forms of antibiotic associated harm include anaphylaxis, drug toxicity most notably kidney and liver damage and super-infections with resistant organisms. Antibiotics are also known to affect mitochondrial function.

Common forms of antibiotic misuse include excessive use of prophylactic antibiotics in travelers and failure of medical professionals to prescribe the correct dosage of antibiotics on the basis of the patient's weight and history of prior use. Other forms of misuse include failure to take the entire prescribed course of the antibiotic, incorrect dosage and administration, or failure to rest for sufficient recovery. Inappropriate antibiotic treatment, for example, is their prescription to treat viral infections such as the common cold. One study on respiratory tract infections found "physicians were more likely to prescribe antibiotics to patients who appeared to expect them". Multifactorial interventions aimed at both physicians and patients can reduce inappropriate prescription of antibiotics. The lack of rapid point of care diagnostic tests, particularly in resource-limited settings is considered one of the drivers of antibiotic misuse.