Short Review on Amoxicillin Potassium Clavulanate Tablets

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Abstract: Despite the considerable number of newer antibacterial made available over the past decades, amoxicillin, alone or in combination with clavulanic acid, still accounts among the most widely used antibacterial agents. Although they are often considered ‘twin drugs’, they are different both in terms of antibacterial activities and of safety profile. It is well documented that the clavulenate component may cause adverse reactions by itself, thus exposing patients to further, and sometimes undue, risks. Although amoxicillin/clavulanate should be considered as an alternative agent only for the treatment of resistant bacteria, evidence shows that it is often used also when a narrow-spectrum antibiotic would have been just as effective. This prescription habit may have serious consequences in terms of patients’ safety, as well as in terms of the development of bacterial resistance.

Keywords: Amoxicillin, antibacterial, MOA, Clavulanic acid

Introduction

Amoxicillin was first introduced orally in the UK in the early 1970s, but gradually established itself as a broad-spectrum antibacterial (1). It treats infections of various diseases. Amoxicillin has been shown to be more effective against gram-positive microorganisms than against gram-negative microorganisms. It has shown excellent efficacy against penicillin and penicillin V (2). Also, other antibiotics such as Ampicillin, azithromycin, clarithromycin, cefuroxime, and doxycycline are used to treat a variety of infections/diseases (3). Amoxicillin in the last 10 years. It has been reported to be useful in the treatment of many indications and is used to treat infections of the middle ear (otitis media), tonsils, (tonsillitis and tonsillitis), throat, larynx (laryngitis), pharynx (pharyngitis), bronchi (bronchitis), lungs (pneumonia), urinary tract (UTI), for skin and treatment of gonorrhea. Recent studies have shown that it can be used prophylactically against bacterial endocarditis in prosthetic patients. Amoxicillin clavulanate is the main antibiotic used in emergency and primary care settings nationwide. It is a combination of two drugs: amoxicillin and clavulanic acid. Amoxicillin is a penicillin derivative and has similar actions against gram-positive and gram-negative bacteria. In addition, the addition of clavulanic acid broadens the spectrum to include beta-lactamase-producing strains and extends coverage to other bacterial species (4). This service reviews the indications, contraindications, dosage and side effects of amoxicillin clavulanate and emphasizes the role of a team of professionals in the effective use of this medicine.

Mechanism of Action-

Amoxicillin is a broad-spectrum beta-lactam antibacterial drug originally derived from penicillin (5). It is a fungicide that targets and kills bacteria by inhibiting the biosynthesis of the peptidoglycan layer of the bacterial cell wall (6). This layer forms the outer part of the cell wall and is responsible for the structural integrity of the cell. Peptidoglycan synthesis involves the stimulation of DD transpeptidases, a type of penicillin-binding protein (PBP). Amoxicillin works by binding to these PBPs and inhibiting peptidoglycan synthesis, which stops cell wall construction and eventually kills or lyses the bacteria. against resistance (7, 8). It has little or no antibacterial activity and instead works by preventing bacterial destruction of beta-lactams (9, 10). Over the years, certain bacteria have evolved to develop resistance to standard beta-lactam antimicrobials through the production of enzymes called beta-lactamases. These enzymes target and hydrolyze the beta-lactam ring, which is necessary for penicillin-like antimicrobials to work. Clavulanic acid prevents this degradation by binding and inactivating beta-lactamase, restoring the antibacterial effect of Amoxicillin (11, 12).

Pharmacodynamics

Amoxicillin is a semisynthetic antibiotic with in vitro bacterial activity, gram-positive and gram-negative bacteria, but since amoxicillin is susceptible to degradation by beta-lactamases, its active spectrum does not include organisms that produce these enzymes. Clavulanic acid is structurally related to the penicillin and the cephalosporin beta-lactam. In particular, it has excellent activity against clinically important plasmid-mediated beta-lactamases, often responsible for drug resistance.

Pharmacokinetics

Amoxicillin is well absorbed (with varying rates and degrees) in GIT. It enjoys extensive clinical use. In addition to having a broad antibacterial spectrum. It is due to the highest bioavailability (70-90%) in plasma. Levels appear in 1-2 hours (13). It is usually dose dependent. 1.5 to 3 times greater than ampicillin when administered orally Dose 54-58. Apparent distribution of amoxicillin. It is about 0.26 - 0.31 L/kg and is widely distributed in many people (14). liver, lung, prostate (human), muscle, bile, Ascites, pleural and synovial and ocular fluids accumulate. It passes through the amniotic fluid and the placenta, but is poorly absorbed. In the absence of inflammation in the central nervous system (10- 60%) was found in serum 52, 53. The concentration of the drug is very low lower levels of aqueous humor, tears, and sweat and saliva 54. It binds to human plasma at a rate of 17-20%. Proteins, mainly albumin35. amoxicillin excretion Mainly renal and >80% of which 50-70% are unchanged dose) can be found in urine, which is very high. It forms the consistency of urine and
is also excreted in milk. About 10 to 25% of the drug is metabolized to penicilloic acid. The terminal half-life (t1/2) is 1.1.5 hours.

Pharmacology
Amoxicillin has a bactericidal effect on susceptible microorganisms by inhibiting the biosynthesis of cell wall mucopeptides. Acts by binding to penicillin during bacterial growth. Binding protein 1A (PBPs-1A) is localized in the walls of bacterial cells. Penicillin (Amoxicillin), Penicillin Sensitive Acylate. The C-terminal domain of the transpeptidase by opening the lactam ring. It causes the inactivation of enzymes, preventing the formation of cross-linking of two linear peptidoglycan chains, inhibition of the third chain and the final stages of bacterial cell wall synthesis, which are required. Cell division and shape and other important processes; and therefore, the lethality of penicillin to bacteria depends on its solution and mechanism of dissolution.

Cell lysis is then carried out by the bacterial cells. Cell wall autolytic enzymes such as autolysin; may Amoxicillin acts as an autolysin inhibitor. Incomplete Cell wall synthesis allows bacterial cells to absorb water by osmotic, gram-positive and gram-negative bacteria 10 to 30 times, 3-5 times osmotic pressure inside the cell than in the external environment. Amoxicillin is more effective than gram positive. It shows high efficiency by eliminating negative microorganisms. Similar to penicillin, penicillin V and other antibiotics. Ampicillin, Azithromycin, Clarithromycin, Cefuroxime. Doxycycline used to treat various infections/disease. In the past decade, amoxicillin has been reported to beneficial. Used to manage many indications and treat infections Middle ear (otitis media) tonsils (tonsillitis and tonsillitis) throat larynx (larynx), pharynx (pharyngitis), bronchi (bronchitis) lungs (pneumonia). Treatment of urinary tract (UTI) skin and gonorrhea. POSTED Reports suggest that amoxicillin is a possible treatment candidate. Chlamydia trachomatis, typhoid fever, early Lyme disease, erythema migrans erythema migrans; Mucopurulent cervicitis, acute sinusitis, gastritis and gastric ulcer and meningitis (15). The latest American Hearts Association (AHA), American Dental Association Recommendation of the American Academy of Orthopedic Surgery (AAOS) has changed to recommend the use of prevention protocols. Prevention of bacterial endocarditis in patients. Joint prosthetic replacement, dental. Amoxicillin It is easily degraded by β-lactamase-producing bacteria, therefore, clavulanic acid and lactamase inhibitors can be given (16, 17).

Adverse Effects
Amoxicillin clavulanate is generally safe and well tolerated in the general population, with the most side effects being mild gastrointestinal symptoms. The most common symptom is diarrhea, but other symptoms include nausea, vomiting, loose stools, and abdominal pain. The incidence of diarrhea is higher with amoxicillin than with clavulanate alone. It also slightly increases the risk of secondary Chloridoids difficile colitis compared with other classes of antibiotics. Women taking this medicine may develop vaginitis after vaginal yeast infection or candidiasis. Dermatological effects are rare and are usually related to hypersensitivity reactions. These reactions can range from simple itching or hives to more serious and life-threatening symptoms as anaphylaxis, Stevens-Johnson syndrome, or toxic epidermal necrolysis (18, 19). Traditionally, the males rash appears in patients with infectious mononucleosis diagnosed with throat sore shortly after starting amoxicillin. Very rare complications of amoxicillin clavulanate include prolonged prothrombin time, vasculitis, thrombocytopenia, cholestatic jaundice, elevated serum alkaline phosphatase, hepatitis, and hepatotoxicity. Large doses of penicillin can cause convulsions, which is especially important in patients with renal failure.

Warning
You should not use amoxicillin and clavulanate potassium if you have severe kidney disease, liver problems, or jaundice while taking this medicine, or if you are allergic to penicillin or cephalosporin antibiotics such as Amoxicillin, Cefin, Cefizil, or Levaquin. Moxatag, Omnicef and others. If you change from one type of pill to another (regular, chewable or extended-release pill), take only the new type of pill and the dose prescribed for you. Amoxicillin and clavulanate may be ineffective or harmful if you do not take the exact type of pill prescribed by your doctor (20, 21). Amoxicillin and clavulanate potassium pass into breast milk and may harm a nursing baby. Do not use this medicine without telling your doctor if you are breast feeding. Amoxicillin and clavulanate potassium may reduce the effectiveness of birth control pills. Ask your doctor about using a non-hormonal method of birth control (eg, condoms, diaphragms, spermicides) to prevent pregnancy while taking this medication.

Conclusion
Amoxicillin with clinical efficacy similar to that of other companies antibacterial and effective dose, pharmacokinetic profile and resistance is an excellent candidate for the treatment of various infectious diseases. Because it is less effective against gram-negative bacteria. This is the only area where bacterial resistance occurs in drug candidates. A big step forward here. Progress is also being made at work. New methods of introduction and administration need to be investigated and A more effective form to reduce dosage and related issues effect.

References