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Commentary

Pharmacokinetics and Antibiotic Activity of Erythromycin

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DESCRIPTION

Erythromycin is a macrolide antibiotic which first identified in 1952. It has an indication for a non-infectious pathology and is helpful for treating a variety of diseases. Its traditional uses have included the prevention of newborn conjunctivitis, chlamydia, and a number of respiratory infections (such as community-acquired pneumonia and Legionnaire's disease). Additionally, it has FDA approval for the prevention of syphilis, pelvic inflammatory disease, intestinal amebiasis, rheumatic fever, and skin infections (PID). It works to cure acne when used with tretinoin cream or benzoyl peroxide. Clinicians can use it throughout pregnancy to protect the infant from contracting Group B streptococcal infection. The off-label usage of erythromycin includes the treatment of gastroparesis. However, the therapy of gastroparesis is not a use that the FDA has approved. Since erythromycin is a bacteriostatic antibiotic, it inhibits bacterial growth rather than eradicating it. This effect is achieved by preventing protein synthesis. Erythromycin blocks the production of peptide chains, which in turn prevents protein synthesis, by binding to the 23s ribosomal RNA molecule in the 50s subunit of the bacterial ribosome. Erythromycin has no effect on protein synthesis in human tissues since humans only contain the 40s and 60s subunits and no 50s subunits.

Erythromycin prevented neutrophil infiltration in the periodontium and lungs during preclinical investigations. Erythromycin thereby protected against lethal lung inflammation and inflammatory periodontal bone loss. Furthermore, the ability of erythromycin to upregulate DEL-1 may indicate a unique molecular mechanism behind the anti-inflammatory and immunomodulatory effects of erythromycin. Gram-positive, gram-negative bacteria, and several other species, are all susceptible to erythromycin. *Streptococcus pneumoniae, Streptococcus pyogenes, Staphylococcus aureus, Listeria monocytogenes, Corynebacterium minutissimum,* and *Corynebacterium diphtheria* are among the gram-positive bacteria. *Legionella pneumophila, Neisseria gonorrhoeae, Haemophilus influenzae*, and *Bordetella pertussis* are among the gram-negative bacteria. *Chlamydia trachomatis*, *Entamoeba histolytica*, *Mycoplasma pneumoniae*, *Treponema pallidum*, and *Ureaplasma urealyticum* are among the other microbes that are prevented by erythromycin.

Pharmacokinetics of erythromycin

Oral capsules need to be enteric-coated or include an ester or stable salt as part of the chemical structure since erythromycin is destroyed by stomach acid. Erythromycin is absorbed by the digestive system after being taken orally. It absorbs *via* the digestive tract and then diffuses into different tissues and phagocytes. Erythromycin produces phagocytes that move through the blood and cause the phagocytosis of microorganisms. During fasting conditions, ideal blood levels are obtained. When given with meals, the peak plasma concentration (C_{max}) is reached in four hours. Although erythromycin is mostly attached to plasma proteins, it quickly diffuses into the majority of body fluids. The liver stores erythromycin, which is then expelled as bile. The majority of the prescribed erythromycin is metabolized in the liver. Through the cytochrome P450 system, especially the enzyme CYP3A4, it is demethylated. Bile is the main excretion route for erythromycin. Renal excretion occurs in very small quantities for this medication. The half-life of erythromycin is between 1.5 and 2 hours.

CONCLUSION

The drug is manufactured in 250 mg and 500 mg tablet forms for oral use. The patient should abstain from alcohol, take the medication on an empty stomach (1 hour before or 2 hours after meals), drink a full glass of water, and stay away from grapefruit juice for maximum absorption and minimal adverse effects. The maximum daily oral dosage advised is 4 grams. Children often get 30 to 50 mg/kg/day in evenly spaced dosages. For more serious conditions, the highest suggested dosage is 4 grams per day. The recommended dosage of erythromycin for urogenital infections during pregnancy is 500 mg taken orally four times per day on an empty stomach for at least seven days.

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