Omadacycline: Recently Approved Antimicrobial Agent

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Introduction

Omadacycline is a broad spectrum antibiotic of class tetracycline and belongs to the subclass of amino-methylcycline group[1], approved by USFDA in October 2018.

Antibacterial Spectrum

Omadacycline has activity against wide range of gram positive and selective gram negative pathogens[2]. *gram-positive bacteria include* Staphylococcus aureus (methicillin-susceptible and resistant isolates), Staphylococcus lugdunensis, Streptococcus pyogenes, Streptococcus pneumoniae, Streptococcus anginosus grp. (Includes S. anginosus, S. intermedius, and S. constellatus), Enterococcus faecalis, Enterobacter cloacae. *Gram-negative bacteria include* Haemophilus influenzae, Haemophilus parainfluenzae, Klebsiella pneumoniae and *a typical microbes include* Legionella pneumophila, Mycoplasma pneumoniae and Chlamydophila pneumoniae[3].

Mechanism of action

The mechanism of action of omadacycline is similar to that of other tetracycline Anti Microbial Agents – act by inhibiting bacterial protein synthesis by binding with 30S ribosomal subunits. Omadacycline is specifically designed to overcome tetracycline resistance and exhibits activity against bacterial strains that develop resistance to tetracycline specially due to the development of efflux pump and ribosomal protection proteins (two main forms of resistance)[5].

Pharmacokinetics: Omadacycline is metabolically stable; does not undergo significant biotransformation and neither inhibits nor interacts with metabolizing enzymes or transporters[4]. It can be administered by oral (300mg/day) as well as parenteral (intravenous: 100mg/day) route.

Clinical uses

Omadacycline has been approved for two specific indications:

1. Community-acquired bacterial pneumonia (CABP) (*caused by susceptible microorganisms including Streptococcus pneumoniae, Staphylococcus aureus (methicillin-susceptible isolates), Haemophilus influenzae, Haemophilus parainfluenzae, Klebsiella pneumoniae, Legionella pneumophila, Mycoplasma pneumoniae, and Chlamydophila pneumoniae*). The early clinical response (upto 72-120 hours) of omadacycline is similar (not-inferior) compared to moxifloxacin (400mg/day)[5].
2. Acute bacterial skin and skin structure infections (ABSSSI)(*caused by susceptible microorganisms including Staphylococcus aureus (methicillin-susceptible and -resistant isolates), Staphylococcus lugdunensis, Streptococcus pyogenes, Streptococcus anginosus grp., Enterococcus faecalis, Enterobacter cloacae, and Klebsiella pneumoniae*). The efficacy of omadacycline is similar to that of linezolid (600-mg intravenously or orally in 12 hourly[5].

Adverse drug reactions

Nausea, vomiting, diarrhea and infusion site reactions are common. Others include raised alanine aminotransferase, aspartate aminotransferase and gamma-glutamyl transferase, hypertension, headache, insomnia and constipation. To be specially noted are side effects of enamel hypoplasia and permanent discoloration of teeth. It can also cause reversible inhibition of bone growth if given in the last half of pregnancy, infancy and childhood up to age of 8 years[5].

Contraindications

Omadacycline is contraindicated in the pediatric age group up to age of 8 years, pregnancy and in infancy.

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Dose and Dosing schedules

The drug is available as oral and once-daily intravenous antibiotic formulations, and has been granted USFDA approval for 100-mg injectable and 150-mg tablets once a day dosing regimen[5].

References

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