New drugs: New hope in the treatment of MRSA

NEWS

For more than 60 years, antibiotics have drastically altered the course of the disease. However, the development of new antibiotics is not able to meet the pace of increasing antimicrobial resistance. Resistant pathogens are posing a major public health problem both by increasing the morbidity, mortality and the health care costs. The problem is no longer limited to the hospitals, but has spread to the community as well.

In this scenario, approval of three new antibiotics by the US FDA in the year 2014[1] is quite cherishing. FDA approved Dalbavancin in May, Tedizolid phosphate in June and Oritavancin in August 2014, for the treatment of acute bacterial skin and skin structure infections (ABSSSI). This has gained importance due to increase in the total hospital admissions from skin and soft tissue infections by 29% from 2000 to 2004. This increased frequency is related to the emergence of community-associated methicillin-resistant *Staphylococcus aureus* (MRSA).

RE (VIEWS)

Dalbavancin,[2] a semisynthetic lipoglycopeptide, interferes with cell wall synthesis by binding to pentapeptide in nascent cell wall peptidoglycan, and prevents cross-linking. It is indicated in ABSSSI in the two dose regimen - initially 1000 mg followed a week later by 500 mg IV infusion over 30 minutes. The most common adverse reactions reported are nausea (5.5%), headache (4.7%), and diarrhea (4.4%).

Tedizolid phosphate[3] is a novel oxazolidinone prodrug rapidly converted *in vivo* by phosphatases to the active moiety tedizolid. It acts by inhibiting the protein synthesis by binding to 50S subunit of the bacterial ribosome. It shows cross resistance to the linezolid-resistant bacteria. Tedizolid phosphate is non-inferior to the linezolid, more potent and equally efficacious and given in a dose of 200 mg once daily for 6 days. No dose adjustment is needed during IV to oral switching of route, due to high oral bioavailability (80%). Its adverse event profile is similar to linezolid; however, it has enhanced safety margin on hematological parameters, drug-drug interaction and neurologic function.

Oritavancin[4] is a lipoglycopeptide antibacterial drug indicated for the treatment of adult patients with ABSSSI. It acts by three mechanisms i.e., by inhibiting the transglycosylation, transpeptidation and disruption of bacterial membrane integrity, thereby causing cell death. It is given as a single dose of 1200 mg by intravenous infusion over 3 h by diluting in 1 liter of 5% dextrose solution. The common adverse reactions are headache, nausea, vomiting, limb and subcutaneous abscesses, and diarrhea. It is contraindicated in patients on warfarin therapy as it prolongs the prothrombin time.

The prologue of these new antibiotics into the market raised the hope in treating the drug-resistant gram-positive bacillus. The effort made in developing these antibiotics will vanish with indiscreet use; hence, the above drugs are to be kept as reserve drugs and to be used rationally to prevent the development of antibiotic resistance.

Podila Karuna Sree, Yadala Venkata Rao

Department of Pharmacology, Kamineni Institute of Medical Sciences, Telangana, India

Address for correspondence:
Podila Karuna Sree, Department of Pharmacology, Kamineni Institute of Medical Sciences, Sreepuram, Narketpally, District Nalgonda - 508 254, Telangana, India.
E-mail: drpkarunasri@gmail.com

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