A delivery system of linezolid to enhance the MRSA osteomyelitis prognosis: in vivo experimental assessment.

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Source

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Abstract

Staphylococcus aureus, a major responsible microorganism of osteomyelitis, represents a challenge to treat because of the poor penetration of antibiotics in bone and increasing minimum inhibitory concentrations (MICs) to glycopeptides. The calcium-deficient apatites (CDA), closer to the biological components found in bone and other calcified tissues, have osteoconductive properties. So, to process severe osseous infections, CDA can be used to deliver in the infectious site antibiotics like linezolid. The acute experimental osteomyelitis due to methicillin-resistant Staphylococcus aureus (MRSA) was induced in rabbit's femurs and surgery mimicking human procedures was performed at day three after inoculation. Animals were randomly assigned to treatment groups: L((IV)) [4-day linezolid IV infusion, human-equivalent dose of 10 mg/kg/12 h], L((CDA50%)) (100 mg CDA with linezolid 500 µg/mg) and L((CDA50%)) + L((IV)). Surviving bacteria were counted in bone marrow (BM) and bone (Bo) at day 3 (before treatment), day 7 (4-day treatment) or day 17 (14-day treatment). L(iv) was effective after a 4-day treatment with a log(10)CFU/g decrease of -2.63 ± 1.92 and -2.17 ± 1.58 in bone marrow and bone, respectively. CDA loaded with linezolid enhance the efficacy of the IV linezolid regimen by more than one log(10)CFU/g.

Eur J Clin Microbiol Infect Dis. 2012 Aug 25. [Epub ahead of print]