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Emergence of daptomycin resistance following vancomycin-unresponsive Staphylococcus aureus bacteraemia in a daptomycin-naïve patient-a review of the literature.

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Source

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Abstract

A patient developed a daptomycin-resistant methicillin-resistant Staphylococcus aureus (MRSA) infection, despite being daptomycin-naïve, in the setting of persistent bacteraemia secondary to vertebral osteomyelitis. Modified population analysis profiling of sequential MRSA blood culture isolates revealed transition from a vancomycin-susceptible phenotype to a vancomycin-intermediate S. aureus (VISA) phenotype through a vancomycin-heteroresistant S. aureus (hVISA) intermediary. Increased cell wall thickening, determined by transmission electron microscopy, correlated with the emergence of daptomycin resistance. This case supports the current hypothesis that MRSA with reduced glycopeptide susceptibility are less susceptible to daptomycin because of a thickened cell wall. This may have significance for the use of daptomycin in salvage therapy. Other predictors of daptomycin resistance include bacteraemic persistence and the presence of high inoculum infections. As resistance may appear de novo and be unstable in vivo, all isolates should have daptomycin susceptibility testing performed. The optimal antibiotic option for salvage therapy of these daptomycin-resistant infections is unknown. However, these findings emphasise the importance of optimising management, including the consideration of early surgical intervention to avoid the emergence of daptomycin resistance, especially in high inoculum infections.

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