Commentary Article

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Daptomycin in Children: Advantages and Drawbacks

DraMarìa Teresa Rosanova[1*] and Lede Roberto[2]

[1]Servicio de Control Epidemiológico e Infectología Hospital de Pediatría J P Garrahan,Barragan 601, Zip Code 1408, Buenos Aires, Argentina

[2]Cardiológico de la Fundación Centro de Estudios Infectológicos, Buenos Aires, Argentina

[*]**Corresponding author:** DraMarìa Teresa Rosanova, Servicio de Control Epidemiológico e Infectología Hospital de Pediatría J P Garrahan, Barragan 601, Zip Code 1408, Buenos Aires, Argentina, Tel: +541145033445; E-mail: margris2@yahoo.com.ar

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Description

Antibiotic resistance is steadily increasing, creating a growing worldwide health problem. Methicillin-resistant Staphylococcus aureus (MRSA) has emerged as a common cause of complicated skin infections, bacteremia, endocarditis, and pneumonia, and optimal antibiotic treatment in critical infections by Gram-positive bacteria in pediatric patients is not well standardized [1-5].

Vancomycin has been the therapy of choice for both methicillin- resistant (MRSA), and ampicillin-resistant enterococcal infections. Since this drug is bacteriostatic, it does not reach an optimal tissue level and lung penetration is scarce. Nephrotoxicity is another point of concern with Vancomycin. Currently other therapeutics options have been proposed for managing serious infections by Gram positive bacteria.

Among them, daptomycin stands out, which is a cyclic glycopeptide derived from fermentation of Streptomyces roseosporus. Its mechanism of action includes insertion into the bacterial cell membrane, producing rapid depolarization of the membrane due to its calcium-dependent mechanism, causing cell death.

It has a rapid bactericidal action against resistant Gram-positive bacteria with a possibility of daily dose, a proven post-antibiotic effect, makes it an attractive therapeutic option for infections caused specially byMRSA. Daptomycin is not indicated for the treatment of pneumonia because the drug has poor lung penetration and is inactivated by surfactant. It is well tolerated, but has been associated with myopathy, so weekly creatine phosphokinase (CPK) levels should be monitored [6-10].

A systematic review to evaluate safety and risk of therapeutic failure when it was prescribed for the treatment of children and adults with skin and soft tissue infections, endocarditis, or bacteremia (pneumonia was not included) comparing with usual antibiotic therapy, showed a nonsignificant trend for less risk of therapeutic failures when daptomycin was used [9].

With regard to adverse effects (AE), daptomycin had been reported to have the potential to cause muscle toxicity. Some studies showed that high doses of daptomycin may elevate CPK levels, however, in healthy volunteers doses up to 12 mg/kg/day were not associated with muscle toxicity and in one study carried out on patients treated with high doses (>6 mg/kg/day) of daptomycin, the rate of CPK elevations were low.

Our meta-analysis showed that elevated CPK levels were more frequent in the daptomycin group but discontinuation of the drug was seldom required due to this AE [9].

Taking into account the similar risk of therapeutic failure of daptomycin, and given its low incidence of any AEs, this drug has a remarkable potential to be used as monotherapy, as an alternative strategy to reduce the use of broad spectrum antibiotics. In addition, daptomycin administration once-a-day could be a preferred therapy for use in ambulatory treatment in selected patients to reduce health care associated infection risk.

We conducted an exploratory descriptive study in a referral tertiary pediatric hospital in Argentina. Its observations suggested that daptomycin therapy may could be useful in children with continuous bacteremia and in cases of severe disease that do not respond to conventional therapy [10].

Conclusion

By the moment, we could suggest that daptomycin should potentially be reserved for intolerance, or when the narrower spectrum antibiotics fail, especially when targeted against MRSA and VRE in selected infections.

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Conflict of interest statement

The authors declare that there are no conflicts of interest.

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