



Tackling the Toxin

Streptococcus pyogenes, or group A *Streptococcus* (GAS), is a gram-positive cocci that grows in pairs and chains. It is a common cause of [bacterial pharyngitis](#) and non-purulent cellulitis. GAS produces streptococcal exotoxins which are associated with the development of severe infections including necrotizing fasciitis and streptococcal toxic shock syndrome.¹ In severe infections, a combination of penicillin and clindamycin is recommended. Why is combination therapy recommended for severe GAS infections?

Why Penicillin + Clindamycin?

Clindamycin is a protein synthesis inhibitor that is able to suppress exotoxin production and reduce the toxin-mediated inflammatory response. Adjunctive clindamycin with a beta-lactam has been associated with decreased mortality when compared to beta-lactam monotherapy in invasive GAS infections.² GAS is always susceptible to penicillin, but resistance to clindamycin may occur. Therefore, the Infectious Diseases Society of America Skin and Soft Tissue Infection guidelines recommends the addition of penicillin.³ However, clindamycin resistance has been associated with higher limb amputations in necrotizing skin and soft tissue infections when penicillin and clindamycin is used.⁴

In the United States, clindamycin resistant GAS has more than doubled from 14.7% in 2016 to 34.4% in 2022.⁵ Is there an alternative anti-toxin agent to clindamycin?

Could Penicillin + Linezolid Work?

Linezolid, another protein synthesis inhibitor, has been shown to inhibit production of streptococcal exotoxin at 1 hour to a similar degree as clindamycin.⁶ In a small study comparing the use of adjuvant clindamycin versus linezolid for severe GAS skin and soft tissue infections, no differences in SOFA score reduction or mortality were observed.⁷ Linezolid may be an alternative to adjunctive clindamycin in combination with a beta-lactam when clindamycin resistance is a concern.⁸

Key Takeaway: Adjunctive clindamycin to penicillin is recommended to inhibit toxin production and improve patient outcomes in severe GAS infections. Linezolid can be an alternative to clindamycin when clindamycin resistance is a concern.

References:

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