

G81: What is the optimal antimicrobial treatment for patients with orthopedic infections caused by *Kingella kingae*?

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Response/Recommendation

Beta-lactam antibiotics are the most effective first-line treatment for *Kingella kingae* infections. For cases involving biofilm-associated infections, adjunctive rifampin may be included. The recommended duration of therapy spans 4–6 weeks for intravenous treatment and 6–12 weeks for oral therapy, with adjustments based on infection severity, chronicity, and patient response.

Level of Evidence: Limited

Delegate Vote: Agree: [% vote], Disagree: [%], Abstain: [%]

Rationale

Kingella kingae is a leading cause of musculoskeletal infections in children under 5 years and is increasingly recognized in adults with invasive orthopedic infections. Its intrinsic resistance to certain antibiotics (such as clindamycin and vancomycin) necessitates careful antibiotic selection. Traditional culture methods often fail to detect *K. kingae* due to its slow growth. Advanced molecular diagnostics, such as 16S rRNA gene sequencing and the BIOFIRE Joint Infection (BJI) Panel, improve accuracy and speed by identifying *K. kingae* DNA even when cultures are negative.

Beta-lactams are generally highly effective against *K. kingae*, and intravenous cephalosporins (ceftriaxone or cefotaxime) are the preferred initial therapy. Step-down oral therapy with amoxicillin-clavulanate demonstrates robust efficacy with good bone penetration. The typical response to these agents is rapid, with clinical improvement often seen within 48 hours of starting treatment (Yagupsky et al., 2022; Ceroni et al., 2010).

For patients with beta-lactam allergies, ciprofloxacin or levofloxacin can be considered. However, their efficacy is not as well-documented in pediatric populations. Macrolides (such as erythromycin) and fluoroquinolones (such as ciprofloxacin) have been tested, but evidence supports the efficacy of beta-lactams due to better bone penetration and higher inherent susceptibility (Ilharreborde et al., 2014; Williams et al., 2018). Clindamycin, oxacillin, and vancomycin are not recommended due to resistance. (Yagupsky et al., 2011).

Biofilm formation complicates treatment, especially in prosthetic joint infections. Adjunctive rifampin is recommended during IV therapy for its biofilm-disruptive properties. For chronic infections, prolonged suppressive therapy may be required, particularly in cases involving retained hardware.

Diagnostic and Therapeutic Approaches

Use molecular diagnostic tools such as the BIOFIRE JI Panel or 16S rRNA gene sequencing for rapid identification. Combine joint or synovial fluid samples with blood culture broths to enhance sensitivity.

Initial IV Therapy typically starts with Ceftriaxone (2g once daily) or cefotaxime (1–2g every 6–8 hours), for a period of 4–6 weeks. Consider adjunctive rifampin (600mg once or twice daily) should be considered for cases involving biofilm-associated infections. A conversion to step-down oral therapy is recommended thereafter, including amoxicillin-clavulanate (1g every 8 hours) or cefixime (400mg daily). Levofloxacin (500–750mg qd) or ciprofloxacin (500mg BD) are the preferred alternatives in cases of beta-lactam allergy or intolerance. The duration of antibiotic coverage should span a period of 6–12 weeks total.

Early surgical intervention, including debridement and hardware removal, may be necessary in chronic infections. Monitor inflammatory markers and clinical response to guide therapy duration.

Evidence Summary

Intravenous beta-lactam therapy followed by oral amoxicillin-clavulanate has consistently demonstrated good clinical and functional outcomes. Studies report rapid symptom resolution within 48 hours of initiating treatment.

Lower complication rates were noted with conversion to oral step-down therapy compared to prolonged IV therapy. Biofilm-associated infections require longer antibiotic durations and adjunctive therapies.

Most *K. kingae* infections occur in children under 60 months. Tailored pediatric dosing of ceftriaxone and amoxicillin-clavulanate ensures efficacy and safety. Molecular diagnostics are particularly beneficial in pediatric cases, where traditional methods may yield false negatives.

Conclusion

Beta-lactam antibiotics remain the cornerstone for treating *Kingella kingae* infections. Their efficacy, coupled with advanced diagnostic tools, ensures rapid pathogen identification and effective treatment. Adjunctive therapies and prolonged suppressive regimens may be necessary in complex or chronic cases. Further research is warranted to optimize therapy duration and evaluate emerging antibiotic alternatives.

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