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Vancomycin-rifampin combination therapy has enhanced efficacy against an experimental *Staphylococcus aureus* prosthetic joint infection

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Abstract

Treatment of prosthetic joint infections often involves a two-stage exchange, with implant removal and antibiotic spacer placement followed by systemic antibiotic therapy and delayed reimplantation. However, if antibiotic therapy can be improved, one-stage exchange or implant retention may be more feasible, thereby decreasing morbidity and preserving function. In this study, a mouse model of prosthetic joint infection was used in which *Staphylococcus aureus* was inoculated into a knee joint containing a surgically placed metallic implant extending from the femur. This model was used to evaluate whether combination therapy of vancomycin plus rifampin has increased efficacy compared with vancomycin alone against these infections. On postoperative day 7, vancomycin with or without rifampin was administered for 6 weeks with implant retention. In vivo bioluminescence imaging, ex vivo CFU enumeration, X-ray imaging, and histologic analysis were carried out. We found that there was a marked therapeutic benefit when vancomycin was combined with rifampin compared with vancomycin alone. Taken together, our results suggest that the mouse model used could serve as a valuable in vivo preclinical model system to evaluate and compare efficacies of antibiotics and combinatory therapy for prosthetic joint infections before more extensive studies are carried out in human subjects.

Figures

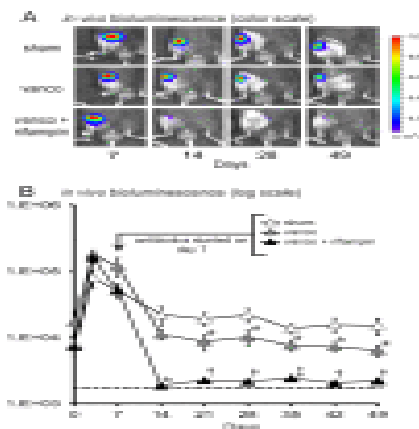


Fig 1

5

Effect of antibiotic therapy on...

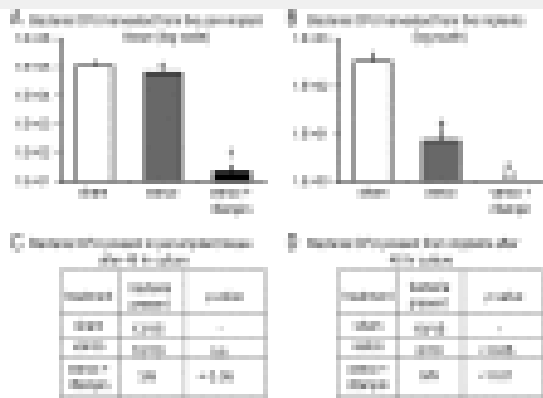


Fig 2

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The effect of antibiotic therapy...

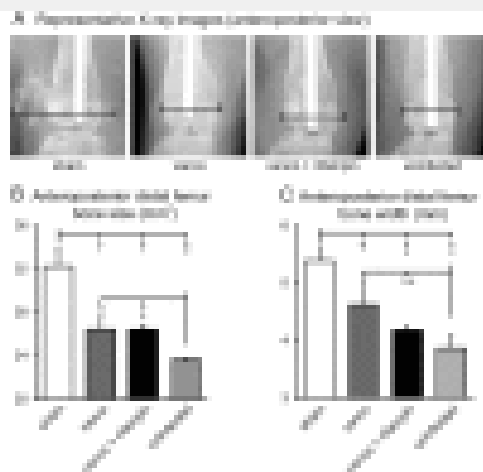


Fig 3

5

Effect of antibiotic therapy on...

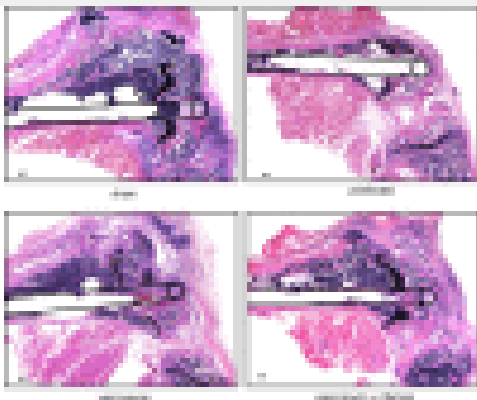


Fig 4

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Effect of antibiotic therapy on...