

P1428 F-P-TiO₂ bottle-shaped nanotubular structure loaded with gentamicin and vancomycin combination as prevention of prosthetic joint infection caused by *Staphylococcus aureus*: an in vivo rabbit model

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Background: Prosthetic joint infections occur infrequently, but they represent the most devastating complication with high morbidity and substantial cost. *Staphylococcus aureus* is one of the most common infecting agents associated with in this kind of infections.

The use of F-P-TiO₂ bottle-shaped nanotubular surfaces as drug delivery platform for local antibiotic therapy is an interesting approach to prevent surface colonization during the early moments after surgery and improve the osteointegration. Here we describe the bactericidal effect of F-P-TiO₂ bottle-shaped nanotubular structure loaded with gentamicin and vancomycin combination in a rabbit *in vivo* model.

Materials/methods: F-P-TiO₂ bottle-shaped nanotubular layers on Ti6Al4V alloy were produced as described previously by Hernández-López *et al.* (*RSC Adv.*, 2014, 4, 62576-62585). Gentamicin and vancomycin combination was loaded in the samples by the method described by Doadrio *et al.* (*International Journal of Pharmaceutics*. 2015. 492: 207–12). Chemical polished Ti6Al4V samples without antibiotic were used as control.

The surgical procedure was performed as described previously by Cordero *et al.* (*J Orthop Res*. 1996 Jul;14(4):663-7) using the two femurs of each animal. After five weeks, the animals were sacrificed and the bacterial load was estimated in the peri-implant bone tissue and the implant using the methodology described by Esteban *et al.* (*J. Clin. Microbiol.* 2008 vol. 46 no. 2 488-492) and estimating colony forming unit per gram or area, respectively. Each treatment was performed five times.

The statistical data were analyzed by nonparametric pairwise comparisons using the nonparametric Mann-Whitney test with a level of statistical significance of p<0.05. Values are cited and represented as medians.

Results: Our results are shown in the Figure 1:

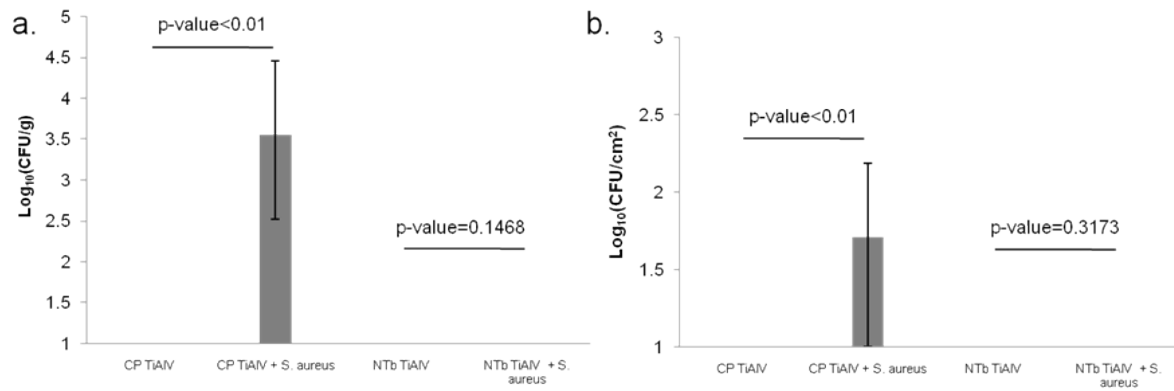


Figure 1. *S. aureus* colony forming units on peri-implant tissue (a) and implant (b) of chemical polished TiAlV and F-P-TiO₂ bottle-shaped nanotubular loaded with gentamicin and vancomycin mixture. The bar represents interquartile range.

Conclusions: Conclusion: F-P-TiO₂ bottle-shaped nanotubular structures loaded with gentamicin and vancomycin could be able to prevent locally the prosthetic joint infections causing by *S. aureus*.