EFFICACY OF HYDROXYAPATITE AND CHLORHEXIDINE COATED EXTERNAL FIXATOR PINS IN PREVENTING PIN TRACT INFECTION IN A CAPRINE MODEL

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**Introduction**: The development of pin tract infections during external fixation of an open fracture can complicate or prevent the conversion to intramedullary stabilization. Therefore, a pin that could prevent or delay the onset of an infection would be of clinical benefit in treating open fractures.

**Purpose**: The objective of our study was to determine if external fixator pins coated with hydroxyapatite, chlorhexidine/chloroxylenol or a combination of hydroxyapatite and chlorhexidine would decrease the incidence of pin tract infection when compared to a commercially available stainless-steel pin in an established Caprine model.

**Materials and Methods**: Twelve castrated, adult male Angora goats underwent insertion of two Synthes 3.0/4.0 mm external fixator pins into each tibia in a randomized position. The pin types consisted of uncoated stainless steel, hydroxyapatite, hydroxyapatite and chlorhexidine or chlorhexidine and chloroxylenol coatings. All pins were placed sterilily followed by inoculation with 30 µl of a 10^6 cfu/ml of S. aureus, genetically marked to allow for subsequent identification. The pins were evaluated by 3 independent observers for 14 days. A label of pin tract infection required both clinical and corroborating microbiological culture results. Animals were euthanized at 14 days for bacteriological and histological examination of the pin sites.

**Results**: The chlorhexidine/chloroxylenol coated pins were found to be efficacious in 100% of the cases (0% infection rate) compared to a 91.7% infection rate with the uncoated stainless steel pins (p<0.0001). The hydroxyapatite alone and in combination with chlorhexidine yielded 66.7% and 58.3% infection rates, respectively (p>0.1)

**Conclusion**: The chlorhexidine/chloroxylenol coated pins demonstrated significantly more efficacy in preventing the development of a pin tract infection in comparison to stainless steel pins in a contaminated setting. The hydroxyapatite coated pins were more efficacious than the uncoated pins, but this was not significant given our number of goats. The potential clinical utility of these pins would be in a decreased risk of osteomyelitis when converting from immediate external fixation to intramedullary fixation of an open fracture.

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