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Topical Anesthetic Gel Interferes with Antibacterial Efficacy of Povidone-Iodine Both In Vitro and In Vivo

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Topical anesthetic gel interferes with antibacterial efficacy of povidone-iodine both in vitro and in vivo

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Purpose: To evaluate the effects of viscous lidocaine gel on the antimicrobial efficacy of povidone-iodine (PI) and their order of application in both in vitro and in vivo models.

Methods: In vitro antibacterial effects were tested against *Staphylococcus aureus* (*S. aureus*) with disc diffusion methods for application of lidocaine alone, PI alone, PI before lidocaine, and lidocaine before PI. Zones of inhibition were measured after incubation at 37°C overnight. Mouse eyes were colonized with *S. aureus* for in vivo study to which PI and/or lidocaine were applied in various combinations. Eyes were then rinsed with saline, and the runoff fluid was collected, diluted, and plated on agar. Viable bacterial estimation was performed after incubation overnight at 37°C.

Results: In vitro studies demonstrated a significantly smaller ($P<0.001$) mean zone of inhibition when lidocaine was applied prior to PI versus PI alone. Zones of inhibition were not significantly different between PI alone versus PI prior to lidocaine and PI prior to lidocaine versus lidocaine prior to PI ($P>0.05$). In vivo studies showed that mouse eyes treated with lidocaine prior to PI had significantly more ($P<0.001$) *S. aureus* growth compared to eyes that had PI applied prior to lidocaine.

Conclusions: Both in vitro and in vivo studies demonstrated that lidocaine gel interfered with PI's antiseptic properties when placed between the surface and PI. Our results are consistent with previous in vitro studies and provide greater evidence for applying PI before lidocaine gel if a viscous anesthetic agent is used.