Evaluation On The Antibacterial Properties Of Lidocaine 1.0 % In Wound Tissue Biopsy For Culture

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Introduction and purpose
The purpose was to test 3 solutions of lidocaine 1.0 % on common wound pathogenic bacteria in vitro. The antimicrobial effects of local anaesthetic drugs (LAD) are documented in earlier investigations (1-5). The effects of LAD on bacterial cell membranes have been described by others (6) and are dose dependent (5,7,8). Commercial preparations of lidocaine from multidose vials often contain preservatives and other additives with antimicrobial properties per se (5,9,10). Quantitative culture from wound tissue biopsy is often regarded as gold standard, especially when dealing with pressure ulcers. In outpatient clinics, biopsy can only be obtained by local anaesthesia.

Antibacterial properties of LAD may produce false negative results (2,11,12). The aim was to investigate the hypothesis that lidocaine 1.0 % would not be detrimental to results of culture from wound tissue biopsy; provided certain conditions were observed.

Methods
An in vitro study was performed on 5 ATCC strains and 3 clinical isolates of each of the following species: Staphylococcus aureus (SA), methicillin resistant Staphylococcus aureus (MRSA), Escherichia coli (EC), Pseudomonas aeruginosa (PA) and Streptococcus pyogenes group A (SP). The clinical isolates were obtained by culture from patients with chronic wounds.

The test organisms were exposed to a pure solution of lidocaine 1.0 % and two commercial solutions of lidocaine 1.0 %, A and B, from multidose vials containing various additives including the preservatives methylparaben and sodiummetabisulfite respectively (Textbox 1). Saline was used for controls.

Results
Controls dispensed in isotonic saline survived well up to 6 hours. SP up to 3 hours (Figure 1-4).

In pure lidocaine 1.0 %, no bacteria were reduced significantly within 2 hours of exposure. SP was the most susceptible bacterium with significant reduction after 3 hours (p<0.05).

Conclusion
Pure lidocaine 1.0 % is not a potent antibacterial drug. This is consistent with previous investigations (3,7). Commercial preparations of lidocaine containing preservatives and other constituents with intrinsic antibacterial activity have a high antibacterial potency and are therefore useless for the purpose of biopsy for culture.

Wound tissue biopsy preceded by local anaesthesia can safely be made without interference on bacterial findings from culture if the following conditions are observed: the lidocaine 1.0 % should be a pure solution (i.e. without preservatives or other additives) from a fresh, sterile single dose vial. Infiltration in a ring block in wide distance from the biopsy site may enhance safety. The biopsy should be carried out immediately after the analgesic effect has occurred, and culture should be commenced within 2 hours.

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Textbox 1: Contents of the test solutions

Lidocaine 1.0 %: Lidocaine (lignocainehydrochloride) 10 mg/ml
Solution A: Lidocaine (lignocainehydrochloride) 10 mg/ml
Sodiummetabisulfite 2.5 mg/ml
Epinginoformic acid 5 mg/ml
Sterile saline 0.9 %

Solution B: Lidocaine 1,0%
Medium-pure-hydrochloride (methylparaben) 0.1 %
Epinginoformic acid 10 mg/ml
Sodiummetabisulfite 7 mg/ml
Sterile saline 0.9 %

References
(2) Filly Banis PS, Salt WJ. Local anaesthetics as antimicrobial agents: structure-action considerations. Microbios 1983; 37:45-64.