Efficacy of oral hygiene products against MRSA and MSSA isolates

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Sir,

Clinical experience has shown that oropharyngeal carriage of methicillin-resistant Staphylococcus aureus (MRSA) can be difficult to eradicate.¹ Oral carriage of MRSA may serve as a reservoir for colonization of other body sites, or cross-infection to other patients or healthcare workers.² Eradication of throat carriage of MRSA has been achieved using topical chlorhexidine (0.2%), in addition to normal control measures of patient isolation, nasal mupirocin and chlorhexidine body washes.³ The aim of this study was to investigate the efficacy of the bactericidal activity of some oral antiseptic agents against various strains of methicillin-susceptible and methicillin-resistant S. aureus.

The antisepctic solutions chosen for testing were commercially available over-the-counter preparations of the following oral hygiene products: Corsodyl mouthwash (chlorhexidine gluconate 0.2% w/v, 7% ethanol, sorbitol, polyoxy 60, hydrogenated castor oil, flavour E1640 1 N1, purified water), Listerine mouthwash (aqua, glycerine, aroma, menthol, thymol, methyl salicylate, sodium saccharin, sodium benzoate, CL 42053), Plax mouthwash (aqua, sorbitol, 25% alcohol, glycerine, aroma, menthol, disodium phosphate, PVM/MA copolymer, sodium fluoride, sodium hydroxide, sodium lauryl sulphate, sodium methyl cocoyl taurate, sodium saccharin, 0.03% tricosan, CL 16035), Oral B mouthwash (aqua, glycerine, polysorbate 20, aroma, methylparaben, 0.05% cetylpyridinium chloride, sodium fluoride, sodium saccharin, sodium benzoate, propylparaben, CL 42051), Fluorigard mouthwash [0.05% w/w sodium fluoride BP (equivalent to 0.225 mg fluoride ion per mL), alcohol 4.96%, pluronic F-108, glycerol Ph Eur, saccharin sodium Ph Eur, sodium benzoate BP, benzoic acid BP, E131, flavour, purified water Ph Eur] and Colgate Total toothpaste (sodium fluoride 0.24%, tricosan 0.3%, glycerine, sorbitol, sodium lauryl sulphate, cellulose gum, sodium saccharin, carrageenan, titanium dioxide, hydrated silica, water). The antiseptic mouthwashes were tested at a concentration of 80%. The toothpaste was diluted according to the method of previous workers.⁴ This involved mixing 10 g of the toothpaste with 10 mL of sterile distilled water on a rotary mixer. The resulting slurry was centrifuged at 4000 rpm for 15 min and the supernatant used in the bactericidal assays.

We studied six isolates of S. aureus, a methicillin-susceptible reference strain (ATCC 29213), a methicillin-resistant clinical strain (EMRSA15), two methicillin-resistant clinical (non-oral sites) isolates (SMRSA-108a and SMRSA-112a) and two methicillin-resistant clinical (oral sites) isolates (R387 and R388).

Bactericidal activity was measured using a method based on the European Standard EN 1040.⁵ Briefly, bacterial suspensions (1.5 × 10⁸ cfu/mL) were mixed with antiseptic preparations, and killing was measured at contact times of 30 s, 1 min, 5 min, 30 min and 60 min. Prior to cell counts, the antiseptic was neutralized with the European Suspension Test Neutralizer for Gram-positive bacteria (0.1% L-histidine, 0.5% sodium thiosulphate, 0.3% lecithin and 10% Tween 80). Cell counts were determined at 24 and 48 h. Each assay was run in duplicate.

All isolates of S. aureus were killed (8 log₁₀ reduction in cfu) within a 30 s contact time by the mouthrinses Corsodyl and Listerine. The Fluorigard mouthrinse was ineffective in reducing bacterial counts over a 60 min exposure time for all isolates tested. All isolates were killed within 5 min of exposure (8 log₁₀ reduction in cfu) to Oral B. Oral MRSA isolates demonstrated increased survival times with the Plax mouthrinse and Colgate Total suspension compared with other S. aureus isolates. All S. aureus isolates, except the oral MRSA isolates, were killed within 30 s by the Colgate Total suspension and Plax mouthrinse (Figure 1).

This study supports some early in vivo observations³ on the efficacy of chlorhexidine products in their anti-staphylococcal activity in the oropharynx. Although previous workers⁶ have investigated the potential of some of the constituents of these products, the data described here provide useful information on the efficacy of over-the-counter preparations that have some anti-staphylococcal activity. These products may be useful as part of a decontamination regimen to decolonize the oropharyngeal flora. It is noteworthy that oral staphylococcal isolates appeared less susceptible to some of these products, in particular the toothpaste preparation. This reduced susceptibility may reflect a form of adaptation to daily exposure to these products. Further work on a larger number of isolates is necessary to confirm this trend, and the presence of other changes associated with oral isolates of staphylococci needs to be investigated.

References


