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Efficacy of berberine, an antimicrobial plant alkaloid, as an endodontic irrigant against a mixed-culture biofilm in an in vitro tooth model.

[J Endod.](#) 2012 Aug; 38(8):1114-7.

JE

Abstract

INTRODUCTION

Berberine, a plant alkaloid isolated from many medicinal plants, has shown antimicrobial activity against selected oral pathogens. The purpose of this investigation was to evaluate the antimicrobial efficacy of berberine solution against selected endodontic pathogens using a multispecies biofilm tooth model.

METHODS

The bacterial species used in the multispecies biofilm tooth model were *Fusobacterium nucleatum*, *Enterococcus faecalis*, and *Prevotella intermedia*. Extracted human anterior teeth were collected and standardized to a length of 14.0 mm. Teeth were cultured in Schaedler broth with the 3 test bacteria strains for 21 days and then randomly assigned to 6 treatment groups (ie, sterile saline, 5.25% NaOCl, 2% chlorhexidine [CHX], 1% CHX, 2 mg/mL berberine, and 1 mg/mL berberine plus 1% CHX). The teeth were instrumented to size 35/.06 and irrigated with 6 mL irrigant for 2 minutes. Surviving bacteria were sampled before and after instrumentation. Data were analyzed using analysis of variance ($P < .05$) followed by the Scheffé test.

RESULTS

The minimal inhibitory concentration of berberine against *F. nucleatum*, *P.*

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intermedia, and E. faecalis was 31.25 µg/mL, 3.8 µg/mL, and 500 µg/mL, respectively. Instrumentation and irrigation resulted in 99% bacterial reduction in all groups. All tested solutions resulted in a statistically significant reduction in bacteria when compared with the saline control. When used alone, berberine (2 mg/mL) was less effective than the other test irrigants. However, when combined with 1% CHX, berberine (2 mg/mL) was comparable in bactericidal activity with 5.25% NaOCl, 2% CHX, and 1% CHX (Table 2).

CONCLUSIONS

Berberine was more effective than saline as an endodontic irrigant against selected endodontic pathogens in vitro and, when combined with CHX, was comparable with NaOCl in its bactericidal efficacy.

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