INTRODUCTION

High-risk human papillomaviruses (HPV 16 & 18) are causal agents of cervical, anal, and oropharyngeal cancers.1,2 Oral HPV infections and associated malignancies have increased alarmingly in recent years in the US, even as the rates of cervical cancer have begun to decline. Our previous studies using suspension and carrier tests demonstrated strikingly poor efficacy of common disinfectant agents in inactivating high-risk HPV (Table 1), 3 even with FDA-approved chemical sterilants, such as GTA and OPA. The potential for iatrogenic transmission in healthcare environments, including dental offices, from inadequate disinfection practices has therefore become a concern. Risk potentials and prior efficacy determinations have commonly been based on outdated criteria or inappropriate test systems.

Objective: To establish the efficacy of pure, stable preparations of HOCl (from Briotech Inc.) in the inactivation of HPV 16 & 18. Our approach to quantifying inactivation depends on use of large amounts of authentic infectious virus, and well-established methods of replication and testing of high-risk HPVs.

METHOD & MATERIALS

Infectious high titer stocks of HPV16 and HPV18 were produced, titered, and infectivity-tested as previously described.1-5 Both suspension and carrier tests were performed with contact times spanning 15 seconds to 20 minutes. Following contact remaining HOCl was neutralized using a Tween 80/peptone/cysteine/Tris buffer formulation (pH 7.5). Residual HPV was isolated and measured by SDS-PAGE gels.

RESULTS

HOCl treatment contact times generally and quickly produced >99.99% reduction in infectivity of HPV16 and HPV18, comparable to the efficacy of 0.87% sodium hypochlorite. Exposure of cell fractions enriched by vector expression of L1 and L2 capsid proteins of BPV to HOCl for 30 seconds resulted in rapid aggregation of these and other extracted proteins on SDS PAGE gels.

CONCLUSION

HOCl is a highly effective disinfectant for HPV 16 & 18, even after contact times as short as 15 seconds. Rapid changes in capsid proteins may be responsible for this decline.

Significance: More than 70% of oropharyngeal cancers are caused by high-risk HPV. Infection rates range from 3-10%,6 and while most are eventually shed, some persist to cause cancerous lesions. Effective inactivation of HPV on surfaces in the dental office can be accomplished using HOCl solutions that are safe for oral and other tissues, e.g., as an oral rinse.

REFERENCES