SODIUM HYPOCHLORITE AND ITS USE AS ROOT CANAL IRRIGANT: A SURVEY AMONG GHANAIAN DENTAL PRACTITIONERS

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Abstract

Background: The majority of endodontic treatment in Ghana is provided by general dental practitioners due to the absence of specialists in endodontics. Sodium hypochlorite has been described as one of the commonly used irrigation solutions during endodontic treatment. However, there are no published reports on its use in Ghana.

Aim: The study was to determine the proportion of Ghanaian dental practitioners who have used sodium hypochlorite for irrigation and the concentrations they usually use.

Materials and methods: Self-administered questionnaires were mailed to dental practitioners in private clinics, government hospitals and clinics, teaching hospitals and training institutions across the country between December 2015 and March 2016. The collated data was analyzed using Microsoft Excel 2010 and SPSS 20.0.

Results: The most commonly used root canal irrigant was 2.5% Sodium Hypochlorite (Milton®). This was routinely used by 31 (73.7%) of the respondents as root canal irrigant while normal saline solution was used regularly by only 6(15.8%) respondents. The various concentrations of sodium hypochlorite used were 0.5%, 2.5%, 1% and 5.0%; with the following percentage-use respectively, 42.9%, 32.1%, 21.4% and 6.1%. Three (10.7%) respondents had reported experiencing some complications with the use of sodium hypochlorite.

Conclusion: Sodium hypochlorite is the most commonly used root canal irrigant by dental practitioners in Ghana. The concentrations usually used ranges between 0.5% and 5.0%.

Keywords: Sodium Hypochlorite, Root canal irrigation, Concentration, Survey, Ghana.

Introduction

Endodontic therapy or root canal treatment is considered an essential treatment procedure in the provision of dental services1. This therapy is essential in the control and management of root canal infection in a tooth2,3. It involves mechanical instrumentation, irrigation, intra-canal medication with anti-microbial agents and obturation4.

Root canal infections can be caused by microorganisms as a result of dental caries, fractures of the tooth secondary to trauma5, periodontal diseases6 and some operative dental procedures7.

Sodium hypochlorite (NaOCl) is the most commonly and widely used root canal irrigant in endodontic therapy and it is often used as a baseline to assess other endodontic irrigants8,10.

It is widely accepted because of its anti-microbial11 and tissue-dissolving properties and its relatively low cost12,13. It dissolves proteins, has a low viscosity, and has a reasonable shelf life14,15.

NaOCL is a broad spectrum antimicrobial agent. It has the ability to oxidize and hydrolyze cell proteins. It is effective against root canal bacteria such as Actinomyces naeslundi (found in untreated necrotic root canals), Enterococcus faecalis and Candida albicans (found in endodontic failure cases)16.

However, sodium hypochlorite has some disadvantages, principally due to its toxicity such as causing tissue damage and pain; when it accidentally comes into contact with surrounding tissues or goes beyond the root apex17. It is strongly alkaline, hypertonic and has a very unpleasant taste14. Sodium hypochlorite is extremely corrosive to metals. Use of rubber dam and careful irrigation techniques are vital in endodontics to help obviate some of these disadvantages by confining the hypochlorite to the pulp chamber and root canal14.

The choice of concentration of NaOCl has been a matter of debate. The range extending from 0.5% to 5.25% has been recommended for use in endodontics14,18. Few studies have investigated the attitude of general dental practitioners toward various aspects of endodontic treatment in developing countries19,21. However, the authors are unaware of any studies that have evaluated sodium hypochlorite use among dental practitioners in Ghana.

The aim of the study was to determine the proportion of Ghanaian dental practitioners who use sodium hypochlorite for irrigation and the concentrations they usually use.

Materials and Methods

The study was conducted using self-administered questionnaire with both open and close ended questions. It involved licensed dental practitioners who practice in
Sodium hypochlorite was the irrigation solution of choice for most respondents 33(73.3%); followed by normal saline 7(15.6%) and one respondent used chlorhexidine as irrigation solution routinely. Only 4(8.8%) of the respondents used combination of irrigation solutions. There was no significant difference among the institutions of practice and the concentrations of sodium hypochlorite usage (P=0.35). The reasons attributed to the choice of irrigation solution is shown in Table 3 with local availability being the commonest reason given.

Table 3. Reasons that inform choice of irrigation solution

<table>
<thead>
<tr>
<th>Reason for choice of irrigant</th>
<th>Number</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Availability</td>
<td>33</td>
<td>73.3</td>
</tr>
<tr>
<td>Type of Infection</td>
<td>9</td>
<td>20.0</td>
</tr>
<tr>
<td>Primary root canal treatment</td>
<td>2</td>
<td>4.4</td>
</tr>
<tr>
<td>Cost</td>
<td>1</td>
<td>2.2</td>
</tr>
</tbody>
</table>

Choosing an irrigation solution was mainly determined by its availability.

Out of the 33(73.3%) sodium hypochlorite users, 14(42.4%) used 2.5% followed by 12(36.7%) who used 0.5% and 7(21.2%) used 1.0%. Two respondents representing 6.1% used 5.0% concentration of sodium hypochlorite. Comparison between the institution of practice and the concentration of sodium hypochlorite used for both full and part time is shown in figures 1 and 2 respectively. Only 3(6.7%) respondents had experienced complication with the use of sodium hypochlorite without giving details.

Fig. 1 Full-time institutions of practice and the concentrations of sodium hypochlorite used.

<table>
<thead>
<tr>
<th>Institution of practice</th>
<th>0.5% Hych</th>
<th>1.0% Hych</th>
<th>2.5% Hych</th>
<th>5.0% Hych</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOH/GHS</td>
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<td></td>
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</tr>
<tr>
<td>Dental School</td>
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<tr>
<td>Private Practice</td>
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<tr>
<td>Teaching Hospital</td>
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</table>
1% with the following percentages respectively, 37.5%, 34.4% and 21.9%. Two respondents representing 6.3% used 5.0% concentration of sodium hypochlorite. The other irrigation solutions used were chlorhexidine, normal saline and combination of multiple irrigation solutions. The choice of more dilute solutions may be related to the reluctance of the dental practitioners to use rubber dam. The reasons that informed the choice of irrigation solution included availability of solution, the type of infection and the cost. The incidence of complications associated with sodium hypochlorite use is not common but there are reported cases of adverse reactions to sodium hypochlorite use.16,27 In this study only three (6.7%) of respondent indicated having experienced some complications but none of them indicated the specific complications experienced with Sodium hypochlorite use.

Conclusion

The assumption that sodium hypochlorite is used widely by these practitioners as an endodontic irrigant has been confirmed by this study. The concentrations of sodium hypochlorite used by dental practitioners in Ghana ranges between 0.5% and 5.0% and majority use 2.5%.

Acknowledgements: The dental practitioners who willingly participated in this survey

References


