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ORIGINAL RESEARCH

Comparison of Efficacy of Two Root Canal Irritants

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ABSTRACT

Background: This study was conducted to assess the efficacy of two root canal irrigants. **Material and methods**: The aim of this study was to compare the antibacterial activity of 2.5% sodium hypochlorite (NaOCl) and 2% iodine potassium iodide (IKI) solutions as intracanal disinfectant in infected root canals. 20dento-radicular pulps with necrotic pulps in 20 patients were selected according to the defined inclusion/exclusion criteria and then randomly divided into two groups. In group I, the canals were irrigated with 2.5% NaOCl during instrumentation, while in group II, the canals were initially irrigated with sterile saline solution during biomechanical preparation and then subjected to a five-minute final irrigating with 2% IKI. Bacterial samples were collected before treatment (S1) and at the end of treatment (S2). The Mann-Whitney U test was used for analysis. **Results:** In this study, there was significant reduction in the bacterial load after irrigation with NaOCl in all the samples. However not all samples irrigated with KI showed reduction in bacterial load. **Conclusion:** Based on the results of this study, it can be concluded that NaOCl was more effective that KI in reducing the bacterial load.

Keywords: Efficacy, Irrigants, Root Canal

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INTRODUCTION

Bacteria and their products are considered the main cause of pulp and periapical tissue diseases. Therefore, the key goal of endodontics is to clean, disinfect and seal the root canal system from sources of infection. The effectiveness of endodontic treatment largely depends on the degree of microbiological control of infections, as well as on the effectiveness of sealing and prevention of reinfection.¹⁻³

Historically, various rinsing agents have been used during instrumentation, the most popular of which was sodium hypochlorite (NaOCl). This rinsing agent is a nonspecific proteolytic agent with a broad against of spectrum activity endodontic microorganisms. It has excellent tissue dissolving capacity and hemostatic properties. Despite the beneficial properties of NaOCl, it has significant clinical disadvantages, such as unpleasant odor and taste, cytotoxicity, negative impact on mechanical and chemical properties of dentin composition, as well as adverse effects on mechanical properties and cutting efficiency of nickel-titanium instruments.4,5

This study was conducted to assess the efficacy of two root canal irrigants.

MATERIAL AND METHODS

The aim of this study was to compare the antibacterial activity of 2.5% sodium hypochlorite (NaOCl) and 2% iodine potassium iodide (IKI) solutions as intracanal disinfectant in infected root canals. 20dento-radicular pulps with necrotic pulps in 20 patients were selected according to the defined inclusion/exclusion criteria and then randomly divided into two groups. In group I, the canals were irrigated with 2.5% NaOCl during instrumentation, while in group II, the canals were initially irrigated with sterile saline solution during biomechanical preparation and then subjected to a five-minute final irrigating with 2% IKI. Bacterial samples were collected before treatment (S1) and at the end of treatment (S2). The Mann-Whitney U test was used for analysis.

RESULTS

Table 1: Group-wise distribution of thedisinfectants

| Groups | Type of disinfectant | Ν |
|---------|----------------------------|----|
| Group 1 | 2.5% Sodium Hypochlorite | 10 |
| Group 2 | 2% Iodine Potassium Iodide | 10 |

There were 10 samples in group 1 that were irrigated with 2.5% Sodium Hypochlorite and 10 samples in

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group 2 were irrigated with 2% Iodine Potassium Iodide.

Table 2: Bacterial load (CFU per μ L) and percent reduction in two groups.

| Groups | S1 | S ₂ |
|-----------------|-----|-----------------------|
| Group 1 (NaOCl) | 30 | 3 |
| | 74 | 21 |
| | 26 | 4 |
| | 89 | 11 |
| | 73 | 12 |
| | 115 | 20 |
| | 165 | 17 |
| | 350 | 54 |
| | 482 | 36 |
| | 120 | 87 |
| Group 2 (KI) | 59 | 4 |
| | 78 | 89 |
| | 29 | 54 |
| | 59 | 21 |
| | 99 | 106 |
| | 115 | 21 |
| | 155 | 16 |
| | 310 | 168 |
| | 412 | 66 |
| | 110 | 77 |

There was significant reduction in the bacterial load after irrigation with NaOCl in all the samples. However not all samples irrigated with KI showed reduction in bacterial load.

DISCUSSION

The removal of bacteria from the root canal system is a crucial component of endodontic treatment. It is imperative that practitioners possess adequate knowledge and skills in this critical area of endodontics. The goal of endodontic procedures should be to ensure they are simple, economical, and reliable.⁶

A primary aim of endodontic therapy is to eliminate infected tissue, eradicate bacteria from the canal system, and prevent any future contamination. Disinfection of the root canal system through preparation and irrigation is essential for minimizing bacterial presence and managing periapical disease. Recent recommendations advocate for the use of single-use endodontic instruments, which underscores the importance of effective irrigation, especially as more root canal treatments are likely to be performed in a single session.⁷

Furthermore, with increasing patient expectations for successful outcomes, it is vital to enhance the disinfection process during endodontic procedures. However, there is currently no evidence linking the type of irrigant used to the success of endodontic outcomes.^{6,7}

This study was conducted to assess the efficacy of two root canal irrigants.

In this study, there was significant reduction in the bacterial load after irrigation with NaOCl in all the samples. However not all samples irrigated with KI showed reduction in bacterial load.

Abbaszadegan A et al.⁸The purpose of this study was to compare the antibacterial activity of 2.5% sodium hypochlorite (NaOCl) and 2% iodine potassium iodide (IKI) solutions as intracanal disinfectant in infected root canals during one-visit endodontic treatment procedure. Thirty single-rooted teeth with necrotic pulps in 27 patients were selected according to specific inclusion/exclusion criteria and divided into two random groups. In group I, canals were irrigated with 2.5% NaOCl during instrumentation and in group II canals were initially irrigated with sterile saline during biomechanical preparation and then exposed to a 5-minute final irrigation with 2% IKI. Bacterial samples were taken before treatment (S_1) , and at the end of treatment (S_2) . Mann-Whitney U test was used for analysis.Bacteria were present in all initial samples. NaOCl was able to significantly reduce the number of colony forming units (CFU) from S_1 to S_2 in approximately 90% of canals. Only 15% reductions in CFUs occurred after irrigation/instrumentation in group II; this degree of disinfection was not statistically significant. According to this study, although root canal irrigation with 2.5% NaOCl could not eradicate all bacteria within the canals; it was significantly superior in comparison with 2% IKI use.

Siqueira JF Jr et al.⁹This clinical study investigated the bacterial reduction after instrumentation using 2.5% sodium hypochlorite (NaOCl) as an irrigant and further interappointment dressing with a calcium (Ca(OH)(2))/camphorated hvdroxide paramonochlorophenol (CPMC) paste. Eleven teeth with primary intraradicular infections and chronic apical periodontitis selected according to stringent inclusion/exclusion criteria followed in the study. Bacterial samples were taken before treatment (S1), after chemomechanical preparation using hand NiTi files and 2.5% NaOCl (S2), and following a 7-day medication with a Ca(OH)(2) paste in CPMC (S3). Cultivable bacteria recovered from infected root canals at the three stages were counted and identified by means of 16S rRNA gene sequencing analysis. At S1, all cases harbored bacteria, with a mean number of 2.8 taxa per canal (range, 1-6). At S2, 6 of 11 (54.5%) of the cases yielded positive cultures, with one to three species per canal. At S3, only one case (9.1%) was positive for the presence of bacteria, with Propionibacterium acnes as the only taxon isolated. A significantly high reduction in bacterial counts was observed between S1 and S2, and S1 and S3. Significant differences were also observed for comparisons involving S2 and S3 samples with regard to both quantitative bacterial reduction (p = 0.029)and number of culture-negative cases (p = 0.03). It was concluded that chemomechanical preparation with 2.5% NaOCl as an irrigant significantly reduced

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the number of bacteria in the canal but failed to render the canal free of cultivable bacteria in more than onehalf of the cases. A 7-day intracanal dressing with Ca(OH)(2)/CPMC paste further significantly increased the number of culture-negative cases.

CONCLUSION

Based on the results of this study, it can be concluded that NaoCl was more effective that KI in reducing the bacterial load.

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