EVALUATION OF POST OPERATIVE PAIN IN SINGLE SITTING INTENTIONAL RCT USING CRYOTHERAPY IRRIGATION SOLUTION: AN ORIGINAL RESEARCH.

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ABSTRACT

Introduction: Controlling pain during and after root canal treatment is very essential. This study was conducted to evaluate post operative pain in single sitting intentional RCT using cryotherapy irrigation solution.

Material and Method: We conducted a randomized control trial had been conducted among 50 patients with irreversible pulpitis. The patients were randomly divided according to the temperature of the final irrigant used, into two groups control (1) using saline at room temperature, and study group (2) using cold saline. Then further subdivided into two subgroups according to pulpal diagnosis, either irreversible pulpitis with apical periodontitis (subgroup a) or irreversible pulpitis without apical periodontitis (subgroup b). Visual analogue scale (VAS) was used to evaluate and compare postoperative pain.

Results: A statistically significant difference was found when comparing the pain level in cryotherapy group (subgroup 2a) with control group (subgroup 1a) 24, 48 hours postoperatively. But there was no statistically significant difference when comparing the pain level in cryotherapy (subgroup 1b) with control (subgroup 1b) after 24, 48 hours postoperatively (p>0.05).

Conclusion: Applying intracanal cryotherapy is effective in lowering postoperative pain in patients with irreversible pulpitis with apical periodontitis. But it may not affect patients with irreversible pulpitis without apical periodontitis

Key words: Postoperative pain, Intracanal cryotherapy, , Irreversible pulpitis.

I. INTRODUCTION

Cryotherapy is a common technique used in abdominal, hernia, gynecological and orthopaedic operation; its mechanism of action is by affecting the nerve conduction capacity. It helps in stimulating the thermo receptors, lowering inflammation, pain, edema and recovery time in the short-term application. In the root canal treatment controlling the pain during and after is an important aspect. Postoperative pain is affected by various factors like...
the periapical tissues condition, the presence of periapical radiolucency, preoperative pain and pulp condition.\textsuperscript{5-10} To lower the pain the several drugs like corticosteroids, analgesics, are prescribed. Using cryotherapy in the dental field was investigated to lower swelling, pain and trismus after third molar extraction. In endodontics, only a several studies researched the use of intracanal cryotherapy.\textsuperscript{11-13} Vera et al. 2015 found a significant reduction in the external temperature of the apical 4mm of root after continuous irrigation with cold saline (2.5 C) in vitro.\textsuperscript{14} In 2016, Keskin et al.\textsuperscript{2} found that the use of intra canal cryotherapy reduced the postoperative pain after single visit root canal treatment in patients with irreversible pulpitis. Another clinical study in 2016, evaluated the intracanal cryotherapy effect with negative pressure irrigation (Endo Vac) on postoperative pain after vital single visit RCT and the authors concluded that periodontitis and patients with irreversible pulpitis with normal apical tissue.\textsuperscript{15} This study was conducted to evaluate post operative pain in single sitting intentional RCT using cryotherapy irrigation solution.

II. MATERIALS AND METHODS
We conducted a randomized control trial study after the approval of the institutional ethics committee. After taking the consent of the 50 subjects were selected who underwent single sitting intentional RCT. Later they were randomly divided into two equal groups where final irrigant was saline at room temperature and with the cryotherapy group where 2.5°C saline was used as the final irrigant. Each group was subdivided into 2 subgroups (a & b) according to preoperative apical diagnosis.

a= teeth with apical periodontitis
b= teeth with normal apical tissues.

The preoperative pain was recorded for all the subjects using visual analogue scale (VAS). The preoperative apical diagnosis was determined according to the radiograph and percussion test. Later the conventional root canal therapy was done. The canals were irrigated with NaOCl then final irrigation was done with either 2.5°C saline or saline at room temperature for 2 min using side vented needle, then access cavity was sealed, and patients were asked to record their postoperative pain after 24 and 48 hours postoperatively using the (VAS) scale. A refrigerator has been used to obtain 2.5°C saline. And thermometer was used to control the temperature. The data thus collected was evaluated the significance with p<0.05.

III. RESULTS
We observed that percent of pain lowered significantly from 100% to 60% in both cryotherapy subgroups (2a &2b) after first 24 hours postoperatively. And after 48 hours postoperatively only 30% of subgroup 2a experienced pain. While 50% in subgroup 2b had pain during the same time interval. (Table1, figure 1) In control subgroup 1a the pain was decreased from 85.7% to 42.9% after 24 hours and similarly after 48 hours. For the control subgroup 1b the pain was decreased from 88.9% to 66.7% after 24 hours. And within 48 hours 55.6% of the patients were having pain. A statistically significant difference was found when comparing the pain level in patients with irreversible pulpitis with apical periodontitis in cryotherapy group (subgroup 2a) with control (subgroup 1a) twenty-four hours postoperatively. But there was no statistically significant difference when comparing the pain level in cryotherapy (subgroup 2b) with control (subgroup 1b) after 24 hours postoperatively (p>0.05). (Table 1)Also there was a statistically significant difference between subgroup 2a and subgroup 1a1 in the pain level 48 hours postoperatively (p < 0.05). While there was no statistical difference between subgroup 2b and subgroup 1b in the pain level after 48 hours (p > 0.05). (Table 1)

Figure 1: Comparison of the pain percentages pre and 24 and 48 hours postoperatively.
Table 1: Comparison of the significance of the pain percentages pre and 24 and 48 hours postoperatively.

<table>
<thead>
<tr>
<th></th>
<th>Study</th>
<th>Control</th>
<th>Chi square (x²) (p value)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No pain</td>
<td>Pain</td>
<td>No pain</td>
</tr>
<tr>
<td>Subgroup1</td>
<td>0%</td>
<td>100%</td>
<td>14.3%</td>
</tr>
<tr>
<td>Subgroup2</td>
<td>0%</td>
<td>100%</td>
<td>11.1%</td>
</tr>
<tr>
<td>After 24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subgroup1</td>
<td>40%</td>
<td>60%</td>
<td>57.1%</td>
</tr>
<tr>
<td>Subgroup2</td>
<td>40%</td>
<td>60%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Chi square (x²) (p value)</td>
<td>13.652</td>
<td>(0.02)</td>
<td>10.709</td>
</tr>
<tr>
<td>After 48</td>
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<td></td>
</tr>
<tr>
<td>Subgroup1</td>
<td>70%</td>
<td>30%</td>
<td>57.1%</td>
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<tr>
<td>Subgroup2</td>
<td>50%</td>
<td>50%</td>
<td>44.4%</td>
</tr>
<tr>
<td>Chi square (x²) (p value)</td>
<td>6.721</td>
<td>(0.05)</td>
<td>4.218</td>
</tr>
</tbody>
</table>

*Statistical significant difference as p < 0.05*

IV. DISCUSSION

We conducted our study to evaluate the effect of intracanal cryotherapy in lowering postoperative pain after single visit intentional endodontic treatment of teeth with irreversible pulpitis with or without apical periodontitis. In this study, vital teeth were chosen to eliminate the need to use intracanal medicament and exclude the presence of infected necrotic pulp. The pulp vitality was confirmed when there was bleeding during access cavity as bleeding is the gold standard test for pulp vitality. The selected patients were systemically free to insure that systemic health-related factors would not interfere with the postoperative pain results. Intracanal cryotherapy was used in this study as the effect of the intracanal use of cold saline with a temperature of 2.5°C was found to produce more than 10°C reduction in the temperature of external root surface. Cold application (cryotherapy) gives three basic physiologic tissue responses: decrease in metabolic activity, blood flow and inhibition in neural receptors in the skin and subcutaneous tissues; hence it lowers inflammation, pain, edema and recovery time in the short term application. In the present study intracanal cryotherapy produced a statistically significant reduction in postoperative pain for patients with irreversible pulpits and apical periodontitis compared to the use of normal saline after 24 and 48 hours postoperatively. This can be described by the effect of cold saline in lowering the edema and inflammation; it worked as a local anti-inflammatory in the apical area. The intracanal cryotherapy did not give a significant difference in postoperative pain reduction compared to normal saline in cases with irreversible pulps without apical periodontitis. In these cases the inflammation was limited to the root canal and did not extend to apical tissues, since the inflamed pulp tissues were already extirpated, so the source of inflammation was removed in both control and study groups. This could explain why the cold saline did not produce a alteration than normal saline in lowering inflammation or edema. In contrast Keskin et al. and Al Nahlawi et al. found that using intracanal cryotherapy had a significant effect in the reduction of postoperative pain in patients with irreversible pulpitis treated in a single visit when equated with room temperature saline. But they did not separate cases according to their apical conditions; they included
all cases with and without apical periodontitis together. There were few limitations in our study like we only selected the anterior teeth and the sample size was restricted. We suggest further studies with different teeth and larger samples.

V. CONCLUSION

We can conclude that using cold normal saline has an effect on reduction of postoperative pain degree in patients with irreversible pulpitis with apical periodontitis. But it does not affect patients with irreversible pulpitis without apical periodontitis.

REFERENCES