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Efficacy of Cold Saline Solution as Final Irrigant for Reduction of Post-Operative Pain

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ABSTRACT

Background: Cold saline is found to reduce pain and dependence on Non-steroidal anti-inflammatory drugs, from studies conducted earlier in this field of cryotherapy. With a very few studies conducted earlier, a lot of research needs to be done in this field to establish the importance and effectiveness of cryotherapy in reducing postoperative pain in clinical endodontic practice.

Materials & Method: The patients were divided in two groups: Group A (n=30): Patient who received final irrigation with saline at room temperature. Group B (n=30): Patient who received final irrigation with saline at 2.5 degree Celsius. Chi-square test was used to compare, the incidence of postoperative pain.

Result: The result showed that there is less number of patients with severe and moderate pain in group A patients that received the cryotherapy. In group A there were no patients with intense or severe pain.

Conclusion: Numerous research studies should be conducted in the near future to investigate the possible benefits of this technique in the treatment of other pulpal and periradicular diseases. In addition, the investigation of inflammatory markers amongst patients subjected to intracanal cryotherapy might shed a further light on the action mechanism and the potential use of cryotherapy in endodontics.

Keywords: Cold Saline, Post-operative pain, Endo therapy, pulpal necrosis, apical periodontitis.

INTRODUCTION

The management of postoperative pain is of utmost importance in an endodontic practice. Hargreaves and Hutter told that this condition can be foretold in teeth with preoperative pain, pulp necrosis, and symptomatic apical Periodontitis.[1] Success of endodontic treatment relies on the elimination of microorganisms from the infected root canal system by adequate chemo mechanical debridement.[2]

The most common factor cause the post-endodontic is remnants of microorganisms. Endodontic irrigation, gutta percha, endodontic sealer, and intra = canal medication are all factors that can cause irritation and post endodontic pain. There is no difference between single-visit and multiple-visit RCT on post-endodontic pain.[3] This pain may be due to an acute inflammatory response in the peri-radicular tissues. Pain is a poor indicator of pathology and is considered an unreliable predictor for long term success of treatment. Hence, the integral part of endodontic treatment must include prevention and management of this post endodontic pain.[4]

Cryotherapy is a common technique used in abdominal, hernia, gynecological and orthopaedic operation; its mechanism of action is by affecting the nerve conduction capacity. The cold application on the skin stimulates the thermo receptors (temperature sensitive receptors), and the stimulation of these receptors can block nociception within the spiral cord spiral cord.[5] Physiologic and

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clinical evidence suggests that applying cold through various methods may decrease the conduction velocity of nerve signals, hemorrhage, edema, and local inflammation and is therefore effective in the reduction of musculoskeletal pain, muscular spasm, and connective tissue distension.[6]

In dentistry, cold application has been frequently employed for postoperative pain control following intraoral surgical procedures. 38 In recent years, few studies have attempted and reported the intracanal use of cryotherapy in endodontics to reduce post endodontic pain. Vera.,et al. (2015)[7] reported in an in vitro study that, cold saline solution (2.5°C) when used as a final irrigant for 5 mins, resulted in external root surface temperature reduction by more than 10°C and maintained for 4 mins. This may be enough to produce a local anti-inflammatory effect in periradicular tissues.

Cold saline is found to reduce pain and dependence on Non-steroidal anti-inflammatory drugs, from studies conducted earlier in this field of cryotherapy.[1] With a very few studies conducted earlier, a lot of research needs to be done in this field to establish the importance and effectiveness of cryotherapy in reducing postoperative pain in clinical endodontic practice.

MATERIAL & METHODS

The present study was performed in the thirty patients diagnosed with pulp necrosis and symptomatic apical Periodontitis. The present study was done in the department of the conservative and endodontics, in the dental college. The ethical committee of the institute was informed about the study and the ethical clearance certificate was obtained from them, prior to the start of study.

Following criteria were included in the study; patient having pulpal necrosis patients pain, diagnosed with symptomatic apical Periodontitis. The presence of periapical abscess was excluded from the study. Presence of any systemic condition such as cold allergy, pregnancy, periapical abscess and difficult root structure were excluded from the study.

History of the patient, visual analog scale, percussion test and cold test, intra and extra oral examination were the prerequisites required. In the first appointment, the patient was asked to fill a questionnaire regarding the level of preoperative pain experienced by the patient. Access opening was done using access opening burs followed by extirpation of pulpal tissue and cleaning and shaping was done using protaper rotary system. During cleaning and shaping, irrigation was done using common irrigants namely Sodium hypochorite and Edta 17%.

After the completion of cleaning and shaping, the final irrigation was done by 20 ml of 2.5 degree celsius cold saline for 5 minutes for the experimental group and similar irrigation protocol was followed for control group but saline at room temperature was used for irrigation. Temporary restoration was placed and the cavity was sealed. The patient was asked to fill a form to rate pain experienced during the procedure.

Patient was asked to take analgesics only on requirement basis. Patient was asked to submit this questionnaire at 2nd appointment. Obturation was performed at the second appointment. The patients were divided in two groups: Group A (n=30): Patient who received final irrigation with saline at room temperature. Group B (n=30): Patient who received final irrigation with saline at 2.5 degree Celsius.

Statistical analysis: Chi-square test was used to compare, the incidence of postoperative pain. Mann-Whitney test used for Comparison of number of analgesics between two groups and differences in postoperative pain intensity (at 6 and 24 hours).

RESULTS

The aim of the present study is to establish the importance and effectiveness of cryotherapy in reducing postoperative pain in clinical endodontic practice. There are two groups present in the study. Each of the groups contains 30 patients that satisfied the inclusion criteria. : Group A (n=3-0): Patient who received final irrigation with saline at room temperature. Group B (n=30): Patient who received final irrigation with saline at 2.5 degree Celsius. The result was recorded in the tabulated form. The statistical analysis was done at the end of the study.

The patients were divided on the basis of mild, moderate and severe type of pain. In group A there were 22 patients who had mild pain and there were

16 patients in group B having mild pain. For moderate pain assessment, there were 8 patients in group A and there were 12 patients in group B. For the assessment of severe pain, there were no patients in group A and there were 2 patients in group B patients. The result showed that there is less number of patients with severe and moderate pain in group A patients. (Table 1)

Table 1: Number of patients experiencing different severity of pain.

Pain Severity	Group A	Group B	Total
Severe	0	2	2
Moderate	8	12	20
Mild	22	16	38

DISCUSSION

In dentistry, cryotherapy has been used after intraoral surgical procedures, such as extractions, periodontal surgery, and implant placement, and it was found to be effective in reducing swelling and pain.[8] In endodontics, George et al28 have found in an in vitro study that the deep dry cryotherapy of NiTi endodontic files can improve its cyclic fatigue resistance, reducing the potential of file separation. It is important to achieve the reduction in postoperative pain after endodontic treatment as it is considered one of the primary problems in the treatment.[9]

Cryotherapy causes vasoconstriction with an antiedema effect. It reduces number of leukocytes migrating to the affected tissues thus reducing endothelial dysfunction and the inflammatory response. It also diminishes the speed of painful nerve impulses.[10] Key receptors to environmental cold include the TRP subfamily ionic channel M, member 8, and TRP cationic channel subfamily A, member 1, plays a role in inducing hyperalgesia. Cold saline Irrigation induces a local anesthetic effect by lowering the activation threshold of these tissue nociceptors and the conduction velocity of pain signals.[11]

Two earlier studies by Keskin C et al. and Al Nahlawi et al. have used intracanal cryotherapy to evaluate its effect on postoperative pain. Both studies showed significant lower postoperative pain levels when cryotherapy was applied and compared with control groups.[12] The use of cooled saline also decreases the outer root surface temperature bya little more than 10 degree C when maintained for a period of 4 minutes. Theoretically speaking this drop in temperature is sufficient to create a local antiinflammatory effect in the underlying tissues.

CONCLUSION

Hence, in light of these observations, intracanal cryotherapy can be considered as a simple, cost-effective, and non-toxic therapeutic treatment option for postoperative pain control in single visit RCT cases. However, numerous research studies should be conducted in the near future to investigate the possible benefits of this technique in the treatment of other pulpal and periradicular diseases. In addition, the investigation of inflammatory markers amongst patients subjected to intracanal cryotherapy might shed a further light on the action mechanism and the potential use of cryotherapy in endodontics.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

REFERENCES

[1] Jaiswal S, Vagarali H, Pujar M, Kapshe N: Effect of cold saline irrigation on postoperative pain–A randomized control trial.

[2] AlRahabi MK: Predictors, prevention, and management of postoperative pain associated with nonsurgical root canal treatment: A systematic review. Journal of Taibah University Medical Sciences 2017, 12:376.

[3] Tarale K: Post-operative pain analysis between single visit and two visit root canal treatments using visual analogue Scale: an in vivo study. J Dent Allied Sci 2013, 2:8-15.

[4] Patel B: Endodontic diagnosis, pathology and treatment planning. Classification of pulp and perio-apical disease Switzerland: Springer International Publishing 2015.

[5] Bazaid DS, Kenawi L: The effect of intracanal cryotherapy in reducing postoperative pain in

patients with irreversible pulpitis: a randomized control trial. Int J Health Sci 2018, 8:83-8.

[6] Navrazhina K, Giordano CN, Minkis K: Prevention and Treatment of Perioperative Pain and Anxiety. Evidence-Based Procedural Dermatology: Springer, 2019. pp. 1157-81.

[7] Vera J, Ochoa-Rivera J, Vazquez-Carcaño M, Romero M, Arias A, Sleiman P: Effect of intracanal cryotherapy on reducing root surface temperature. Journal of endodontics 2015, 41:1884-7.

[8] Mehra P, Jeong D: Maxillary sinusitis of odontogenic origin. Current allergy and asthma reports 2009, 9:238-43.

[9] Al-Abdullah A, Abdullah A, Al-Marrawi K: Comparative study to investigate the effect of cryotherapy on post-operative pain using two different preparation techniques (In vivo study).

[10] Chauhan K, Bhushan J: Efficacy of Intracanal Cryotherapy in Reducing Post Operative Pain in Patients with Symptomatic Apical Periodontitis: An In-Vivo Study. Journal of Advanced Medical and Dental Sciences Research 2020, 8:6-11.

[11] Premkumar LS: Transient receptor potential channels as targets for phytochemicals. ACS chemical neuroscience 2014, 5:1117-30.

[12] Alharthi AA, Aljoudi MH, Almaliki MN, Almalki MA, Sunbul MA: Effect of intra-canal cryotherapy on post-endodontic pain in single-visit RCT: A randomized controlled trial. The Saudi dental journal 2019, 31:330-5.