

Original Research

Assessment of the effect of preoperative intraoral cryotherapy application on the success rate of inferior alveolar nerve blocks in patients with symptomatic irreversible pulpitis

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ABSTRACT:

Background: In the endodontic, one of the most damaging and frightening experience is precipitation of pain, during or after the treatment for both patient and clinician. The present study was conducted to assess the effect of preoperative intraoral cryotherapy application on the success rate of inferior alveolar nerve blocks in patients with symptomatic irreversible pulpitis. **Materials & Methods:** 120 patients age ranged 20-50 years with diagnosis of symptomatic irreversible pulpitis of mandibular molars in both genders were randomly divided into 2 groups of 60 each. Group I comprised of control group and group II received cryotherapy. Before the treatment, all the patients rated their pain on a 170-mm Heft-Parker VAS. **Results:** There were 35 males and 25 female sin group I and 28 males and 32 females in group II. 36 was involved in 24 cases, 37 in 10, 46 in 18 and 47 in 8 cases in group I and 36 in 21, 37 in 13, 46 in 19 and 47 in 7 cases in group II. The difference was significant ($P < 0.05$). The mean VAS in group I patients was 110.2 and in group II patients was 109.3. The difference was non- significant ($P > 0.05$). **Conclusion:** Intraoral cryotherapy application increased the success rate of inferior alveolar nerve block in mandibular molar teeth with symptomatic irreversible pulpitis.

Key words: Cryotherapy, mandibular molar, VAS

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INTRODUCTION

In the endodontic, one of the most damaging and frightening experience is precipitation of pain, during or after the treatment for both patient and clinician. The condition turns more complex, when initially there was no pain.¹ Even in the conditions where pain was present, post treatment aggravation could arise. In any of these situations, pain could be precipitated due to a multitude of involved factors. Some of the common factors are the passage of irritants microorganisms, toxins etc into the periapical area or conduction of pressure.²

An inferior alveolar nerve block (IANB) is the uniform injection technique used for achieving regional anesthesia for teeth. It is observed that in patients with symptomatic irreversible pulpitis (SIP),

an IANB does not always result in successful pulpal anesthesia. The fact that patients often feel pain during endodontic treatment of teeth with SIP is a challenge for the clinician and the patient.³ Successful anesthesia is only obtained if no or minimal pain is reported by the patient during access cavity preparation and canal shaping. Numerous different techniques have been validated to improve the success rate of IANBs in mandibular molars with SIP. These include different techniques for the IANB, different anesthetic solutions, supplemental infiltration techniques, acupuncture, and premedication before the IANB is performed. However, the success rate of IANBs in mandibular molars with SIP ranges from 15%–57% only.⁴

Cryotherapy is a long-standing technique that has frequently been applied in medicine for pain management and postoperative care.⁵ Cryotherapy means cold therapy, which was widely used by Greeks. It is based on the principle of extracting heat from the applied area rather than implementing cold. In this process, the incidence of pain is either prevented or diminished.⁶ The present study was conducted to assess the effect of preoperative intraoral cryotherapy application on the success rate of inferior alveolar nerve blocks (IANBs) in patients with symptomatic irreversible pulpitis (SIP).

The diagnosis of SIP was made according to clinical and radiographic findings. Pulp sensitivity was confirmed by a positive response to electric pulp testing and a prolonged response to cold testing. All patients were randomly divided into 2 groups of 60 each. Group I comprised of control group and group II received cryotherapy. Before the treatment, all the patients rated their pain on a 170-mm Heft-Parker VAS. The scale was divided into 4 categories: 0- no pain, 1–54 mm- mild pain, 55–114 mm- moderate pain, and >114 mm- severe pain. Group I patients received an IANB injection with 2% lidocaine. In group II, intraoral cryotherapy application was performed for 5 minutes after the IANB. Endodontic therapy was then conducted 15 minutes after the IANB injection. If the patients reported moderate or severe pain during the procedure, the IANB was defined as “unsuccessful,” and a supplementary injection was administered. Results thus obtained were statistically analyzed with chi- square test, where p value less than 0.05 was considered significant.

MATERIALS & METHODS

The present study comprised of 120 patients age ranged 20-50 years with diagnosis of symptomatic irreversible pulpitis of mandibular molars in both genders. All were included in the study after explaining them the purpose of the study and obtaining their written consent.

RESULTS

Table I Distribution of patients

Groups	Group I	Group II
Status	Control	Cryotherapy
M:F	35:25	28:32

Table I shows that there were 35 males and 25 female sin group I and 28 males and 32 females in group II.

Table II Comparison of parameters in both groups

Parameters	Group I	Group II	P value
Tooth 36	24	21	0.05
37	10	13	
46	18	19	
47	8	7	
Successful anesthesia	20	32	0.02

Table II, graph I shows that 36 was involved in 24 cases, 37 in 10, 46 in 18 and 47 in 8 cases in group I and 36 in 21, 37 in 13, 46 in 19 and 47 in 7 cases in group II. The difference was significant (P< 0.05).

Graph I Comparison of parameters in both groups

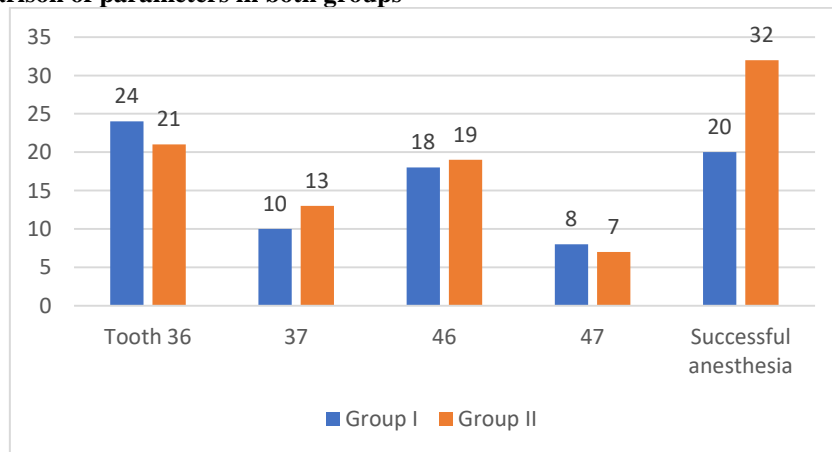
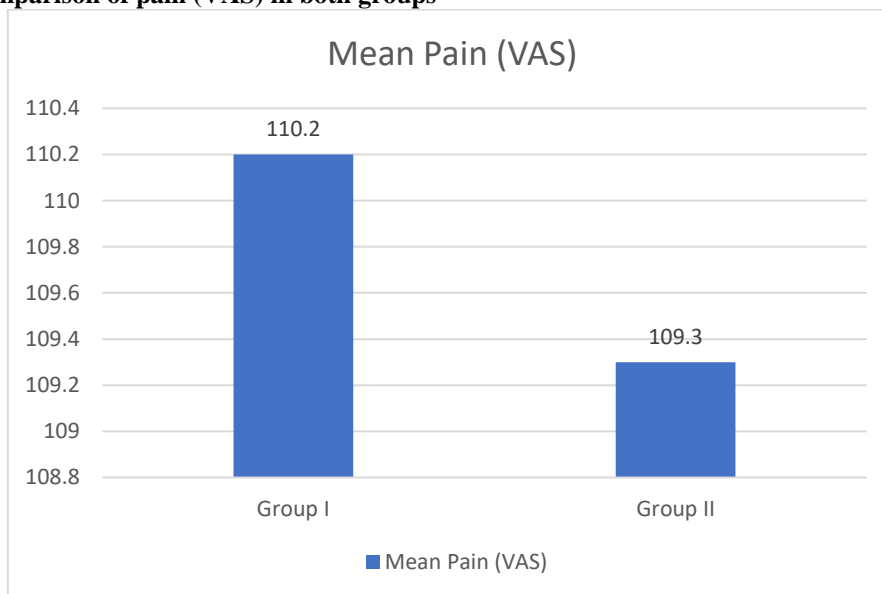


Table III Comparison of pain (VAS) in both groups

Groups	Mean Pain (VAS)	P value
Group I	110.2	0.94
Group II	109.3	

Table III, graph II shows that mean VAS in group I patients was 110.2 and in group II patients was 109.3. The difference was non- significant ($P > 0.05$).

Graph II Comparison of pain (VAS) in both groups



DISCUSSION

The objective of endodontic therapy is to eliminate micro-organisms from the infected root canal system by an adequate chemo- mechanical debridement followed by obturation. This produces a seal, thereby provide a favourable environment for peri-radicular healing.⁷ Even by following standardized aseptic procedures in a root canal therapy, some patients experience pain during or after the treatment. Pain management is the important phase of treatment.⁸ The incidence of post- operative pain was reported to range from 3-58%. One of the primary reasons for initiating endodontic treatment is to rid the patient of the excruciating pain, present pre-operatively.⁹ In order to control this pain as well as the potential pain precipitated as a result of endodontic treatment, various strategies have been devised and suggested. One of the latest additions to these is the use of cryotherapy. The use of cryotherapy during endodontic treatment is gradually becoming pervasive.¹⁰ This study was planned and carried out so as to test the effectiveness of cryotherapy, in reducing post-operative pain after biomechanical preparation, in symptomatic irreversible pulpitis with normal periapical tissue and asymptomatic / symptomatic apical periodontitis.¹¹ The present study was conducted to assess the effect of preoperative intraoral cryotherapy application on the success rate of inferior alveolar nerve blocks

(IANBs) in patients with symptomatic irreversible pulpitis (SIP).

In present study, there were 35 males and 25 female sin group I and 28 males and 32 females in group II. Group I was control group and group II was cryotherapy group. Topcoglu et al¹² conducted a study on 104 patients with SIP which were randomly distributed into 2 groups ie. control and cryotherapy groups. In the control group, patients received an IANB injection with 2% lidocaine. In the cryotherapy group, intraoral cryotherapy application was performed for 5 minutes after the IANB. Endodontic therapy was then conducted 15 minutes after the IANB injection. All patients reported profound lip numbness. The overall success rate for the IANBs was 43.3%. In the cryotherapy group, the success rate of the IANBs was 55.8%, whereas in the control group it was 30.8% ($P < .05$).

We observed that tooth number 36 was involved in 24 cases, 37 in 10, 46 in 18 and 47 in 8 cases in group I and 36 in 21, 37 in 13, 46 in 19 and 47 in 7 cases in group II. Jain et al¹³ evaluated the role of cryotherapy in reducing post-operative pain after biomechanical preparation in symptomatic irreversible pulpitis with normal periodicals tissue, asymptomatic or symptomatic apical periodontitis. 60 patients underwent endodontic treatment in mandibular first molar. Mesial canals were prepared till No 30 K file and distal canals till No 35 K file, using step back technique. Final irrigation was carried out with either

2.5°C cold saline or saline at room temperature. Patients were given a questionnaire to record their post-operative pain at 6, 24 & 48 hours. In all the subgroups, there was a reduction in post-operative pain at 6 hours, 24 hours and 48 hours in the cryotherapy group, compared to control group. Intracanal cryotherapy is effective in reducing post-operative pain in patient with irreversible pulpitis with apical periodontitis.

We found that mean VAS in group I patients was 110.2 and in group II patients was 109.3. Yadav et al¹⁴ evaluated the effect of various Cryotherapy applications on post-operative pain in teeth with Chronic Irreversible Pulpitis on 40 patients which were randomly divided into four groups depending upon the type of Cryotherapy; Control group – No Cryotherapy application; Intracanal Cryotherapy application with 20 ml saline as final irrigant at 4 degree C; Intraoral Cryotherapy application with ice packs placed on vestibular region of treated tooth; Extra oral Cryotherapy application with icepacks placed extraorally on cheek surface. The postoperative pain of the patients was recorded at the first, third, fifth, and seventh days. All Cryotherapy groups exhibited less percussion pain and less postoperative pain.

Cryotherapy is one of the latest modalities. The response to this treatment could be variable in different pre-existing periapical conditions.¹⁵ Cryotherapy aids in reducing pain by decreasing the blood flow in the periapical region along with metabolic activity. It also inhibits the neural receptor in the periapical region. The number of inflammatory cells is diminished in the periapical area, since cryotherapy reduces the adhesion of these cells to the walls of the capillaries.¹⁶ It decreases the release and activity of bradykinin, the pain causing agent. Cryotherapy has been found to be of help in reducing pain along with inflammation and hastening healing. Not just for endodontic treatment, but cryotherapy has been suggested and used in various other body parts.¹⁷

CONCLUSION

Authors found that intraoral cryotherapy application increased the success rate of inferior alveolar nerve block in mandibular molar teeth with symptomatic irreversible pulpitis.

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