

EFFICACY OF GREATER AURICULAR NERVE BLOCK IN ELIMINATING PAIN DURING MANDIBULAR THIRD MOLAR EXTRACTION

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ABSTRACT

Pain during mandibular third molar tooth surgery following conventional inferior alveolar nerve block (IANB) is quite common because of sub-optimal analgesia. A double-blind randomized controlled trial was done to evaluate the efficacy of extraoral greater auricular nerve block (GANB) as preemptive analgesia in patient undergoing surgical extraction of mandibular third molar class 2, 3 position B and C. This Study was conducted in minor oral surgical department at Armed Forces Institute of Dentistry from 6th Aug, 2012 to, 5th Feb 2014. A total of sixty patients were divided into two equal groups. Group A received conventional IANB along with GANB while group B was administered IANB only. In group A, 23(76.7 %) patients experienced no pain while only 7(23.3 %) patients experienced mild pain. While in group B, 6(20.0%) patients experienced no pain, 22(73.3%) experienced mild pain, 2(6.7 %) patients experienced moderate pain. The difference was statistically significant (p -value 0.0001). Based on this study it was concluded that perioperative pain can be eliminated by preemptive GANB analgesia in deep seated mandibular third molar extractions.

Key Words: Perioperative pain, Greater auricular nerve block, mandibular third molar.

INTRODUCTION

Pain control has become an integral part of the dentist's professional responsibilities. The physiological and humanitarian ramifications of inadequate pain relief can be catastrophic. Depending upon the type of surgical procedure, pain can occur preoperatively and/or postoperatively. Managing perioperative pain is still a major challenge irrespective of technical, pharmacological and surgical advances.^{1,2}

Patients undergoing surgical extraction of deep seated mandibular third molar often experience significant amount of mild to moderate pain even after adequate conventional inferior alveolar nerve block (IANB).^{3,4,5} Various techniques are being used to minimize perioperative pain but none proved to be completely effective. The role of GANB as preemptive analgesia has not been much studied in dentistry. This is one of the two cited studies in which GANB was used as preemptive analgesia to optimize perioperative analgesia.

METHODOLOGY

This double-blind randomized control was conduct-

ed in department of Oral and Maxillofacial Surgery, Armed Forces Institute of Dentistry (AFID) Rawalpindi from 6th August, 2012 to, 5th February 2014. Ethical committee of AFID for dental research approved the trial. Inclusion criteria consisted of: Patient with no medical illness, mandibular tooth impaction class 2, 3 and depth B, C, either gender, more than 18 years of age and no history of allergy to local anesthesia. A total of 60 patients were divided in two equal groups containing 30 patients each. Patients requiring 3rd molar extraction who fulfilled inclusion criteria were selected and briefed about purpose of study, risks and benefits of technique being used and informed written consent was taken. The patients were divided into two equal groups having 30 patients each by lottery method, dental and systemic history was taken and confounding variables like age of the patients, duration of surgery and type of impaction were also assessed.

Conventional IANB was performed by depositing anesthetic agent of 2ml of 2% lignocaine hydrochloride (Septodont France) and epinephrine 1:100,000 using 27-gauge disposable needle in pterygomandibular space while retrieving needle lingual nerve block, and after withdrawing needle long buccal nerve blocks were also performed in both groups. GANB was administered only in Group A at Erb's point (i.e. point where greater auricular nerve exits behind the posterior border of sternocleidomastoid muscle) using 2ml of 2% lignocaine with 1; 100,000 epinephrine subcutaneously at this point with gentle massage after injection. Other Group

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(i.e. Group B) not receiving GANB acted as a control group. Success of both conventional nerve block (i.e inferior alveolar nerve block, lingual nerve block and long buccal nerve block) and GANB anesthesia in Group A and Group B were checked three minutes after the commencement of injections by patients self-reporting loss of sensations of respective lip, half side of tongue and skin over angle of mandible (GANB). The patients were subjected to similar type of surgery and surgical procedure was carried out in conventional manner including flap elevation, bone removal, tooth sectioning (if needed), tooth retrieval out of socket and finally wound closure with stitches. Efficacy of GANB anesthesia was

TABLE 1: GENDER OF THE PATIENTS PARTICIPATING IN THE STUDY

Gender	Group A (n=30)	Group B (n=30)	Total (n=30)
Male	19(63.3%)	20 (66.7%)	39 (65%)
Female	11 (36.7%)	10 (33.3%)	21 (35%)

TABLE 2: DURATION OF SURGERY

	N	Mini- mum	Maxi- mum	Mean	Std. Devi- ation	P- value
Group A	30	35	45	42.60	2.444	0.080
Group B	30	35	45	43.10	2.440	

TABLE 3: TYPES OF THIRD MOLAR IMPACTIONS

	N	Mesioan- gular	Hori- zontal	Distoan- gular
Group A	30	25(83.3%)	4(13.3%)	1(3.4%)
Group B	30	24(80%)	5(16.6%)	1(3.4%)

TABLE 4: CHI-SQUARE TEST

	Value	Df	Asymp. sig. (2-sided)
Pearson chi-square	6.000 ^a	4	.0199
N of valid cases	3		

TABLE 5: PAIN EVALUATION

	No Pain	Mild pain	Moderate pain	Severe pain	Total	P-value
Group A	23(76.7 %)	7(23.3 %)	—	—	30	0.0001
Group B	6(20 %)	22(73.3 %)	2 (6.7 %)	—	30	
Total	29	29	2	0	60	

assessed in patients of Group A as compare to Group B by patients self-reporting subjective pain sensation at surgical site at any point of time during surgical procedure till closure of the flap with stitches. Patients were demonstrated how to rate their pain on visual analogue scale (VAS) and were asked to rate their pain on VAS chart and measurements were recorded.

Data was analyzed using SPSS version 20. Descriptive statistics were used to describe the data. Mean and Standard deviation were calculated for numerical variable i.e age, duration of surgery. Frequencies and percentages were presented for gender, type of impaction and pain. Chi square test was used to compare efficacy in group A and B patients and student T-test was used to compare means of both groups. P- value of <0.05 was considered as statistically significant.

RESULTS

Study comprised of 60 patients and were divided into two equal groups of 30 patients each. None of the patients were excluded or dropped out from the study. Out of total 60 patients, 39 (65%) were males and 21 (35%) were females. (Table 1)

Mean age of the patients was 24 years with standard deviation ± 4.773 , whereas age range was 17 to 39 years. Mean age of the patients in group A was 23 years with SD ± 4.297 whereas mean age of the patients in Group B was 25 years with SD ± 5.054 . Means of duration of surgery in both groups were compared with student's T-test and was found to be insignificant p-value 0.08. (Table 2) Types of mandibular third molar impactions in both group were also equally distributed. (Table 3)

The subjects recorded their perceived pain on VAS as zero no pain, mild (1-3), moderate (4-7), severe pain (8-10). In group A, 23(76.7%) patients experienced no pain while only 7(23.3%) patients experienced mild pain. while in group B, 6(20.0%) patients experienced no pain, 22(73.3%) experienced mild pain, 2(6.7%) patients experienced moderate pain. The difference was statistically significant (p-value 0.0001). (Table 5)

DISCUSSION

Mandibular third molar has been extensively used in clinical trials for evaluation of efficacy of analgesics as well as different local anesthetics. The reason for using third molar as a pain model is the frequent production

of pain mediators due to surgical assault.⁶ Moreover, this is considered a clean model since, by nature of the condition, participating subjects are relatively young and without other significant diseases that might be confounding factors in assessing analgesia. It is the most reproducible model for evaluating efficacy of different anesthesia techniques and drugs.⁷ It has been observed that mandibular anesthesia attempted by depositing the solution in the vicinity of mandibular nerve and other sites using intraoral landmarks leaves much to be desired.⁸

Deep seated mandibular third molar extraction are usually attempted under general anesthesia due to intensity of surgical assault.⁹ We experienced that during surgical extraction of these teeth under local anesthesia, patient feels mild to moderate pain especially while lateral retraction of flap and grinding of bone around angle of the mandible. The initial pain is due to the release of various mediators into the local environment like, 5-HT and bradykinin.¹⁰ These mediators make local tissue pain receptors hyper responsive. That's why perioperative augmentation of analgesia sometime may not completely relieve the pain and procedure have to be aborted. However, this painful situation during local anesthesia can be tackled by anesthetizing required intra oral and extraoral regional nerves prior to surgery.¹¹

Concept of preemptive analgesia is not new in dentistry, various drugs like analgesics, steroids and anti-anxiety drugs have been under clinical trial.¹² Cutaneous supply of angle of mandible is supplied by greater auricular nerve which synapses with neighboring nerve fibers like facial nerve and branches of mandibular nerve.¹³ GAN unfortunately was rarely anesthetized during surgical procedure at angle of the mandible. Role of GANB through extraoral approach in third molar surgery has not been tried before. Introduction of GANB is quite new in mandibular third molar surgery and there is only one such study in literature in which intraoral infiltration was used in mandibular third molar surgery.⁴ However, it has routinely been used as preemptive analgesia in patient undergoing parotidectomy, tympanomastoid surgery, craniotomy and otoplasty. The clinical significance of this nerve is apparent in some patients of facial pain and parotid surgery where separate infiltration is required to achieve total analgesia of the region.^{14,15}

Liaquat et al⁴ did their study on 40 patients requiring surgical removal of mandibular third molars using IANB in all patients and GANB on only those patients who experienced perioperative pain. They concluded that 26(65%) patients out of 40 experienced perioperative pain while 14(35%) patients were pain free. GANB relieved pain in 21(80.8%) patients out of 26(65%)

while only 5(19.2%) patients remained symptomatic. The overall success rate was significantly higher for the patient received IANB and GANB (80.8%) than for patients received IANB injections only (35%).⁴

Results of our study are consistent with those reported by Liaquat et al⁴ with GANB being more effective than IANB alone in achieving successful perioperative anesthesia in difficult mandibular third extractions. Patients in group A which received IANB and GANB 23(76.7%) patients out of 30 experienced no pain perioperatively while only 7(23.3%) experienced mild pain. Our results are consistent with previous study. During this study we also noted that female experienced more pain as compared to male due to the fact that naturally they have shorter size mandible and associated tissues. It can be concluded from this trial that GANB is effective in eliminating perioperative pain during surgical extraction of mandibular third molar teeth.

We present a safer, more efficient and more effective technique utilizing a combination of intraoral IANB and extraoral GANB. This combination provides a pain-free procedure while avoiding the risks of intravenous sedation or general anesthesia. It is a more cost effective and a less demanding procedure than general anesthesia.

There were few limitations in this study. As timing of surgical procedure, experience of surgeon and type of local anesthesia solution being used can greatly affect the results. Moreover extraoral block is a painful procedure and can cause needle tract infections.¹⁶ It also warrants thorough counselling before attempting extraoral nerve block.

Keeping in view it is recommended that study should be conducted on larger sample of population and whether intraoral infiltration or extraoral nerve block be used, should be studied separately.

Based on this study, it was concluded that introduction of GANB as preemptive analgesia in difficult mandibular third molar extractions greatly improves the perioperative comfort and confidence level of clinician and patient. Moreover, postoperative morbidity can greatly be reduced by employing simple and cost effective LA technique. It also obviates the need for sedation and general anesthesia which is only available at hospital settings.

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CONTRIBUTION BY AUTHORS

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|--------------------------|---|
| 1 Khalid Mahmood: | Conducted clinical trial, collected data, article write up. |
| 2 Waseem Ahmad: | Conceived the idea, assisted in clinical trial and biostatistics. |
| 3 Nazeer Khan: | Supervised the study, discussion writing. |

CORRIGENDUM

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- 1 Page 462, Table 1 heading should be read as Gender (not genger) (Typographical error)
- 2 Page 464, first paragraph ninth line reference number 4 & 7 are not written as sub text.
- 3 Page 464, third paragraph fourth line the reference number 18 is not written as sub text.