

Adjunctive Role of GANI in Reducing Pain During Third Molar Removal

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ABSTRACT

Background: Mandibular third molar extraction is one of the most common oral surgical procedures, yet achieving complete anesthesia remains challenging due to anatomical variations and accessory innervation. Conventional inferior alveolar nerve block (IANB) has a reported failure rate of 15–20%, often resulting in intraoperative discomfort and the need for supplemental injections.

Objective: This study aimed to evaluate the adjunctive role of Greater Auricular Nerve Infiltration (GANI) in reducing intraoperative pain during third molar surgery.

Methods: A quasi-experimental study was conducted at Mayo Hospital, Lahore, between June 2023 and May 2024. A total of 104 patients were enrolled and randomly allocated into two groups: Group A received IANB supplemented with GANI, while Group B received IANB alone. Pain intensity was assessed intraoperatively using the Visual Analogue Scale (VAS).

Results: Group A showed a significant reduction in mean VAS scores (1.9 ± 0.8) compared to Group B (4.8 ± 1.1) ($p < 0.001$). Moreover, 71.2% of patients in Group A reported complete absence of pain versus only 13.5% in Group B. No significant difference was observed in operative time between the two groups.

Conclusion: Targeting accessory innervation through GANI substantially improves perioperative analgesia and enhances patient comfort without prolonging surgery. Incorporating GANI as a supportive anesthetic technique may represent a practical and effective advancement in oral surgical anesthesia protocols.

Keywords: Greater auricular nerve, inferior alveolar nerve block, mandibular third molar, pain control, anesthesia.

INTRODUCTION

The most common type of oral surgery procedures permeate the world, with the prevalence of impaction being estimated to be between 20 to 30% within the general population.^{1,2} In spite of being a usual operation, this type of surgery is said to be accompanied by high-intraoperative pain and post-operative morbidity, with this phenomenon affiliated to a high degree with variations in anesthetic responsiveness and action related to the intricate nature of mandible innervation.³ Deep anesthesia is therefore a significant variable that predetermines the outcome of a surgery and patient satisfaction. Historically, inferior alveolar nerve block (IANB) can be described as a techniqueology which turned out to be a direct-backbone of anesthesia practice when performing surgery on the mandibular deformity on the third molar. However, when the failure of which has been documented as 15 to 20 percent because of variation in anatomy and accessory innervation coupled with technique limitation, it indicates that adjunctive measures are needed to enhance the analgesic effect.

The incidence habit of patients experiencing pain throughout surgery on third molar not only affects patient comfort but it also exudes the performance of the surgery, which results to longer duration of operation, stress assumption, and in few instances, there is need to use extra pathetic injections. It has been argued that accessory sensory innervation especially that of the mylohyoid, buccal, auriculotemporal, and greater auricular nerve might cause incomplete anesthesia after traditional IANB. Although additional blocks addressing the buccal nerve and lingual nerve have been thoroughly conducted, they are even less effective, and patients frequently complain of breakthrough pain.^{4,5} These constraints demonstrate the need to consider alternative or supplementary methods that go beyond the main mandibular nerve distribution.^{6,7}

The parotid region, angle of the mandible, and some sections of the ear are sensitized by a cervical plexus (C23; greater auricular

nerve), which serves the parotid region,⁸ and angle of the mandible region.⁹ Its course anatomy and sensory distribution congruence with that of the mandibular territory imply that it can be involved in providing accessory innervation in case of third molar surgery.¹⁰ Greater auricular nerve infiltration (GANI) is used with success in otolaryngology and head-and-neck surgery and specifically in postoperative analgesia during parotidectomy and with the microsurgery of the ear.¹¹ Nonetheless, little effort has been on its use in dental anesthesia. The role of GANI in oral surgery is an innovative and pertinent research focus, because the use of GANI in dentistry supports the anatomical feasibility of the procedure and is supported by reverse engineering, given the close connection to related surgical specialties.

The measurement of pain in surgery is expressed most frequently in validated scale, i.e., the Visual Analogue Scale (VAS), which gives a strong indication of subjective pain severity.^{12,13} In the context of oral and maxillofacial surgery, efficient pain management during the third molar removal procedure is directly associated with decreased perioperative stress levels, enhanced cooperation, and patient satisfaction in general.^{14,15} Further, reportedly poor anesthesia during surgery is a potential risk factor in relation to the increase in postoperative pain, which stresses the significance of comprehensive approaches to analgesics during operations.^{16,17}

In addition to intraosseous anesthesia, akinosi or Gow-Gates nerve blocks, several adjunctive methods have been also suggested in order to improve the effectiveness of IANB.¹⁸ Although such methods have proved up to differing degrees effective, none of them fully help to resolve the problem of accessory innervation. GANI provides a theoretically more comprehensive range of anesthetics by acting upon the greater auricular nerve, with the potential to surmount a setback of mandibular blocks and narcotics used alone. Notably, its application does not require any specific devices or require a significant time extension to the work process of the operations, which will become a relevant add-on in everyday oral surgery facilities.

This gap was aimed to be filled in the current study through a systematic evaluation on the adjunctive effects of GANI as a way of intraoperative analgesia during the process of mandibular third molar removal. This is to the best, one of the first quasi-experimental studies of GANI in dental surgery, and we seek to establish whether or not there are better analgesic effects to IANB supplemented with GANI than there to IANB supplemented alone. We assumed that the combined IANB and GANI patients would report much lower intraoperative pain scales, reduced incidences

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of breakthrough pain, and better patient comfort against reduced efficacy of operation. The proposed research aims to enhance the arsenal of pain control interventions in the practice of oral and maxillofacial surgeons and add pieces to the objective evidence-based optimization of anesthetic techniques by analyzing this approach to anesthesia.

To conclude, poor anesthesia still remains the constant threat in a third molar surgery even with the enhanced anesthetic engines and anesthesia methods. This knowledge of GANI as an adjunctive measure is based on the reasons of anatomy and it is supported by the success of the intervention in other fields of surgery. In case it proves successful, the introduction of GANI into everyday practice would help to significantly improve how pain in the preoperative period is managed, decrease the incidence of anesthetic failure, and eventually improve the quality of provided care to patients undergoing one of the most prevalent oral surgical operations.

METHODOLOGY

The quasi-experimental study was performed at a Lahore hospital called Mayo that is based in Pakistan between June 2023 and May 2024, to evaluate adjunctive usefulness of Greater Auricular Nerve Infiltration (GANI) in increasing analgesic effects in a study on mandibular third molar surgery. One hundred and forty clients (104), who met the inclusion and exclusion criteria, were recruited using non-probability consecutive sampling and selected at random into two equal groups. Group A had been used to enable the study of conventional inferior alveolar nerve block (IANB) with GANI added, and Group B included the use of only IANB. The surgical extractions of the impacted third molars in the mandible were done in a uniform manner with just one surgical group serving as the standard to ensure that the procedure did not fluctuate. The peri-operative pain was measured with a Visual Analogue Scale (VAS) during the intra-operative period, with 0 implying no pain, and 10 the worst possible pain. Demographic variables, classification of impactions as well as operative time followed. analytics SPSS version 23. The normal distribution was tested using ShapiroWilk test. Mean VAS scores were compared using Independent samples t-test whereas the categorical pain outcomes across groups were compared using chi square test. A p-value of less than 0.05 was considered to have statistical significance.

RESULTS

A total of 104 patients were enrolled, with 52 participants in each study group. The mean age of the study population was 27.3 ± 6.1 years, with a nearly equal distribution of males (51.9%) and females (48.1%). The majority of patients (55%) presented with Class II impactions, followed by Class I (28%) and Class III (17%). The mean operative time was 22.1 ± 5.4 minutes, with no significant difference between groups (p = 0.327).

Pain assessment revealed a significant difference between the groups. In Group A (IANB + GANI), 72% of patients reported no pain during surgery compared to only 14% in Group B (IANB only) (p < 0.001). The mean VAS score was markedly lower in Group A (1.9 ± 0.8) compared to Group B (4.8 ± 1.1), demonstrating the adjunctive efficacy of GANI in improving peri-operative analgesia.

Table 1: Demographic and Clinical Characteristics of Study Population (n=104)

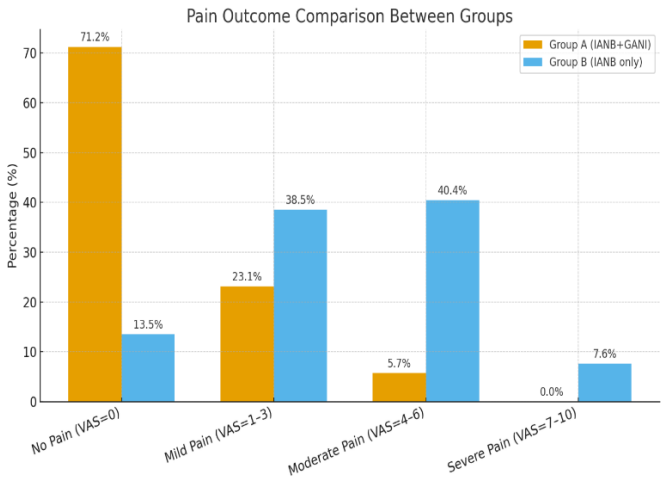
Variable	Group A (IANB+GANI) (n=52)	Group B (IANB only) (n=52)	p-value
Age (years), Mean ± SD	27.1 ± 6.0	27.5 ± 6.2	0.742
Gender (Male), n (%)	26 (50.0)	28 (53.8)	0.691
Impaction Type	Class I, n (%)	14 (26.9)	0.981
	Class II, n (%)	29 (55.8)	
	Class III, n (%)	9 (17.3)	
Operative Time (min), Mean ± SD	21.8 ± 5.3	22.4 ± 5.5	0.327

Table 2: Comparison of Pain Outcomes between Groups

Pain Outcome	Group A (IANB+GANI) (n=52)	Group B (IANB only) (n=52)	p-value
No Pain (VAS=0), n (%)	37 (71.2)	7 (13.5)	<0.001*
Mild Pain (VAS=1-3), n (%)	12 (23.1)	20 (38.5)	
Moderate Pain (VAS=4-6), n (%)	3 (5.7)	21 (40.4)	
Severe Pain (VAS=7-10), n (%)	0 (0.0)	4 (7.6)	
Mean VAS Score ± SD	1.9 ± 0.8	4.8 ± 1.1	<0.001*

*Statistically significant at p<0.05.

Figure 1



DISCUSSION

The selected quasi experimental study examined the adjuncting effect of Greater Auricular Nerve Infiltration (GANI) to enhance the analgesic properties during the third molar of the mandibular surgery literature. We infer that our findings could mean that the GANI allowed conventional inferior alveolar nerve block (IANB) supplementation to significantly reduce the degree of pain during the Operation with much more participants reporting experiencing no pain in full as opposed to those with IANB. The results are suggestive of future clinical utilization of accessing other sensory routes of innervation to optimize the management of pain during peri-surgery conditions in oral and maxillofacial surgery.

Third molar extraction is one of the most common and most common surgeries performed in the dental practice among others and one of the procedures that has much intraoperative pain that is mostly linked to the higher complexity in the innervation of the mandible region. The IANB exists but the standard anesthetic procedure does not exceed 1520 percent, and the difference that does exist may be in great part due to the anatomy and the presence of cutaneous nerve-innervation, but we are accustoming youth to the cause-and-effect factor of the situation. A previous study has already used other blocks such as oticular and lingual nerve blocks but in a holistic manner. The present study adds to this discussion literature by highlighting the usefulness of GANI, the tool which is actually concerned with the process of accessory electrical impact and extends the sphere of anesthesia.

The significantly reduced mean VAS score was observed and evaluated in the Group A compared to the one observed in Group B and is of clinical significance because effective management of pain deprives not only of patients gaining the ability to be far more comfortable but also of surgical practice in which involuntary movements and fear of their safety did not play the role during the practice. Besides this, the ultimate safety of GANI group, in contrast to experiencing the extreme pain, shows that the method is efficient as a support method in problematic impactions. Interestingly enough, the evidence shows that the differences in the operative time did not exist between the groups, which means that the implementation of GANI does not add to surgical

workflow, and that is why it is more acceptable to be included in the presentation in everyday practice.

We will find our findings agree with the recent anatomical and clinical studies that in part emphasize variability in sensory innervation of the orofacial area. Whereas there is no data that has been related to the application of GANI during dental extractions, the available results coincide with other reports where the use of larger capacities of the auricular block has been indicated to be effective in eliminating postoperative pain-related problems during irreversible extraction during routine procedures in otologic and head-and-neck surgery cases. The reasoning behind this evidence is supported by the multidisciplinary evidence on its implementation in oral surgical anesthesia.

The benefit of this research will be not just pain control, the contribution of inadequate anesthetism remains a top contributor to intraoperative stress, patient dissatisfaction, and in other cases, procedure salvaging. This paper has a high explanation in derailing, as rethinking the conventional type of anesthetic practice by demonstrating statistically as well as a clinical significance of improvement on GANI, especially among patients who portray a tough impaction, or, ones, who were incapable of responding aptly to prior treatment with IANB.

But there must be a few constraints to one. The quasi experimental design has shortcomings since it might be susceptible to allocation bias, though an attempt is made to randomise groups. In addition, the subjective experience of the pain is also a biased phenomenon and may become biased by the existence of psychological and culturally influenced assumptions, and the use of an assayed VAS scale designates these criticisms obsolete. This included no measurement of long-term postoperative pain and complication and that could have helped provide additional insights on the long-term benefits of GANI. The findings are a wonderful necessity to devote additional evaluations of subsequent randomized regulated trials which enchant a larger multicentric cohort that could prove the discoveries and examine safety profile of recurring injured aural insertions.

Overall, this paper provides that adjunctive administration of GANI and IANB has a significant impact on providing pain

management intraoperatively in mandibular third molar surgery. This technique could lead to increased patient comfort and a healthier delivery of procedures, which represents a significant advance in oral surgical anesthesia by taking it to a change-in important place.

CONCLUSION

This study demonstrates that the adjunctive use of Greater Auricular Nerve Infiltration (GANI) with conventional IANB provides superior intraoperative analgesia in mandibular third molar surgery. Patients receiving GANI reported significantly lower pain scores and a higher proportion achieved pain-free procedures compared to those managed with IANB alone. Importantly, the addition of GANI did not increase operative duration, making it a practical enhancement to standard practice. Given the limitations of IANB and the anatomical contribution of accessory innervation, GANI emerges as a valuable adjunctive strategy for improving patient comfort, reducing breakthrough pain, and facilitating smoother surgical performance. Future multicenter randomized controlled trials are warranted to validate these findings and assess long-term outcomes, but the present evidence strongly supports the integration of GANI into routine oral surgery anesthesia protocols.

Authors' Contribution

KN: Concept & study design, data collection and drafting of the manuscript.

HA: Data entry, statistical analysis, interpretation of the results.

MA: Manuscript editing and critical revision of the manuscript.

All authors approved the final version of the manuscript to be published.

Conflict of Interest

The authors declared no conflict of interest.

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Data Availability

Data is available with authors and can be provided on request.

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