Efficacy of Vazirani Akinosi and Gow Gates Technique in Inferior Alveolar Nerve Block: A Comparative Study

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Abstract---Aim: The purpose of this study is to evaluate the onset of anesthesia, anesthetic success and incidence of positive aspiration during administration of local anesthetic solution using the Vazirani Akinosi and Gow Gates techniques. Methodology: The study involves 100 subjects, divided into two different groups of 50 subjects each receiving Gow Gates, Vazirani Akins nerve blocks. The onset of anesthesia, positive aspiration and anesthetic success was evaluated. Results: In Vazirani Akinosi technique group, patients showed highest anesthetic success of 95.71%; there was a significant difference seen between the Gow Gates and Vazirani Akinosi techniques (p = 0.0241).

The mean value of the onset of anesthesia in Gow Gates technique showed the longest 343.71 ± 153.20 s and in Vazirani Akinosi technique it was 192.86 ± 61.20 s. Conclusion: The Vazirani Akinosi technique was found to be significantly better than GG techniques with respect to both onset and success of anesthesia.

Introduction

Mandibular anesthesia can be achieved in many ways like the conventional inferior alveolar nerve block, Vazirani Akinosi (VA) and Gow Gates (GG) techniques. The most widely used technique for achieving local anesthesia for mandibular surgical procedures is the conventional inferior alveolar nerve block technique. Traditionally, the inferior alveolar nerve block (IANB), also known as the "standard mandibular nerve block" or the "Halstead block," has been used to provide anesthesia in mandibular teeth and bone. According to the literature, however, this technique has a success rate of only 80–85 percent. Sometimes, operators may incorrectly identify the anatomical landmarks in administering the IANB, relying on assumptions as to where the needle should be positioned. Thus, a failure rate to be 20–25% is reported (1). Gow Gates described a new technique for mandibular anesthesia in which he used both extra-oral and intra-oral landmarks, and the lateral aspect of the condylar neck was the target site. The Gow Gates technique showed higher success rates in achieving successful anesthesia approximately 99% when compared to other techniques (2). Vazirani Akinosi technique is generally indicated in patients with trismus, where the conventional inferior alveolar technique is cumbersome to use (3). Considering the high level at which this block is administered, it shares the advantages of other high-level blocks in the distribution of its anesthetic effect. Although this technique can be used for giving anesthesia in all patients, most clinicians reserve it for those who have severe mouth opening deficiencies or are severe gaggers. The techniques mentioned above have their own merits and demerits. The literature is replete with studies showing conflicting results. A clinician may be in an ambiguous situation in selecting the appropriate anesthetic technique while performing root canal treatment, especially in mandibular teeth diagnosed with irreversible pulpitis. Thus, the present study was intended to evaluate the efficacy of Vazirani Akinosi and Gow Gates techniques for mandibular anesthesia

Aim of the present study

This study evaluated whether the Vazirani–Akinosi (VA) and Gow-Gates (GG) techniques for mandibular anesthesia have superior outcomes in the form of fewer positive aspirations and rapid onset of action, as well as better anesthetic attainment.

Methodology

A comparative double-blinded study was designed involving 100 patients who underwent tooth extractions in the mandibular region between March 2021 and January 2022. Patients who gave written informed consent and agreed to participate in the study were included. Ethical clearance was obtained from the institution prior to commencement of the study. This study included systemically healthy patients aged 20–30 years. Patients who were allergic to the local anesthetic agent and pregnant patients were excluded. All the patients who participated in this study were randomly assigned to three groups randomly using a computer-generated register generated by a statistician. This study was carried out by a single investigator who documented and analyzed the results in all the patients without knowing the type of anesthetic technique administered to any individual patient. Similarly, the patients were also not informed regarding the type of anesthetic technique administered to ensure double blinding. Group I received mandibular anesthesia through the GG technique, Group II received mandibular anesthesia through the VA technique. All techniques of mandibular anesthesia were administered by a single experienced oral and maxillofacial surgeon in all patients. Anesthesia was achieved with 2% lignocaine with adrenaline (1 in 200,000 concentration) in all the patients. The amount of local anesthesia (LA) used was 2.8 ml in all the patients. The onset of action, the incidence of positive aspiration, and the success of the anesthetic technique were assessed in all patients, in addition to any associated complications.

Following the administration of the mandibular nerve block, if the patient did not complain of pain during the course of extraction and if no supplementary nerve block was required to achieve anesthesia, then the anesthetic technique was considered successful. The time anesthetic onset was determined by running a straight probe at the gingival sulcus of the first premolar and lateral incisor region to check for objective signs following the administration of the LA. The needle was inserted at the ideal anatomical area for the delivery of anesthesia and an aspiration was done. Blood entering the barrel of the syringe at the time of aspiration was considered positive. Any failure to attain appropriate anesthesia following the administration of the nerve block necessitated a supplementary nerve block. Data were analyzed using the Statistical Package for the Social Sciences version 25, and the Chi-square test was employed for the assessment of differences between the groups for the aspiration rate, anesthetic success, and onset of anesthesia.

Results

The mean age (years) for Gow Gates technique was 34.87 ± 11.75, for IANB was 33.83 ± 11.13, and for Vazirani Akinosi was 34.50 ± 11.32. The common mean age between all the three groups was 34.40 ± 11.36. The positive aspiration rate was 1.43% in both Gow Gates technique and Vazirani Akinosi technique. (Table 1) In Vazirani Akinosi technique group, patients showed highest anesthetic success at 95.71%, and with 84.29% success for Gow Gates technique. There was a significant difference seen between the Gow Gates and Vazirani Akinosi techniques (p = 0.0241). The mean value of onset of anesthesia in Gow Gates technique was found to be the longest 343.71 ± 153.20 s. The mean value of

onset of anesthesia in Vazirani Akinosi technique was found to be 192.86 ± 61.20 s. There was a significant difference seen between Gow Gates and Vazirani Akinosi techniques (p = 0.0001). None of the patients in the three groups have encountered any trismus or transient facial palsy following the administration of local anesthesia for inferior alveolar nerve block. (Table 2)

Table 1
Comparison of the study groups with status of anesthetic success

Status of anesthetic success	Gow Gates %	Vazirani Akinosi %	Chi-square	p value
Positive	84.29	95.71	5.0796	0.0241
Negative	15.71	4.29		

Table 2
Comparison of three study groups with status of onset of anesthesia

Status of onset of anesthesia	Gow Gates %	Vazirani Akinosi %	Chi-square	p value
Negative	15.71	4.29	46.5655	0.0001
180s	0.00	78.57		
300s	8.57	17.14		

Discussion

The mandible is a cortical bone and requires an efficient nerve block for conducting surgical interventions, unlike the maxilla where local infiltrations can still be effective. The failure of a conventional IANB can arise for several reasons, including failure to adhere to the ideal anatomical landmarks during the administration of the LA, anatomical variations in the mandibular foramen, and improper orientation or position of the needle (4). In addition, the failure rates increase when the procedure is conducted by an inexperienced operator. Therefore, the techniques of GG and VA can be viewed as reliable alternatives to the conventional IANB for delivery of successful anesthesia, since the anesthetic solution is delivered at an anatomical region that is much deeper than that used for the IANB (3). The GG technique involves deposition of the anesthetic solution close to the pterygoid fovea, which is present near the condylar head and therefore much higher than that used in the conventional IANB. This anesthetic solution then spreads downward due to gravity and enters the pterygomandibular space.

A significant size of the nerve is also exposed to the anesthetic solution when compared to the conventional IANB.5 An added advantage of the GG technique is that it uses the upper second molar mesiopalatal cusp as a very reliable landmark during the delivery of anesthesia (3). However, the close proximity of the maxillary artery and pterygoid plexus of veins at the site of LA deposition requires due care to avoid iatrogenic injury that can lead to pain and hematoma (5). The major limitation with the GG technique is the time of onset of anesthesia, which is generally much longer than with the conventional IANB. The VA technique,

similar to the GG technique, uses an anatomically higher position for anesthetic administration than the conventional IANB, thereby increasing the length of the nerve exposed to the anesthetic solution. The main benefit of the VA technique is that it can be employed in clinical scenarios with reduced mouth opening. The lack of an osseous contact end point during the administration of the LA is the limitation of this technique (5). Despite their specific advantages and disadvantages, all these methods demonstrated contradictory outcomes. The published literature shows that the conventional IANB has a superior success rate over other techniques (3,6-9). However, a previous study reported that the success of the VA technique was comparable to that of the conventional IANB.10 In the current study, VA technique was considerably superior to either the GG technique with regard to the onset of action and the anesthetic success. Therefore, based on the results of this study and the evidence available in the literature, the VA can be considered to represent an ideal replacement for the conventional IANB in clinical scenarios where the latter fails to achieve the desired pain control.

Conclusion

The results of this study suggest that the VA technique provided superior outcomes in the form of fewer positive aspirations and a rapid onset of action, in addition to attainment of better anesthesia.

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