Original Article

Comparison of Efficacy of Halstead and Vazirani Akinosi Block Technique in Achieving Mandibular Anesthesia

Eruj Shuja[1], Sadia Daaniyal[2], Osama Mushtaq[3], Naseer Ahmed[4], Ammarah Afreen[5], Zarah Afreen[6]

[1,5,6] Assistant Professor, Oral & Maxillofacial Surgery, Watim Dental College, Rawalpindi.
[2,3] Senior Registrar, Oral & Maxillofacial Surgery, Watim Dental College, Rawalpindi.
[4] Medical Officer, Oral & Maxillofacial Surgery, Shifa International Hospital, Islamabad.

Author's Contribution
[1] Conception of study
[1] Experimentation/Study conduction
[1,2] Analysis/Interpretation/Discussion
[2] Manuscript Writing
[4,5] Critical Review
[3,6] Facilitation and Material analysis

Corresponding Author
Dr. Eruj Shuja,
Assistant Professor,
Oral & Maxillofacial Surgery,
Watim Dental College,
Rawalpindi
Email: erujshuja@hotmail.com

Article Processing
Received: 16/04/2021
Accepted: 02/03/2022

Cite this Article: *Shuja, E., Daaniyal, S., Mushtaq, O., Ahmed, N., Afreen, A., Afreen, Z. Comparison of Efficacy of Halstead and Vazirani Akinosi Block Technique in Achieving Mandibular Anesthesia. Journal of Rawalpindi Medical College. 30 Jun. 2022; 26(2): 169-173.*
DOI: https://doi.org/10.37939/jrmc.v26i2.1627

Conflict of Interest: *Nil*
Funding Source: *Nil*

Access Online:

Abstract

Objective: To compare the efficacy of Halstead and Vazirani Akinosi block techniques in achieving mandibular anesthesia during exodontia among subjects reporting to Watim Teaching Hospital.

Study Design: Randomized controlled trial.

Place and Duration of Study: This study was conducted in the department of Maxillofacial Surgery, Watim Dental Hospital, Rawalpindi from July 2019 to January 2020.

Materials and Methods: This is a randomized control trial of 60 patients. Duration of onset of anesthesia, pain during injection, the incidence of aspiration, success, and failure of Halstead and Vazirani Akinosi techniques and their mean doses were analyzed and compared by using SPSS version 17. Comparison of categorical variables was done by Chi-square test. Comparison of non-categorical variables was done by independent sample t-test. A P-value of less than or equal to 0.005 was considered significant.

Results: 28(93.3%) experienced moderate while 2(6.7%) experienced severe pain in the Halstead group, while 30(100%) experienced mild pain in the Vazirani Akinosi group. Halstead technique was successful in 22(73.3%) while unsuccessful in 8(26.7%) patients. Vazirani Akinosi technique was successful in 29(96.7%) and unsuccessful in 1(3.3%) patients.

Conclusion: It may be concluded from analysis in the present study that the Vazirani Akinosi technique was statistically superior in all parameters such as duration of onset, pain during injection, aspiration, and success rate as compared to the conventional Halstead block technique.

Keywords: Extraction tooth, local anesthesia, Nerve block, Vazirani-Akinosi technique.

Introduction

The main objective of an oral surgeon during performing any kind of surgical procedure is adequate anesthesia.[1] There are different techniques available for achieving mandibular anesthesia including the Halstead technique, Vazirani Akinosi, and Gow Gates mandibular block techniques.[2] Painful stimulus is reversibly blocked by the use of a local anesthetic agent such as lignocaine which acts on preventing the generation of action potential on a nerve.[3] 2% Lignocaine with 1:100,000 epinephrine is the drug of choice for exodontia and minor local anesthetic procedures.[1]

The inferior alveolar nerve is the primary sensory nerve supply of the mandible, innervating mandibular teeth and their surrounding soft tissue, tongue, and floor of the mouth.[1] Maxillary anesthesia is easily achieved as compared to mandibular anesthesia owing to the fact that maxillary bone is less compact as compared to the mandibular bone so the infiltration technique that is the deposition of local anesthetic near the root apices provides adequate anesthesia with less expertise and within a shorter duration of time.[3] Halstead block is the most common technique used in providing adequate analgesia during minor surgical procedures however previous studies have revealed that the failure rate for it is around 20-25%.[2] Various reasons for failure to achieve mandibular anesthesia with the Halstead technique are patient apprehension, anatomical variation, technical failure, infected tissue at the injection site, and accessory innervations.[4]

Vazirani Akinosi technique also known as the closed mouth block is mainly indicated in cases of trismus.[5] It aims to anesthetize the inferior alveolar nerve at a higher level as compared to the Halstead technique.[2] Anatomic variability and accessory innervations account for failure in achieving adequate anesthesia in the case of open mouth technique however Vazirani Akinosi technique has proved to overcome these shortcomings as it requires less expertise in identifying the anatomic landmarks and by bathing nerves at a deeper level.[5]

The rationale of the study is to compare the efficacy of the two block techniques in terms of duration of onset of anesthesia, pain during injection, the incidence of aspiration, and anesthetic success.

Materials and Methods

This is a randomized control trial of 60 patients, 30 patients in each group. The sample size was calculated using the WHO calculator. This study was conducted at the department of Maxillofacial Surgery Watim Dental Hospital Rawalpindi. The duration of the study was 7 months from July 2019 to January 2020. Ethical clearance was obtained from the institution prior to the commencement of the study.

A written consent form was obtained by all the participants for inclusion in the study. A single operator was used for administering both techniques. Patients were randomly divided into two groups by lottery method. Group A (Halstead technique) and Group B (Vazirani Akinosi technique).

Inclusion criteria comprise d of healthy patients both males and females with no known medical history that reported to the oral and maxillofacial surgery department for extraction of mandibular teeth.

Exclusion criteria comprised patients that had a medical history of cardiac disease, diabetes mellitus, renal condition, smokers, allergy to local anesthesia, established infection, and pregnant females.

Both groups received 2% lignocaine with 1:100,000 epinephrine. An aspirating syringe of 40 mm with a 27 mm gauge was used with a total amount of 1.5 ml solution. The anesthetic solution was injected slowly within the duration of 60 seconds into an inferior alveolar nerve.

For group A i.e. the conventional inferior alveolar block technique the patient was instructed to open his/her mouth, the external oblique ridge was palpated and the coronoid notch was identified. The target area for injection was the medial side of the ramus lateral to the pterygomandibular raphe. The syringe was positioned at the level of opposite premolars after initial aspiration. 1.5ml solution was deposited after the 2/3rd needle had penetrated the soft tissue and bone contact was positive. A needle was then retracted and local anesthesia for deposited for the lingual nerve.

For group B i.e. Vazirani Akinosi block technique patient was put in a supine position and instructed to close his/her mouth in maximum intercuspation. The maxillary mucobuccalfold opposite to the 2nd molar was penetrated and almost whole of the length of the needle was inserted within the soft tissue after aspiration 1.5 ml of solution was deposited.

Subjective assessment for the onset of anesthesia was made by the patient, describing onset by the achievement of lower lip numbness and numbness of ipsilateral half of the tongue. Objective assessment for anesthetic success was made by periodontal probing in the gingival sulcus in the area of anesthetized tissues.

The time for onset of anesthesia was noted using a stopwatch.

Pain during the administration of individual techniques was measured by VAS Scale from 0 to 10mm and was divided into three groups mild (0-4) moderate (5-7) and severe (8-10).

Aspiration of blood was noted as positive or negative by use of a self-aspirating syringe at the time of initial administration of the block technique.

Failure of anesthetic technique was labeled when the patient did not report numbness of the lower lip and tongue along with pain on probing after 10 minutes of administration of the respective block. In such instances, supplemental injections were given to achieve the desired result.

Duration of onset of anesthesia, pain during injection, the incidence of aspiration, success, and failure of technique, and mean dose were analyzed and compared by using SPSS version 17. Percentages and frequencies along with mean± S.D were calculated for various variables. Comparison of categoric variables was done by Chi-square test. Comparison of non-categoric variables was done by independent sample t-test. A P-value of less than or equal to 0.05 was considered significant.

Results

A total of 60 patients 27 (45%) males and 33 (55%) females, mean age 36.90±12.67 years were included in our study. In group A, Alstead block technique, 16 patients were female while 14 were males. In group B, Vazirani Akinosi block technique 16 patients were female while 14 were males.

The mean duration of onset of anesthesia in the Halstead technique is 172.67±41.55 seconds which is much earlier compared to the Vazirani Akinosi technique i.e. 198.56+18.18 seconds (Table 1). The Independent sample t-test showed a p-value < 0.001.

A comparison of the intensity of pain during injection in the Halstead technique and Vazirani Akinosi showed that 28(93.3%) experienced moderate while 2(6.7%) experienced severe pain in the Halstead group, while 30(100%) experienced mild pain in Vazirani Akinosi group chi-square test showed significant difference p-value < 0.001. (Table 2)

Aspiration during administration was compared between the groups. It was positive in 6(20%) and negative in 24(80%) patients in the Halstead technique and positive in 1(3.3%) and negative in 29(96.7%) in the Vazirani Akinosi technique. This was statistically significant on chi-square test p-value< 0.004. (Table3)

A comparison of the rate of Success in achieving anesthesia was noted for each group. Halstead technique was successful in 22(73.3%) while unsuccessful in 8(26.7%) patients. Vazirani Akinosi technique was successful in 29(96.7%) and unsuccessful in 1(3.3%) patients. This was statistically significant on the Chi-square test with a p-value < 0.001(Table 4).

The total dose of local anesthesia used was calculated in ml. A mean dose of 2.28±0.80 was observed in the Halstead group which was higher as compared to the Mean dose of1.86±0.32 for the Vazirani Akinosi group. The Independent sample t-test shows statistical significance with a p-value < 0.001.

Table 1: Statistics for Duration of onset of anesthesia

Local anesthesia technique	*Mean duration ±SD (seconds)*	*p-value*
Halstead technique	172.67±41.55s	
Vazirani akinosi technique	198.56±18.18s	<0.001

Table 2: Statistics for Pain during the administration of local anesthesia

Local anesthetic technique	*Mild pain*	*Moderate pain*	*Severe pain*	*p-value*
Halstead technique	0%	93.3%	6.7%	
Vazirani akinosi technique	100%	0%	0%	<0.001

Table 3: Statistics for Aspiration during the administration of local anesthesia

Local anesthesia technique	*Positive aspiration (%)*	*Negative aspiration (%)*	*p-value*
Halstead technique	20%	80%	
Vazirani akinosi technique	3.3%	96.7%	<0.004

Table 4: Statistics for Rate of success in achieving anesthesia

Local anesthesia technique	*Successful (%)*	*Unsuccessful (%)*	*p-value*
Halstead technique	73.3%	26.7%	<0.001
Vazirani akinosi technique	96.7%	3.3%	

Discussion

This study was done to compare the efficacy of the Halstead block and Vazirani Akinosi block technique. The first parameter that was measured is the onset of anesthesia. According to our research, the onset of the duration of anesthesia in the Halstead technique is 172.6 seconds and 198.6 seconds for the Vazirani Akinosi technique which are consistent with the results of Debojyoti Roy et.al[1], Kiran BS et al[2] study also supports the results of our study. However JendiSK et al[4] show contradictory results with respect to the onset of anesthesia which was 78.36 seconds for the Halstead technique and 104.24 seconds for the Vazirani Akinosi technique. This discrepancy in results could be attributed to a decrease in the concentration of adrenaline i.e. 1:1200,000 used in their study.

The intensity of pain during anesthesia injection administration was compared between the two selected techniques. 28(93.3%) experienced moderate while 2(6.7%) experienced severe pain in the Halstead group, while 30(100%) experienced mild pain in the Vazirani Akinosi group. Nakkeeran KP et al[8] favor our study with a mean pain score of 3.05 for the Halstead technique and 1.93 for the VA technique this was statistically significant with a p-value less than 0.001. Mild pain experienced during the Vazirani Akinosi technique could be attributed to the fact that during injection no bony landmark is contacted with the needle and also the buccal soft tissue in the maxillary region is less sensitive and less resistant to penetration with less musculofascial bands in the concerned region.[9] SangeethaKarunakaran et al[10] show that both the Inferior alveolar nerve group and Vasirani Akinosi group experienced mild pain on injection. Differences in pain perception might be due to subjective understanding of pain. In another study by Costa FA et al[11] pain perception by subjects was reported as being mild for both the techniques. Misra S et al[12] in their study revealed mild pain was experienced by the VA group and moderate pain by the IAN group which is consistent with our study. This is due to anatomical divergence of medial pterygoid muscle from the ramus thus providing greater pterygomandibular space and preventing the risk of penetration of medial pterygoid muscle.[12]

A comparison of aspiration in our study between the two study groups revealed positive aspiration in 20% of the IAN group and 3.3% in the VA group, the difference was statistically significant. JendiSK et al[4] reported positive aspiration in 15% of the IAN group and 3% in the VA group which is supporting the current study. Mohajerani H at el[13] study results is also consistent with our results showing 15% aspiration in the IAN group and 5% in the VA group this is statistically significant p-0.04.

This study revealed that the Halstead technique was successful in 22(73.3%) while unsuccessful in 8(26.7%) patients. Vazirani Akinosi technique was successful in 29(96.7%)and unsuccessful in 1(3.3%)patients. Saatchi M et al[14] checked the efficacy of IAN block with a success rate of 44%. Haas et al[8] showed an increased success rate in Vazirani Akinosi as compared to the conventional block technique. Aggarwal V et al[15] in their study the success rate of conventional IAN block was 36% and of VA was 41% this contradiction of results with our study may be due to assessment of pain associated with irreversible pulpitis as compared to our study in which participants experienced pain during extraction of teeth. AlHindi M et al[16] favour our result as well. The mean dose used in the IAN block was more as compared to the Vazirani-Akinosi block.[17,18]

There were a few limitations in this research such as the detailed complications and their incidences associated with anesthesia administration were not recorded. Individual nerves and their responses were also not calibrated. Thus this study can be improved with a larger sample size and taking into account above mentioned factors.

Conclusion

It may be concluded from our analysis that the Vazirani Akinosi technique was statistically superior to the conventional block technique in parameters such as duration of onset, pain during injection, aspiration, and success rate as compared to the conventional Halstead block technique. We found that Vazirani Akinosi is an underestimated inferior alveolar nerve block as it provides better outcomes.

References

1. Roy D, Talukdar B. Comparison between Conventional Inferior Alveolar Nerve Block with Vazirani-Akinosi Technique and Gow-Gates Technique of the Mandibular Nerve Block.IJRR Vol 6,Issue 8,August 2019.
2. Kiran BS, Kashyap VM, Uppada UK, Tiwari P, Mishra A, Sachdeva A. Comparison of efficacy of halstead, vaziraniakinosi and gow gates techniques for mandibular anesthesia. Journal of maxillofacial and oral surgery. 2018 Dec;17(4):570-5.
3. Maqsood A, Asim MA, Aslam F, Khalid R, Khalid O. Comparison of efficacy of Gow-Gates mandibular nerve block and inferior alveolar nerve block for the extraction of mandibular

molars. ANNALS OF ABBASI SHAHEED HOSPITAL AND KARACHI MEDICAL & DENTAL COLLEGE. 2018 Dec 31;23(4):177-83.
4. Jendi SK, Thomas BG. Vazirani–Akinosi Nerve Block Technique: An Asset of Oral and Maxillofacial Surgeon. Journal of maxillofacial and oral surgery. 2019 Dec;18(4):628-33.
5. Nagendrababu V, Ahmed HM, Pulikkotil SJ, Veettil SK, Dharmarajan L, Setzer FC. Anesthetic efficacy of Gow-Gates, Vazirani-Akinosi, and mental incisive nerve blocks for treatment of symptomatic irreversible pulpitis: A systematic review and meta-analysis with trial sequential analysis. Journal of endodontics. 2019 Oct 1;45(10):1175-83.
6. Haas DA. Alternative mandibular nerve block techniques: a review of the Gow-Gates and Akinosi-Vazirani closed-mouth mandibular nerve block techniques. The Journal of the American Dental Association. 2011 Sep 1;142:8S-12S.
7. Ghoddusi J, Zarrabi MH, Daneshvar F, Naghavi N. Efficacy of IANB and Gow-Gates techniques in mandibular molars with symptomatic irreversible pulpitis: a prospective randomized double blind clinical study. Iranian endodontic journal. 2018;13(2):143.
8. Nakkeeran KP, Ravi P, Doss GT, Raja KK. Is the Vazirani-Akinosi nerve block a better technique than the conventional inferior alveolar nerve block for beginners?. Journal of Oral and Maxillofacial Surgery. 2019 Mar 1;77(3):489-92.
9. Haghighat A, Jafari Z, Hasheminia D, Samandari MH, Safarian V, Davoudi A. Comparison of success rate and onset time of two different anesthesia techniques. Medicina oral, patologia oral y cirugiabucal. 2015 Jul;20(4):e459
10. SangeethaKarunakaran BD, AlankruthaGangasani BD, Priyanka Unnam BD. Evaluation of Efficacy and Pain in Open Mouth versus Closed Mouth Ianb Technique for Third Molar Extraction. Saudi J Oral Dent Res, July, 2020; 5(7): 317-320.
11. Costa FA, Souza LM, Groppo F. Comparison of pain intensity during inferior alveolar nerve block. Revista Dor. 2013 Sep;14(3):165-8
12. Mishra S, Tripathy R, Sabhlok S, Panda PK, Patnaik S. Comparative analysis between direct conventional mandibular nerve block and Vazirani-Akinosi closed mouth mandibular nerve block technique. Int J Adv Res Technol. 2012 Nov;1(6):112-7.
13. Mohajerani H, PAKRAVAN AH, Bamdadian T, Bidari P. Anesthetic efficacy of Inferior Alveolar Nerve block: conventional versus Akinositechnique.Journal of dental school 2014;32(4):210-215.
14. Saatchi M, Shafiee M, Khademi A, Memarzadeh B. Anesthetic efficacy of Gow-Gates nerve block, inferior alveolar nerve block, and their combination in mandibular molars with symptomatic irreversible pulpitis: a prospective, randomized clinical trial. Journal of endodontics. 2018 Mar 1;44(3):384-8.
15. Aggarwal V, Singla M, Kabi D. Comparative evaluation of anesthetic efficacy of Gow-Gates mandibular conduction anesthesia, Vazirani-Akinosi technique, buccal-plus-lingual infiltrations, and conventional inferior alveolar nerve anesthesia in patients with irreversible pulpitis. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology. 2010 Feb 1;109(2):303-8.
16. AlHindi M, Rashed B, AlOtaibi N. Failure rate of inferior alveolar nerve block among dental students and interns. Saudi medical journal. 2016 Jan;37(1):84.
17. Shah FA, Jan IU, Ahsan A, Afridi RU, Zain M, Haider S. Comparison of anesthetic efficacy of inferior alveolar nerve block and vazirani-akinosi techniques in patients with irreversible pulpitis. Pakistan Oral & Dental Journal. 2019 Sep 30;39(3):301.
18. Lee CR, Yang HJ. Alternative techniques for failure of conventional inferior alveolar nerve block. Journal of Dental anesthesia and pain medicine. 2019 Jun;19(3):125.
19. Sakdejayont W, Chewpreecha P, Boonsiriseth K, Shrestha B, Wongsirichat N. Does the efficacy of direct inferior alveolar nerve block depend on patient position?.M Dent J volume 36,2016 may-august.
20. Devarakonda BV, Issar Y, Goyal R, Vadapalli K. Difficult airway 'made easy' with Vazirani-Akinosi (closed mouth) technique of mandibular nerve block. Medical Journal, Armed Forces India. 2019 Apr;75(2):225.