

A COMPARATIVE STUDY OF ANESTHETIC BLOCK TECHNIQUES (V-BLOCK VS. H-BLOCK) FOR REMOVAL OF INGROWN TOENAIL

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Abstract: *Ingrown toenail (onychocryptosis) is a common and painful condition often requiring surgical intervention. Adequate local anaesthesia is crucial for patient comfort and surgical success. However, the optimal anaesthetic technique for this procedure remains debated. Objectives:* This study aimed to evaluate and compare the anaesthetic efficacy, patient comfort, onset and duration of anaesthesia, and occurrence of complications between the V-block and H-block techniques during surgical procedures for ingrown toenail removal. **Methods:** After ethical approval, an open-label randomised control trial was conducted at Ruth PFAU Civil Hospital, Dow University of Health Sciences, Karachi. One hundred eighty-eight patients, aged 18 and above, with type II, III, and IV onychocryptosis were included. Patients were randomly assigned to either Group A (H-technique, n=94) or Group B (V-technique, n=94). Local anaesthesia was administered using 5 ml of 2% Xylocaine diluted in 5 ml of distilled water. Pain severity, numbness, and loss of sensation were assessed at 2, 5, and 10 minutes post-injection. Data were analysed using SPSS version 26. **Results:** Group A (H-technique) had a significantly younger average age (35.12±9.8 years) compared to Group B (39.77±13.01 years). Gender distribution differed significantly, but weight did not. At 2 minutes, Group B reported more pain (90% vs. 86.5%, P=0.045). At 5 and 10 minutes, Group B showed higher numbness and loss of sensation, indicating more comprehensive anaesthesia. Efficacy at 10 minutes was higher in Group B (44% vs. 39%, P=0.045), with similar trends at 20 minutes but no significant difference. **Conclusion:** The V-block technique offers rapid onset and effective pain relief for routine procedures, while the H-block technique provides more comprehensive and sustained anaesthesia for complex surgeries. The selection of anaesthetic techniques should be based on the surgical context to optimise patient outcomes. Further research is recommended to enhance these techniques' efficacy and minimise complications.

Keywords: anaesthesia, V-block, H-block, toenail.

Introduction

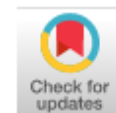
Ingrown toenails, also known as onychocryptosis, are a common ailment where the nail edge grows into the surrounding soft tissue, causing pain. This issue often leads to considerable discomfort, inflammation, and infection. (1)Surgical intervention is often necessary in cases where conservative methods, including proper nail-cutting techniques, topical therapies, and orthotic devices, do not provide relief. (2)The main objective of surgical intervention is to ease pain and infection and avoid the reoccurrence of the condition. Ensuring patient comfort during the treatment and attaining optimal surgical outcomes heavily relies on the use of adequate local anaesthesia. (3). The V-block and H-block procedures are frequently used to achieve local anaesthesia during ingrown toenail surgery. The selection of an anaesthetic approach can impact the procedure's simplicity, the patient's pain perception, and the probability of postoperative problems (4). The ease and efficiency of this procedure in achieving rapid and sufficient anaesthesia for the distal toe have been highly acknowledged. (5). On the other hand, the H-block technique involves injecting in a configuration that resembles the letter H. This configuration covers both the top and bottom parts of the toe, resulting in a more thorough blocking of the nerves responsible for

sensation (6). Proponents of the H-block technique contend that it offers a more comprehensive kind of anaesthesia, particularly beneficial in situations that involve extensive manipulation or a more invasive approach. Prior research has yielded inconclusive findings about the advantages of one strategy over the other. (7, 8). According to certain studies, the V-block technique provides quicker onset and adequate anaesthesia for typical procedures. In contrast, the H-block technique is more advantageous for complex situations due to its broader anaesthesia coverage. (9). Considering the different viewpoints, it is necessary to compare various strategies to ascertain the most efficient approach in clinical practice. This study evaluated and contrasted the anaesthetic efficacy, patient comfort, onset and duration of anaesthesia, and occurrence of problems between the V-block and H-block approaches during surgical procedures for removing ingrown toenails.

Methodology

After the ethical approval from the institutional review board, this Open-label randomised control trial was conducted at the Department of General Surgery, Ruth PFAU Civil Hospital Dow University of Health Sciences,

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Karachi, from April 2023 to September 2023. Through non-probability consecutive sampling, 188 patients above 18 years, both genders, ASA class I or II, and have type II, III and IV onychocryptosis according to Martinez-nova classification were included in the present study. Pregnant and lactating patients, patients allergic to the drugs, patients with Raynaud's syndrome or peripheral neuropathy, and known skin diseases, e.g. psoriasis and eczema, were excluded from the present study. After the informed consent, patients were randomly assigned into two groups through Opaque-sealed envelopes with sequential numbers: Group A- H technique (n=94) and Group B- V technique (n=94). According to hospital protocol, designated duty physicians conducted thorough physical examinations and necessary laboratory tests to determine the patient's medical suitability for the surgical procedure. A consultant surgeon with at least five years of experience performed the anaesthesia blockade and nail plate avulsion procedure in the ward Minor OT. For local anaesthesia, 5 ml of 2% Xylocaine diluted in 5 ml of distilled water was used, with a total of 5 ml administered and a potential rescue dose of 5 ml if needed. Patients in group A received anaesthesia using the V-technique, while those in group B received anaesthesia using the H-technique. The H-technique involved injecting 2 ml of anaesthetic into the dorsal medial (peroneal) aspect of the toe at the first site, rotating the needle 90 degrees without entirely withdrawing it and injecting 1 ml beneath the extensor tendon, then injecting 2 ml into the dorsal lateral (tibial) aspect at the second site. The V-technique involved pinching the toe dorsum above the proximal phalanx and injecting 1 ml subcutaneously above the extensor tendon after aspiration, rotating the needle 45 degrees towards the plantar aspect and injecting anaesthetic while partially withdrawing the needle, injecting 1 ml in the plantar region to raise wheels, and repeating the initial step in the medial/proximal region at a 45-degree angle towards the plantar area to anaesthetise the nail's peroneal canal. Pain severity was assessed immediately using the visual analogue score, and the efficacy of the blockade was evaluated at 2, 5, and 10 minutes by pressing the toe pad with Adson forceps to determine numbness, sensitivity loss, or pain. The surgical removal of the toenail was carried out at 10 minutes, and patients were monitored in the ward for one-hour post-procedure. Data were analysed using SPSS version 26. Categorical variables were summarised as frequency and percentage, while numerical variables were presented as mean ± standard deviation. The chi-square test compared categorical variables between groups, and numerical variables were compared using an independent t-test or Mann-Whitney U test based on

normality. A two-tailed p-value ≤0.05 was considered statistically significant.

Results

In a comparative study of two techniques, Group A (H-technique) and Group B (V-technique), used in treating onychocryptosis, various demographic and physiological variables were analysed (Table 1). The average age of participants in Group A was 35.12±9.8 years, significantly younger than the 39.77±13.01 years in Group B (P = 0.001). Gender distribution also showed a statistically significant difference (P = 0.001), with 64% males and 36% females in Group A, compared to 74% males and 26% females in Group B. However, there was no significant difference in weight between the two groups, with Group A averaging 79.57±10.9 kg and Group B averaging 80.06±10.7 kg (P = 0.601). Table 2 and Figure 1 compare the effects of two groups (A and B) at different time intervals (2 minutes, 5 minutes, and 10 minutes); several sensory outcomes were evaluated, including pain, numbness, and loss of sensation. At 2 minutes, pain was reported by 86.5% in Group A and 90% in Group B (P = 0.045), indicating a significant difference. Numbness was reported by 9% in Group A and 24% in Group B (P = 0.083), and loss of sensation was reported by 22% in Group A and 33% in Group B (P = 0.14), neither showing significant differences. At 5 minutes, pain was reported by 34% in Group A and 31% in Group B (P = 0.025), indicating a significant difference. Numbness was reported by 38% in Group A and 45% in Group B (P = 0.014), also showing a significant difference. Loss of sensation was reported by 44% in Group A and 52% in Group B (P = 0.083), not a significant difference. At 10 minutes, pain was reported by 13% in Group A and 20% in Group B (P = 0.001), indicating a significant difference. Numbness was reported by 90% in Group A and 94% in Group B (P = 0.004), which is also a significant difference. Loss of sensation was reported by 86.5% in Group A and 94% in Group B (P = 0.007), showing a significant difference. A notable distinction was observed when evaluating the efficacy of two study groups (A and B) at different time intervals (Table 3 and Figure 2). At the 10-minute mark, 37(39%) participants in Group A and 41 (44%) participants in Group B showed efficacy, with a statistically significant P value of 0.045. However, at the 20-minute mark, 87(92.5%) participants in Group A and 90 (96%) participants in Group B demonstrated efficacy, with a P value of 0.083, indicating that the difference was not statistically significant later.

Table 1: Demographic parameters of the study participants

Variables	Group A (H-technique)	Group B- (V-technique)	P value
Age (years)	35.12±9.8	35.11 ±9.9	0.849
Gender			0.014
Male	60 (64%)	65 (74%)	
Female	34 (36%)	29 (26%)	
Weight (kg)	79.57±10.9	79.58±10.7	0.836

Table 2: Comparison of V and H technique anesthesia effects

Variables	2mins			5mins			10 mins		
	A	B	P value	A	B	P value	A	B	P value
Pain	81 (86.5%)	85 (90%)	0.045	32 (34%)	29 (31%)	0.025	13 (14%)	19 (20%)	0.001

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Numbness	8 (9%)	23 (24%)	0.083	36 (38%)	42 (45%)	0.014	85 (90%)	88 (94%)	0.004
Loss of Sensation	21 (22%)	31 (33%)	0.14	41 (44%)	49 (52%)	0.083	81 (86.5%)	88 (94%)	0.007

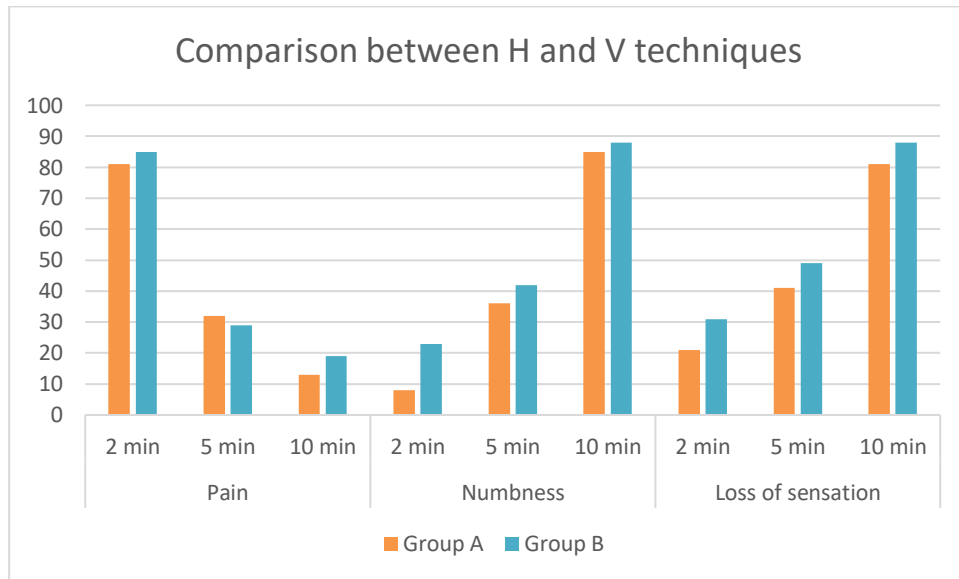


Figure 1: Comparison of V and H technique anesthesia effects

Table 3: Comparison of efficacy between the two anaesthesia techniques

Efficacy	Group A	Group B	P Value
10 minutes	37 (39%)	41 (44%)	0.045
20 minutes	87 (92.5%)	90 (96%)	0.083

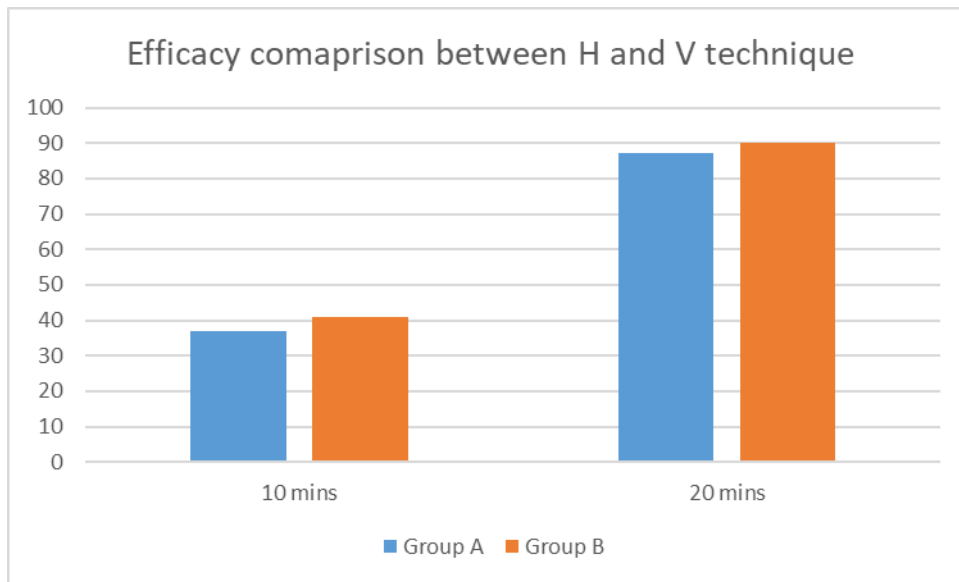


Figure 2: Comparison of efficacy between the two anaesthesia techniques

Discussion

This study aimed to compare the safety, efficacy, patient comfort and postoperative complications using V-block and H-block techniques to provide local analgesia for ingrown toenail surgery. Pain scores within the post-anaesthesia administration intervals showed significant differences among techniques. From the 2-minute point on, it was clear

that a significantly higher percentage of patients in Group B experienced pain than in Group A, demonstrating that the Technique may provide a faster onset of pain relief. This aligns with the study by Hernández et al. (2022), which showed that V-block analgesia could produce instantaneous analgesia for distal toe surgeries. This significant difference favouring the V-technique for rapid and effective pain

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mitigation was maintained by 5 and 10 minutes (9). Similar results were in line with Giralt de Veciana (2021), who commented that the V-block technique provides a quicker onset of action, which may be suitable for day-to-day procedures (9). There was mixed evidence regarding numbness/loss of sensation for anaesthetic efficacy. An increased proportion of numbness and loss of sensation at 2 and 5 minutes in Group B represents a greater extent of nerve blocking as compared to Group A and supports the claim made by Chen (2024) regarding the H-block technique offering complete anaesthetic coverage and, therefore, potentially being potentially more beneficial for more invasive or complex procedures (10). Nonetheless, at 10 minutes, their effect was the same in Group A and Group B, with a slight trend towards Group B, which may suggest that the H-block could be the solution for diffuse and long-term analgesia. Considering the often complex nature of surgery, this was not the case in a significant series by Flaviano et al. (2023), who underscored the importance of the H-block about dissection depth in complex surgical settings (11). In overall anaesthetic efficacy, at 10 and 20 minutes, the proportion of participants demonstrating adequate anaesthesia was lower for Group A than for Group B. However, this difference was only statistically significant at 10 minutes. Thus, it can be concluded that the V-block technique may give faster initial relief, but the H-block technique gives stable and effective anaesthesia of a longer duration. The slower narrowing of efficacy percentages by 20 min suggests that the H-block provides equivalent anaesthesia to 4Q but may have a slight advantage when a longer duration of action is desired. This is consistent with the findings of a 2020 study, which compared two anaesthesia procedures for treating infected ingrown toenails in 16 patients. The study found that the V approach was more effective, with a success rate of 87.5%, compared to a success rate of 62.5% for the H technique. Consequently, the H technique's anaesthetic impact is diminished in infected ingrown toenails (12).

Conclusion

In conclusion, the study shows that the V-block and H-block approaches significantly benefit when administering local anaesthesia for ingrown toenail procedures. The V-block approach gives expedited and efficient pain relief, making it appropriate for simple procedures. In contrast, the H-block technique delivers more extensive and enduring anaesthesia, which is advantageous for complex surgeries. These data indicate that choosing the most suitable anaesthetic strategy according to the surgical situation can enhance patient outcomes. Additional study is necessary to improve and optimise these procedures, leading to better patient care and reducing postoperative problems.

Declarations

Data Availability statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate.

It is approved by the department concerned. (IRBEC-23e/672)

Consent for publication

Approved

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Conflict of interest

The authors declared an absence of conflict of interest.

Authors Contribution

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Drafting & Concept & Design of Study

References

- Pawlik P, Zaroda P, Dąda P, Niewinna P, Żuchowski M, Mańdziuk D, et al. Onychocryptosis: A review of epidemiology, risk factors, classification, complications and effective therapeutic strategies. *Journal of Education, Health and Sport*. 2024;55:199-216.
- Şenol Z, Gülşen T. A new, quick, effective and minimally invasive treatment technique applied to ingrown toenails. *The European Research Journal*. 2022;8(3):383-8.
- Mayeaux Jr E, Carter C, Murphy TE. Ingrown toenail management. *American family physician*. 2019;100(3):158-64.
- Thakur V, Vinay K, Haneke E. Onychocryptosis—deciphering the controversies. *International Journal of Dermatology*. 2020;59(6):656-69.
- Ranganath A, Ahmed O, Iohom G. Effects of local anaesthetic dilution on ultrasound-guided axillary brachial plexus block characteristics: a randomised controlled study. *Medical Ultrasonography*. 2022;24(1):38-43.
- Phuphanich ME, Convery QW, Nanda U, Pangarkar S. Sympathetic blocks for sympathetic pain. *Physical Medicine and Rehabilitation Clinics*. 2022;33(2):455-74.
- Exley V, Jones K, O'Carroll G, Watson J, Backhouse M. A systematic review and meta-analysis of randomised controlled trials on surgical treatments for ingrown toenails part I: recurrence and relief of symptoms. *Journal of foot and ankle research*. 2023;16(1):35.
- Asma Ghafoor IV O, Paracha H, Goldstein Z. Ingrown Toenail Management. *Osteopathic Family Physician*. 2021;13(3):31-4.
- Giralt de Veciana E. Comparison of 2 Anesthetic Techniques in Onychocryptosis Surgery of the Great Toe: A Randomized Clinical Trial. *Actas Dermo-sifiliograficas*. 2021;113(4):370-5.
- Chen Y, Xu J, Li P, Shi L, Zhang S, Guo Q, et al. Advances in the use of local anaesthetic extended-release systems in pain management. *Drug Delivery*. 2024;31(1):2296349.
- Flaviano E, Bettinelli S, Assandri M, Muhammad H, Benigni A, Cappelleri G, et al. Erector spinae plane versus fascia iliaca block after total hip arthroplasty: a randomized clinical trial comparing analgesic effectiveness and motor block. *Korean Journal of Anesthesiology*. 2023;76(4):326-35.
- Sánchez S, de Veciana EG. Bloqueo digital anestésico con técnica V versus técnica H en onicocriptosis infectadas del primer dedo del pie.: Eficacia Técnica en V. *REVISTA IBERO-AMERICANA DE PODOLOGIA*. 2020;2(2):190-5.



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