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Nerve Block or Gel? Comparing Analgesia Techniques for Enhancing Comfort During Trans-Rectal Ultrasound-Guided Prostate Biopsy

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Abstract

Background: Transrectal ultrasound-guided prostate biopsy (TRUS PBx) is a widely used method for diagnosing prostate cancer. Ensuring effective pain control during this procedure is essential for patient comfort and compliance. Apical periprostatic nerve block (PNB) and intrarectal topical anaesthesia (ITA) are two commonly employed anaesthetic techniques. This study aimed to compare the analgesic effectiveness of apical PNB versus ITA during TRUS-guided prostate biopsy. ***Methods:*** In this prospective, randomised comparative trial, participants were allocated into two groups. Group 1 was administered 10ml of 2% lignocaine through apical periprostatic infiltration, whereas Group 2 received 10ml of xylocaine gel via intrarectal application. Pain assessment was performed using the Wong-Baker FACES Pain Rating Scale (WBFPRS) during probe insertion, biopsy, and post-procedure. Baseline characteristics were comparable between groups. ***Results:*** Both anaesthetic techniques relieved pain; however, Group 1 consistently exhibited lower pain scores. During biopsy, Group 1 reported significantly less pain than Group 2 ($p = 0.001$), and this difference remained significant 30 minutes post-procedure ($p = 0.001$). Most patients in Group 1 recorded pain scores of 0 or 2 post-biopsy, indicating minimal discomfort. On Day 3 follow-up, no significant differences were observed in post-biopsy complications, although there was a non-significant trend toward increased haematuria in the ITA group ($p = 0.304$). ***Conclusion:*** Apical PNB is more effective than ITA for pain control during TRUS PBx and does not influence delayed post-procedural outcomes. These results support the efficacy of apical periprostatic nerve block (PNB) in improving patient comfort during prostate biopsy, without compromising procedural safety.

Keywords: ***Apical nerve block, TRUS guided prostate biopsy, TRUS guided prostate biopsy.***

Introduction

Tissue acquisition for prostate cancer diagnosis is most effectively performed through transrectal ultrasound-guided prostate biopsy (TRUS PBx). The primary sources of discomfort during this procedure are related to the insertion of the ultrasound probe and the penetration of the prostate capsule [1]. Since TRUS PBx was first introduced in 1989, various strategies have been explored to enhance patient comfort by improving local anaesthesia techniques.

Periprostatic nerve block (PNB) and intrarectal topical anaesthesia (ITA) are the two most widely adopted anaesthetic methods. To minimise discomfort non-invasively, intrarectal application of xylocaine gel has been proposed. Additionally, Injection of lignocaine around the prostate is also routinely used to control/reduce the pain. Consequently, a major clinical question remains: which technique offers better pain relief during prostate biopsy [2].

Pain is "an unpleasant sensory and emotional experience related to actual or potential tissue damage." To quickly and effectively assess pain verbally and in writing, the Wong-Baker FACES Pain Rating Scale (WBFPRS)is frequently used in clinical environments. The FACE scale, which ranges from 0 (no pain) to 10 (worst possible pain), is particularly popular in hospitals due to its ease of use and practicality [3].

This study seeks to compare the analgesic effects of intrarectal xylocaine gel versus apical periprostatic nerve block during TRUS PBx. Pain assessments, using the WBFPRS, will be recorded during probe insertion, biopsy sampling, and post-procedure periods across the different study groups.

Materials & Methods

A total of 108 participants undergoing TRUS PBx between January 2024 and January 2025 were chosen at random after obtaining informed/written consent and institutional ethical committee clearance. A prospective randomised design was utilised to compare the clinical outcomes and pain levels in participants who underwent prostate biopsy using two different techniques. The participants were divided into two groups: group 1 ($n = 52$) received 10 ml of 2% lignocaine infiltration as apical anaesthesia, while group 2 ($n = 56$) received 10 ml of 2% intrarectal topical xylocaine instillation before the biopsy.

Inclusion and Exclusion Criteria

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We included male patients > 50 years of age with PSA level >4ng/ml or hard diffuse/nodular prostate on digital rectal examination who were subjected to prostate biopsy. Those with a diagnosis of anorectal disease, bleeding diathesis, and allergy to local anaesthetic medication were excluded from the study.

Data on demographic and clinical factors, including age, concomitant lower urinary tract symptoms (LUTS), duration of LUTS and prostatic volume, were collected and assessed.

Procedure

An enema was administered to all patients before the procedure. All patients received an injection of Amikacin 500mg one hour before the procedure, as part of the departmental antibiotic prophylaxis protocol. The patient was positioned in the left lateral position and underwent a digital rectal examination. Before the biopsy, Group 1 (Apical block group) and Group 2 (ITA group) received 10 ml of 2% Intrarectal topical Xylocaine. The prostate was initially punctured using a biopsy needle, followed by the injection of 2% lignocaine, and the patient's pain response to the needle insertion was evaluated. When the injected lignocaine separated the prostate from the rectal wall on the ultrasound monitor, seen as an ultrasonic wheal, the anaesthetic agent's deposition was considered successful. The prostate was punctured once again with the biopsy needle before tissue retrieval began. A successful anaesthetic implied numbness over the prostate. Following that, the level of numbness was scored using a numeric pain rating scale.

Both research groups underwent TRUS-guided 12-core prostate biopsies utilising biopsy needles following a 5-minute anaesthetic period. WBFPRS was utilised to evaluate pain before, during, and after the prostate biopsy procedure, including pain suffered at the time of probe insertion, during biopsy, 30 minutes post biopsy and 3 days following the procedure. On post-biopsy days 3 and 7, clinical outcomes were evaluated in terms of fever, epididymo-orchitis, haematospermia, rectal bleeding, and haematuria.

Data Analysis

Descriptive and inferential statistical analyses were performed in the present study. Results for continuous measurements are presented as Mean ± Standard Deviation (Min–Max), and results for categorical measurements are presented as Number (percentage). Statistical significance was assessed at the 5% level. The student's t-test (two-tailed, independent) was used to evaluate the significance of study parameters on a continuous scale between two groups (intergroup analysis) for metric variables. The Chi-square test or Fisher's Exact test was applied to determine the significance of study parameters on a categorical scale between two or more groups in a non-parametric setting for qualitative data analysis. A p-value of <0.05 was considered statistically significant. Statistical analyses were conducted using SPSS software, version 18.0.

Results

The Wong-Baker FACES Pain Rating Scale (WBFPRS) results for pain during probe insertion (**Figure 1**) indicate that the highest percentage of patients reported mild pain (scale 2) in both Group 1 (67.4%) and Group 2 (66%), suggesting minimal discomfort during this stage.

During the biopsy itself (**Figure 3**), Group 1 showed peak frequencies at pain scales 4 (44.3%) and 2 (40.4%), while Group 2 peaked at scales 6 (46.2%) and 4 (37.5%). These findings suggest that Group 1 experienced lower pain levels during the biopsy compared to Group 2.

Post-biopsy pain assessments (**Figure 4**) showed that Group 1 most commonly reported no pain (scale 0 at 47.1%) or mild pain (scale 2 at 45.3%), whereas Group 2's highest responses were at pain scales 2 (42.8%) and 4 (37.5%). Thus, Group 1 had overall lower post-biopsy pain levels than Group 2.

Demographic and clinical characteristics (**Table 1**) of the Apical (n = 52) and Topical (n = 56) groups, including age, LUTS presence, symptom duration, and prostate volume, showed no significant differences. Both groups were similar in mean age (~66 years), 100% had LUTS, and symptom duration and prostate volume were comparable. On the third day post-procedure, while more patients in the Apical group reported "No Hurt" (71.2% vs. 55.4%), the difference was not statistically significant (p = 0.127).

Pain during and after the biopsy (**Table 2**) showed no significant difference during probe insertion. However, the Topical group reported significantly more pain during the biopsy and 30 minutes afterwards compared to the Apical group.

By Day 3 (**Table 3**), clinical outcomes, including haematuria, showed no statistically significant differences between the groups (p = 0.304). Similarly, Day 7 outcomes (**Table 4**) for fever, epididymo-orchitis, haematospermia, rectal bleeding, and haematuria revealed no significant differences between the Apical and Topical groups.

Figure 1: Wong-Baker FACES Pain Rating Scale

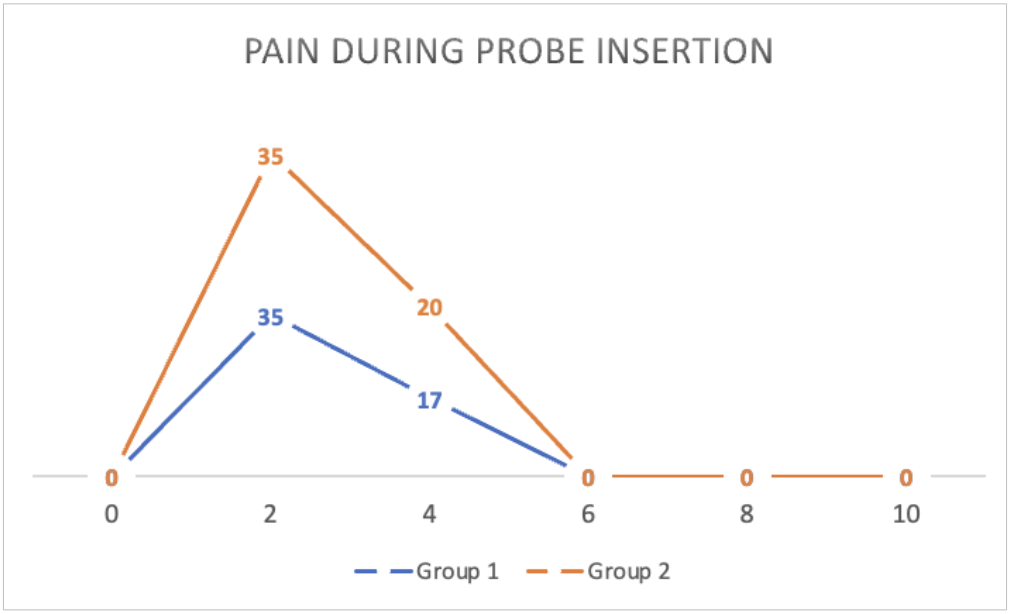

Figure 2: The measured outcome for pain during probe insertion.

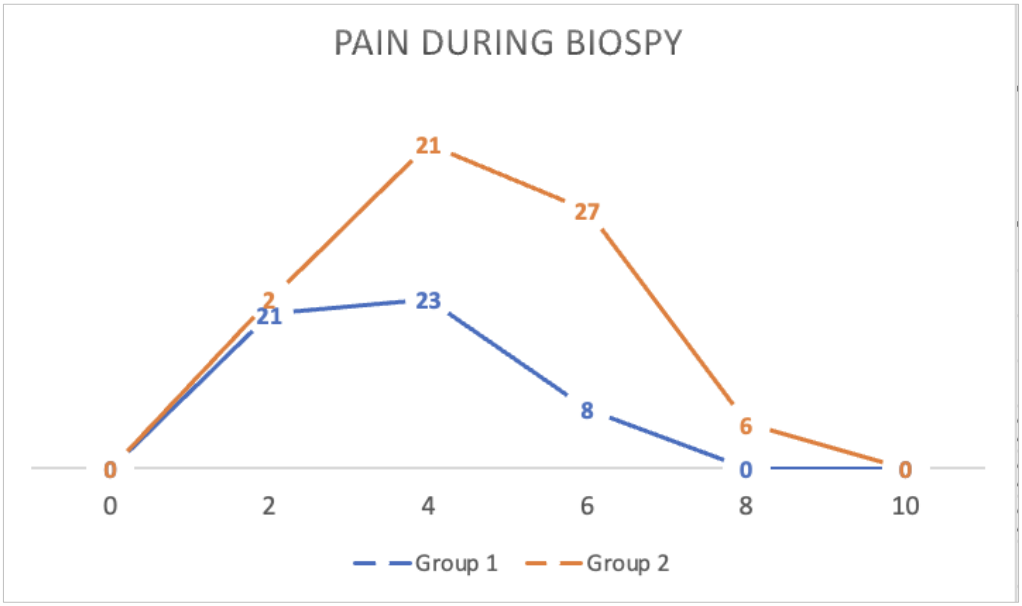

Figure 3: The measured outcome for Pain during biopsy.

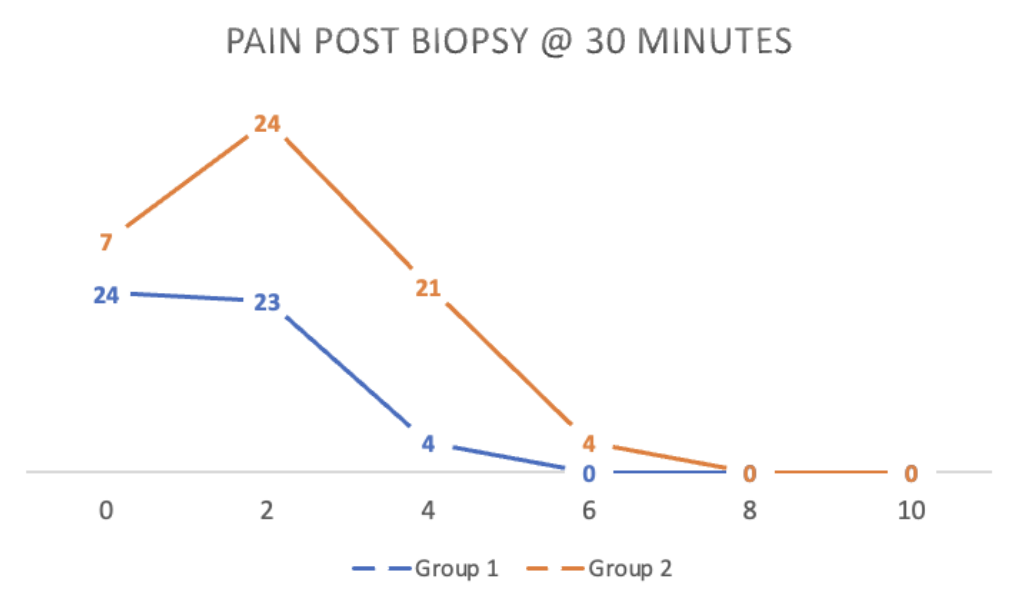

Figure 4: The measured outcome for Pain post biopsy after 30 min duration.

Table 1: Demographic and Clinical Characteristics of Study Participants.

Variables	Apical (n = 52)	Topical (n = 56)	Test Statistic	p-value
Age (Mean, SD)	66.08 ± 4.86	66.07 ± 4.59	T = 0.006	0.995
LUTS	52 (100%)	56 (100%)	Chi-sq = 0.0001	0.999
Duration of Symptoms Months	20.35 ± 4.699	20.09 ± 4.41	T = 0.293	0.771
Prostate Volume (cc) (Mean, SD)	67.42 ± 5.47	67.58 ± 5.17	T = -0.162	0.871
Pain at 3rd day				
No Hurt (0)	37 (71.2)	31 (55.4)	Chi-sq = 5.699	
Hurts Little Bit (2)	11 (21.2)	12 (21.4)	0.127	
Hurts Little More (4)	4 (7.7)	11 (19.6)		
Hurts Even More (6)	0 (0.0)	2 (3.6)		

Table 2: Pain Levels during and after Prostate Biopsy in "Apical" and "Topical" Groups.

Variables	Apical (n = 52)	Topical (n 56)	t- Statistic	p-value
Pain during probe insertion	2.654 ± 0.947	2.679 ± 0.956	-0.135	0.893
Pain during biopsy	3.5 ± 1.421	5.321 ± 1.441	-6.607	0.001**
Pain post biopsy 30 min	1.269 ± 1.315	2.786 ± 1.604	-5.389	0.001**

Table 3: Clinical Outcomes on Day 3 After Prostate Biopsy.

Day 3	Variables	Apical (n = 52)	Topical (n 56)	Chi-square	p-value
Fever	Yes	2 (3.8)	3 (5.4)	0.139	0.709
	No	50 (96.2)	53 (94.6)		
Epididymoorchitis	Yes	0 (0.0)	2 (3.6)	1.892	0.169
	No	52 (100)	54 (96.4)		
Hematospermia	Yes	0 (0.0)	0 (0.0)	0.000	1.00
	No	52 (100)	56 (100)		
Rectal bleed	Yes	4 (7.7)	5 (8.9)	0.054	0.816
	No	48 (92.3)	51 (91.1)		
Hematuria	Yes	8 (15.4)	13 (23.2)	1.055	0.304
	No	44 (84.6)	43 (76.8)		

Table 4: Clinical Outcomes on Day 7 After Prostate Biopsy.

Day 7	Variables	Apical (n = 52)	Topical (n 56)	Chi-square	p-value
Fever	Yes	0 (0.0)	1 (1.8)	0.937	0.333
	No	52 (100)	55 (98.2)		
Epididymoorchitis	Yes	0 (0.0)	1 (1.8)	0.937	0.333
	No	52 (100)	55 (98.2)		
Hematospermia	Yes	0 (0.0)	0 (0.0)	0.000	1.00
	No	52 (100)	56 (100)		
Rectal bleed	Yes	0 (0.0)	0 (0.0)	0.000	1.00
	No	52 (100)	56 (100)		
hematuria	Yes	0 (0.0)	0 (0.0)	0.000	1.00
	No	52 (100)	56 (100)		

Discussion

An essential step in prostate cancer screening is the transrectal ultrasound-guided prostate biopsy (TRUS PBx) [4]. This section compares the anaesthetic effects of 10 ml of 2% lignocaine administered via apical infiltration versus 10 ml of 2% intrarectal xylocaine gel (IXG) instilled before the biopsy. Pain levels during probe insertion, the biopsy procedure, 30 minutes post-biopsy, and three days after the procedure were evaluated using the Wong-Baker FACES Pain Rating Scale (WBFPRS). According to **Figure 1**, pain during probe insertion was most frequently rated at Pain Scale 2 in both Group 1 (67.4%) and Group 2 (66%), indicating that both groups experienced relatively mild pain. A study by Guo *et al.*, involving 148 patients, found no significant differences in pain scores between groups receiving intrarectal topical anaesthesia (ITA) and apical periprostatic nerve block (PNB) during probe insertion [2]. Similarly, Cevik *et al.* found mild to moderate pain during periprostatic block after the probe insertion, which supports the idea that both ITA and PNB can minimise pain during this phase [5]. These findings support the view that the pain of prostate biopsy is minimal and can be reduced with appropriate anaesthesia.

In this study, WBFPRS for pain during biopsy (**Figure 3**) shows that Group 1 had the highest percentage of patients reporting Pain Scale 4 (44.3%) and Pain Scale 2 (40.4%), while Group 2 had Pain Scale 6 (46.2%) and Pain Scale 4 (37.5%) as the most frequent responses. This suggests that Group 1 experienced less pain during the biopsy compared to Group 2. The pain experienced during the procedure is believed to be caused by the interaction of the biopsy needle with sensory nerves in the prostate capsule [1]. The inferior hypogastric plexus is the source of the prostate's autonomic nerve supply, and pain results when the needle contacts these nerves during the biopsy. The fact that apical infiltration with 2% lignocaine was found to be more effective than intrarectal anaesthesia (ITA) in reducing pain during the biopsy supports the previous studies suggesting that PNB offers superior analgesia6; PNB is now considered the gold standard for TRUS-guided prostate biopsy [7].

Post-biopsy pain (**Figure 4**) was also lower in Group 1, with the WBFPRS showing a maximum frequency for Pain Scale 0 (47.1%) and Pain Scale 2 (45.3%), whereas Group 2 had the highest frequencies for Pain Scale 2 (42.8%) and Pain Scale 4 (37.5%). These findings are consistent with Gurbuz *et al.*,[8] who found that intraprostatic analgesia using apical periprostatic infiltration with

2% lignocaine effectively controls post-biopsy pain. Additionally, Song *et al.*[9] demonstrated that PNB was significantly more effective than ITA in managing pain during anaesthesia and the biopsy itself.

The clinical outcomes from Tables 1, 2, 3 and 4 provide essential insights into the effectiveness and safety of 2% xylocaine apical infiltration compared to topical intrarectal xylocaine gel (IXG) for pain control during TRUS-guided prostate biopsy. Table 1 shows that the clinical characteristics of Group 1 (apical infiltration) and Group 2 (intrarectal xylocaine) were similar across several parameters, including age, prostate volume, and symptom duration. This uniformity is essential for ensuring the accuracy of pain assessments, as previous research emphasises the importance of homogenous patient characteristics in evaluating pain management efficacy [10,11].

Table 2 indicates that pain scores during and after the biopsy were significantly lower in Group 1 (apical infiltration) compared to Group 2 (intrarectal gel), with a p-value of 0.001. These results align with earlier studies conducted primarily on Caucasian populations, which found that apical periprostatic nerve block significantly reduces pain during TRUS biopsy [4]. This finding emphasises the suitability of apical PNB as an effective anaesthesia technique for prostate biopsies.

In Table 3, it is shown that 3 days post-procedure, there were no statistically significant differences in clinical outcomes such as fever, epididymo-orchitis, haematospermia, rectal bleeding, and haematuria between Group 1 and Group 2. This indicates that the type of anaesthesia used (apical versus intrarectal) did not significantly affect early post-biopsy clinical outcomes.

Similarly, Table 4 reveals that 7 days after the biopsy, there were no significant differences between the two groups for fever ($p = 0.333$), epididymo-orchitis ($p = 0.333$), haematospermia ($p = 1.00$), rectal bleeding ($p = 1.00$), or haematuria ($p = 1.00$). This further suggests that anaesthesia type does not significantly influence late post-biopsy clinical outcomes. Both groups showed similar rates of complications, which aligns with findings from Ozah *et al.*[12] who reported low complication rates for both groups, with hematuria and rectal bleeding being the most common, but none requiring hospitalisation.

The ease of administering apical PNB and the relatively low volume of xylocaine required make this method a practical choice. Furthermore, apical PNB is easily teachable, making it a feasible technique for doctors performing prostate biopsies. The results of a study by Moinzadeh *et al.*[13] noted the lack of significant difference in pain scores during probe insertion between apical and intrarectal groups, which may be attributed to the timing of the periprostatic block (administered after probe insertion). The mild pain experienced during this phase is consistent with existing literature, which describes this stage as inherently uncomfortable.

In terms of complications, Ozah *et al.*[12] found no hospital admissions or significant differences in complication rates between the apical and intrarectal groups. This study supports the safety of TRUS-guided prostate biopsy, as post-biopsy haematuria and rectal bleeding were the most common complications, consistent with previous studies [14]

Conclusion

In conclusion, the findings of this study indicate that 10 ml of 2% lignocaine administered via apical infiltration is more effective in controlling pain during probe insertion, biopsy, and post-biopsy than 10 ml of 2% intrarectal topical xylocaine gel. However, no significant differences were observed in clinical outcomes on Days 3 and 7 post-procedure between the two groups. This suggests that both anaesthetic techniques are safe and effective, but apical periprostatic nerve block (PNB) offers superior pain management during TRUS-guided prostate biopsy.

Declarations

Ethics approval

Ethics approval and consent to participate were obtained from the Institutional Ethics Committee.
Ethical committee Name: Ramaiah Medical College Ethical committee.
Approval number: MSRMC/EC/FEB-04/196-22

Informed & written consent

Informed & written consent obtained to publish data

Data Availability

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Conflict of Interest

The authors declare that they have no competing interests.

Funding Statement

None

Authors' contributions

Dron Sharma: Data acquisition, Analysis of Data, Manuscript Drafting.
Manasa T: Designed the work, Acquisition Analysis and Interpretation of data,
Manuscript Drafting
Puvvada Sandeep: Data acquisition, Analysis of Data.
Prasad Mylarappa: Conception, Design of the work, Draft revision

All authors have read and approved the manuscript.

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References

[1] Bingqian L, Peihuan L, Yudong W, Jinxing W, Zhiyong W. Intraprostatic local anaesthesia with periprostatic nerve block for transrectal ultrasound-guided prostate biopsy. J Urol. 2014;182:479–83.

[2] Guo G, Xu Y, Zhang X. TRUS guided transperineal prostate 12+X core biopsy with template for the diagnosis of prostate cancer. Oncol Lett 2017;13:4863 7.

[3] Saraçoğlu T, Unsal A, Taşkın F, Sevinçok L, Karaman CZ. The impact of pre-procedural waiting period & anxiety level on pain perception in patients undergoing transrectal ultrasound-guided prostate biopsy. Diagn Interv Radiol. 2013;18:195–9.

[4] Ochiai A, Babaian RJ. Update on prostate biopsy technique. Curr Opin Urol. 2014;14:157–62.

[5] Cevik I, Ozveri H, Dillioglugil O, Akdaş A. Lack of effect of intrarectal lidocaine for pain control during transrectal prostate biopsy: A randomised prospective study. Eur Urol 2012;42:217-20.

[6] Alabi TO, Tijani KH, Adeyomoye AA, Jeje EA, Anunobi CC, Ogunjimi MA, *et al.* Combined intrarectal lidocaine gel & periprostatic nerve block: A 'balanced' anaesthesia for transrectal ultrasound guided prostate biopsy? Niger Postgrad Med J 2018;25:252 6.

[7] Yang Y, Liu Z, Wei Q, Cao D, Yang L, Zhu Y, *et al.* The efficiency & safety of intra-rectal topical anaesthesia for transrectal ultrasound guided prostate biopsy: A systematic review & meta-analysis. Urol Int 2017;99:373 83.

[8] Gurbuz C, Canat L, Bayram G, Gokhan A, Samet G, Caskurlu T. Visual pain score during transrectal ultrasound-guided prostate biopsy using no anaesthesia or three different types of local anaesthetic application. Scand J Urol Nephrol 2016;44:212-6.

[9] Song SH, Kim JK, Song K, Ahn H, Kim CS. Effectiveness of local anaesthesia techniques in patients undergoing transrectal ultrasound-guided prostate biopsy: A prospective randomised study. Int J Urol 2016;13:707-10.

[10] Madej A, Wilkosz J, Różański W, Lipiński M. Complication rates after prostate biopsy according to the number of sampled cores. Cent European J Urol 2012;65:116 8.

[11] Wang J, Wang L, Du Y, He D, Chen X, Li L, *et al.* Addition of intrarectal local analgesia to periprostatic nerve block improves pain control for transrectal ultrasonography-guided prostate biopsy: A systematic review and meta-analysis. Int J Urol 2015;22:62 8.

[12] Ozah E, Ezenwa EV, Agbugui JO, Osaigbovo EO. Transrectal ultrasound-guided prostate biopsy in University of Benin teaching hospital: effect of prostate volume on pain amongst Nigerian patients. Am J Clin Exp Urol. 2021 Feb 15;9(1):157-162.

[13] Moinzadeh A, Mourtzinos A, Triaca V, Hamawy KJ. A randomised double blind prospective study evaluating patient tolerance of transrectal ultrasound-guided biopsy of the prostate using prebiopsy rofecoxib. Urology 2013;62:1054 7.

[14] Maccagnano C, Scattoni V, Roscigno M, Raber M, Angiolilli D, Montorsi F, *et al.* Anaesthesia in transrectal prostate biopsy: Which is the most effective technique? Urol Int 2011;87:1 13.