



www.bioinformation.net
Volume 22(6)

Research Article

Received June 1, 2026; Revised June 30, 2026; Accepted June 30, 2026, Published June 30, 2026

DOI: 10.6026/973206300223457

SJIF 2026 (Scientific Journal Impact Factor for 2026) = 8.478

2022 Impact Factor (2023 Clarivate Inc. release) is 1.9

Declaration on Publication Ethics:

The author's state that they adhere with COPE guidelines on publishing ethics as described elsewhere at <https://publicationethics.org/>. The authors also undertake that they are not associated with any other third party (governmental or non-governmental agencies) linking with any form of unethical issues connecting to this publication. The authors also declare that they are not withholding any information that is misleading to the publisher in regard to this article.

Declaration on official E-mail:

The corresponding author declares that lifetime official e-mail from their institution is not available for all authors

License statement:

This is an Open Access article which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly credited. This is distributed under the terms of the Creative Commons Attribution License

Comments from readers:

Articles published in BIOINFORMATION are open for relevant post publication comments and criticisms, which will be published immediately linking to the original article without open access charges. Comments should be concise, coherent and critical in less than 1000 words.

Disclaimer:

Bioinformation provides a platform for scholarly communication of data and information to create knowledge in the Biological/Biomedical domain after adequate peer/editorial reviews and editing entertaining revisions where required. The views and opinions expressed are those of the author(s) and do not reflect the views or opinions of Bioinformation and (or) its publisher Biomedical Informatics. Biomedical Informatics remains neutral and allows authors to specify their address and affiliation details including territory where required.

Edited by Ruby Singh

E-mail: bioinformationruby@gmail.com

Citation: Tiwari *et al.* Bioinformation 22(6): 3457-3460 (2026)

A comparative study of ultrasound-guided versus landmark-based femoral with sciatic nerve blocks in lower limb surgeries

Ajita Tiwari^{1,*}, Irfan Ahmad Siddiqui² & Sushil Chand Verma¹

¹Department of Anaesthesia, Birsu Munda Government Medical College, Shahdol, Madhya Pradesh, India, ²Department of Anaesthesia, Government Medical College, Satna, Madhya Pradesh, India, *Corresponding author

Affiliation URL:

<https://gmcsahdol.org/>

<https://gmcsatna.mp.gov.in/>

Author contact:Ajita Tiwari - E-mail: ajita.mishra@gmail.com; Phone: +91 7415895849Irfan Ahmad Siddiqui - E-mail: irfanahmad20@gmail.com; Phone: +91 8600688969Sushil Chand Verma - E-mail: drsushil1182@gmail.com; Phone: +91 9713071049**Abstract:**

Peripheral nerve blocks are widely used in lower limb surgeries to provide effective anesthesia and post-operative analgesia. Therefore, it is of interest to compare ultrasound-guided and landmark-based femoral with sciatic nerve block techniques in terms of success rate, onset time, duration of analgesia and complications. A prospective comparative study was conducted on 100 patients undergoing elective lower limb surgeries, divided equally into ultrasound-guided and landmark-based groups. Ultrasound-guided blocks demonstrated significantly faster onset, higher success rates, longer duration of analgesia and fewer complications compared to the landmark-based technique ($p < 0.05$). Thus, data shows that ultrasound guidance improves the safety, accuracy and overall efficacy of peripheral nerve blocks in clinical practice.

Keywords: Peripheral nerve block, ultrasound guidance, landmark technique, lower limb surgery, regional anesthesia

Background:

Peripheral nerve blocks are an essential component of modern regional anesthesia, particularly femoral with sciatic nerve block in lower limb surgeries, due to their ability to provide targeted anesthesia with minimal systemic effects [1]. Traditionally, landmark-based techniques have been used; however, these rely heavily on anatomical knowledge and may be associated with variable success rates and complications [2]. The use of ultrasound guidance has significantly enhanced regional anesthesia by enabling real-time visualization of neural structures, adjacent tissues and needle positioning [3]. Recent studies have demonstrated improved block accuracy, reduced onset time and decreased complications with ultrasound-guided techniques compared to conventional methods [4]. Despite these advantages, the adoption of ultrasound guidance in resource-limited settings remains inconsistent [5, 6]. Therefore, it is interest to compare ultrasound-guided and landmark-based femoral with sciatic nerve blocks in lower limb surgeries to assess their clinical effectiveness and safety.

Methods:

A prospective, randomized comparative study was conducted in the Department of Anesthesiology at a tertiary care center. A total of 100 patients undergoing elective lower limb surgeries were included in the study.

Inclusion criteria:

- [1] Patients aged 18–65 years
- [2] ASA physical status I and II
- [3] Scheduled for elective lower limb surgery
- [4] Patients providing informed consent

Exclusion criteria:

- [1] Coagulopathy or bleeding disorders
- [2] Infection at injection site
- [3] Allergy to local anesthetics
- [4] Neurological disorders affecting lower limbs
- [5] Refusal to participate

Grouping:

- [1] Group A (n=50): Ultrasound-guided femoral with sciatic nerve block
- [2] Group B (n=50): Landmark-based femoral with sciatic nerve block

Parameters assessed:

- [1] Block onset time
- [2] Block success rate
- [3] Duration of analgesia
- [4] Complications (vascular puncture, nerve injury, local anesthetic toxicity)

Statistical analysis:

Data were analyzed using SPSS version 26. Continuous variables were expressed as mean $\pm$ standard deviation and compared using Student's t-test. Categorical variables were analyzed using Chi-square test. A p-value < 0.05 was considered statistically significant.

Results:

A total of 100 patients were included in the study and divided equally into Group A and Group B (50 patients each). The demographic variables such as age, gender and ASA status were comparable between the two groups. No statistically significant difference was observed ($p > 0.05$). This indicates that both groups were similar at baseline (Table 1). Group A showed a significantly faster onset of block compared to Group B ($p < 0.001$). The success rate was significantly higher in Group A, indicating superior efficacy of the ultrasound-guided technique (Table 2). The duration of analgesia was significantly longer in Group A compared to Group B ($p < 0.001$). This suggests improved post-operative pain control with the ultrasound-guided approach (Table 3). The incidence of complications was lower in Group A compared to Group B. A statistically significant difference was observed for vascular puncture ($p < 0.05$), while other complications were not statistically significant (Table 4). Figure 1 demonstrates a significantly faster onset time in Group A compared to Group B.

Table 1: Demographic characteristics of patients in Group A and Group B

Parameter	Group A	Group B	p-value
Age (years)	42.5 ± 10.2	43.1 ± 9.8	0.78
Gender (M/F)	28/22	30/20	0.67
ASA I/II	32/18	30/20	0.64

Table 2: Comparison of block characteristics between Group A and Group B

Parameter	Group A	Group B	p-value
Onset Time (min)	8.2 ± 2.1	15.4 ± 3.6	<0.001
Success Rate (%)	96%	82%	0.02

Table 3: Comparison of duration of analgesia between Group A and Group B

Parameter	Group A	Group B	p-value
Duration (hours)	10.5 ± 2.3	7.8 ± 2.0	<0.001

Table 4: Comparison of complications between Group A and Group B

Complication	Group A	Group B	p-value
Vascular puncture	2%	10%	0.04
Nerve injury	0%	4%	0.15
LA toxicity	0%	2%	0.31

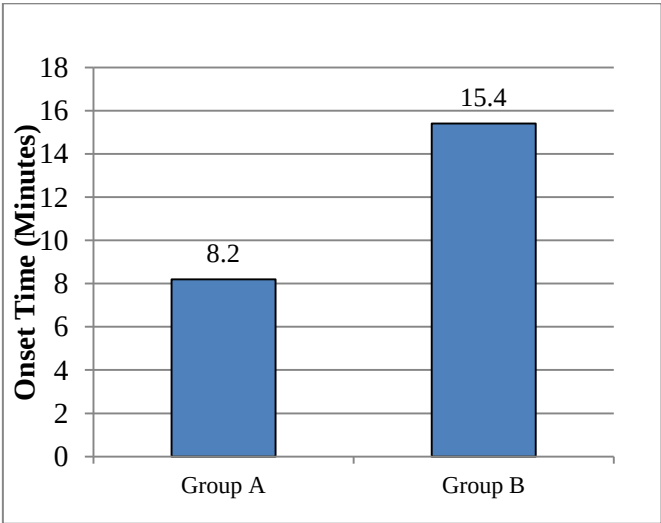


Figure 1: Comparison of block onset time between Group A and Group B

Discussion:

Recent developments in regional anesthesia have highlighted the importance of ultrasound guidance in enhancing the precision and reliability of nerve block techniques [7]. In the present study, ultrasound-guided femoral with sciatic nerve blocks demonstrated a significantly faster onset time compared to landmark-based techniques, which is consistent with findings from recent studies [8]. The higher success rate observed in the ultrasound group can be attributed to direct visualization of neural structures and accurate local anesthetic deposition [9].

Additionally, the reduced incidence of complications such as vascular puncture further supports the safety advantage of ultrasound guidance [10]. Recent studies have also highlighted improved patient outcomes and reduced procedural variability with ultrasound use [11]. Despite this, the requirement for equipment and training may limit its widespread use in certain healthcare settings [12, 13]. The findings of this study have important clinical implications, suggesting that the use of ultrasound guidance can enhance procedural efficiency, improve patient safety and optimize perioperative outcomes in lower limb surgeries. However, this study has certain limitations, including a relatively small sample size and single-center design, which may limit the generalizability of the findings.

Conclusion:

Ultrasound-guided femoral with sciatic nerve blocks are superior to landmark-based techniques in lower limb surgeries, offering faster onset, higher success rates, prolonged analgesia and fewer complications. Incorporating ultrasound guidance into routine anesthetic practice can significantly improve patient outcomes and procedural safety. Thus, efforts should be made to enhance accessibility and training to facilitate its broader implementation.

References:

[1] Sehmbi H *et al.* *Anaesthesia*. 2021 **76**:974. [PMID: 33118163]
[2] Abdallah FW *et al.* *Anesthesiology*. 2020 **132**:839. [PMID: 32044802]
[3] Chin KJ *et al.* *Reg Anesth Pain Med*. 2021 **46**:581. [PMID: 34145071]
[4] Pakpirom J *et al.* *BMC Anesthesiol*. 2022 **22**:198. [PMID: 35752755]
[5] Dohlman LE *et al.* *Local Reg Anesth*. 2020 **13**:147. [PMID: 33122941]
[6] Desai N *et al.* *Anaesthesia*. 2021 **76**:100. [PMID: 33426668]
[7] Haskins SC *et al.* *Reg Anesth Pain Med*. 2021 **46**:1031. [PMID: 33632778]
[8] Eman A *et al.* *Medicine (Baltimore)*. 2024 **103**:e40311. [PMID: 39496033]
[9] Christensen AB *et al.* *Acta Anaesthesiol Scand*. 2025 **69**:e70063. [PMID: 40536436]
[10] Hill J *et al.* *Reg Anesth Pain Med*. 2022 **21**:103751. [PMID: 35863787]
[11] Ashken T *et al.* *Reg Anesth Pain Med*. 2022 **47**:762. [PMID: 36283714]
[12] Macfarlane AJR *et al.* *Anaesthesia*. 2021 **76**:27. [PMID: 33426662]
[13] Pattajoshi B *et al.* *Cureus*. 2022 **14**:e26137. [PMID: 35891863]

Caveat Emptor is applicable among the literate community where required and possible. The publisher, its journal, editors and the

internal/external reviewers take adequate steps to check, evaluate, correct, edit, revise and improve content where possible and required.