

## **An Observational Study to Evaluate the Efficacy of Genicular Nerve Block for Pain Management in Osteoarthritis Knee Patients**

**Jaideep Singh<sup>1</sup>, Shikha Mehrotra<sup>2</sup>, Sushma Uikey<sup>3</sup>, Sonali Gupta<sup>4</sup>**

<sup>1</sup>Associate Professor, Department of Anaesthesia, Gandhi Medical College Associated Hamidiya Hospital, Bhopal, M.P

<sup>2</sup> Prof.& Head of Department, Department of Anaesthesia, Gandhi Medical College Associated Hamidiya Hospital, Bhopal, M.P

<sup>3,4</sup>(3<sup>rd</sup> Year RMO), Department of Anaesthesia, Gandhi Medical College Associated Hamidiya Hospital, Bhopal, M.P

---

Received: 25-10-2022 / Revised: 25-11-2022 / Accepted: 14-12-2022

Corresponding author: Dr. Sushma Uikey

Conflict of interest: Nil

---

### **Abstract**

**Background & Method:** Osteoarthritis also known as degenerative joint disease is the most common type arthritis most likely to develop as people age causing significant pain and functional limitation. Several studies suggested that genicular nerve BLOCK is a safe and effective therapeutic procedure for intractable pain associated with chronic knee osteoarthritis (OA). Ultrasound-guided genicular block provided > 50% pain relief in knees using this technique. This simple technique causes all three genicular nerves blocked.

**Methods:** 60 patients (age 20-70 years) with advanced knee osteoarthritis pain (Kellgren Lawrence grade 3-4) who failed conservative treatment underwent ultrasound-guided genicular nerve block. The genicular nerve block is performed. This method was used to inject a total of 6 mL of lidocaine plus 20 mg of triamcinolone (TA) at 3 separate target sites: the superior lateral, superior medial, and inferior medial genicular nerves). Outcome measures were assessed according to hospital visits at baseline and at 1, 4, and 12 weeks after the procedure via visual analogue scale (VAS) graded 0 to 10 .0 means no pain 10 means worst pain and Western Ontario and McMaster Universities Arthritis Index (WOMAC) The test questions are scored on a scale 0-4 which correspondence to None (0), Mild (1), Moderate (2), Severe (3), and Extreme 4.

**Results:** At 3 month follow-up, the patient get relief from baseline knee pain and functional improvement. At 12 weeks, all outcome measures revealed statistically significant. Improvement in swelling, tenderness and knee pain is seen.

**Conclusion:** Nerve block, a new promising local therapy for RA, can control disease activity in knee joints according to clinical and US scales. In conclusion, the results of this study have shown that genicular nerve block treatment is safe and beneficial in osteoarthritis related knee pain.

**Keywords:** chronic pain, genicular nerve block, knee osteoarthritis, steroids.

**Study Designed:** Observational Study.

---

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

---

## Introduction

Osteoarthritis also known as degenerative joint disease is the most common type arthritis most likely to develop as people age causing significant pain and functional limitation. Various non pharmacological and pharmacological methods available for osteoarthritis in the past with only modest clinical benefits, but in the advanced osteoarthritis surgical knee replacement remains the definitive treatment of choice. [1,2] Many patients, who choose not to undergo surgery due to coexisting comorbidities or financial constraints, accept this pain and disability as inevitable corollaries of OA and ageing. Genicular nerves block is a novel technique for the alleviation of knee pain in patients with Kellgren Lawrence grade 2, 3 and 4 osteoarthritis. [3] Pain relief and improvement in functioning is expected. In low-income countries where total knee arthroplasty is not available for the population this procedure could be of major interest for patients. This study aims at assessing the immediate benefits on pain, gait, and stairs kinematics after a genicular nerve blockade in patients suffering from knee osteoarthritis. [3,4]

Ultrasound -guided genicular block provided > 50% pain relief in knees using this technique. This simple technique permitted causes all three genicular nerves blocked. When performing the block, it was found that the inferomedial genicular artery was identified more easily than the superomedial and superolateral arteries [5].

Several studies have reported the successful performance of GNB or RF genicular ablation under ultrasound guidance. This technique is based on anatomical studies demonstrating that genicular nerves are accompanied by genicular arteries or are located near the adductor tubercle and medial collateral ligament. Ultrasound-guided block genicular yielded both significant

reductions in knee pain and improvements in functional capacity [6].

Kellgren-Lawrence classification scale for knee OA.

### Grade Description

- 0- No radiologic features of osteoarthritis
- 1- Doubtful narrowing of joint space, possible osteophytic lipping
- 2- Possible narrowing of joint space, definite osteophytes
- 3- Definite narrowing of joint space, multiple osteophytes, some subchondral sclerosis, possible bony deformity
- 4- Marked narrowing of joint space, large osteophytes, severe subchondral sclerosis, definite bony deformity

### Aims and Objective:

To evaluate the efficacy of genicular nerve block for management of chronic knee pain due to osteoarthritis.

### Material & Method

The present study was conducted in department of Anaesthesiology, Gandhi medical college and associated Hamidia hospital, Bhopal.

After approval by institutional ethical committee and written informed consent; Study was conducted on 60 patients of 20–70 years, American Society of Anesthesiologists physical status I to III with chronic knee pain who visited our Pain Clinic.

### Inclusion criteria:

60 patients (age 20-70 years) with advanced knee osteoarthritis pain (Kellgren Lawrence grade 3-4) who failed conservative treatment underwent ultrasound-guided genicular nerve block. The genicular nerve block is performed.

### Methodology:

After taking written informed consent from patients. Each patient was placed in the supine position with a pillow under the popliteal fossa to alleviate discomfort. The examined area was prepared and draped according to standard sterile techniques, and the 12 MHz linear probe was covered with sterile plastic. The transducer was first placed parallel to the long bone shaft and moved up or down to identify the epicondyle of the long bone. The genicular arteries were identified near the periosteal areas and confirmed by color Doppler ultrasound. Accordingly, GNB target points should be next to each genicular artery because the superior lateral, superior medial, and inferior medial genicular artery traveled along each genicular nerve. After using color Doppler to confirm the genicular artery, the needle was inserted in the plane of the ultrasound probe in the long-axis view. After confirming the placement of the needle-tip next to a genicular artery, a gentle aspiration was performed and a 2 mL injection volume was administered. This method was used to inject a total of 6 mL of lidocaine plus 20 mg of triamcinolone (TA) at 3 separate target sites: the superior lateral, superior medial, and inferior medial genicular nerves). After the procedure, all the patients were advised to continue using any previously prescribed medications when their symptoms were persisted. after the procedure. The patients are observed in the recovery room and then discharged.

Outcome measure analysis; All preoperative baseline and postprocedural outcome measurements (1, 4, and 12 weeks) at the outpatient pain clinic. Baseline characteristics were recorded for all patients. Weight-bearing radiographs were reviewed at baseline, and the Kallgren-Lawrence system was used to grade the degree of OA.

1. Outcome measures were assessed according to hospital visits at baseline and at 1, 4, and 12 weeks after the procedure via verbal numeric rating scale (VNRS) graded 0 to 10 .0 means no pain 10 means worst pain.
2. Western Ontario and McMaster Universities Arthritis Index (WOMAC) The test questions are scored on a scale 0-4 which correspondence ;None(0),Mild(1),Moderate(2),Severe(3),and Extreme (4).
3. WOMAC score is a sum of questionnaire 0-20 score for pain,0-8 for stiffness , and 0-68 for physical function.

**Statistical Analysis:** Statistical analysis was performed using SPSS software program (Chicago, IL, USA) for Windows version 11.0 using Anova test Data were shown as mean  $\pm$  standard deviation .Statistical analysis was performed to determine average degree pain relief and standard deviation in those who showed any response to treatment.

### Results

Total 60 patients are included in the study 38 male patients and 22 female patients.

All patients had established disease with more than 1-year duration. Pain decreased after of interventions At 12 weeks, all outcome measures revealed statistically significant. VNRS mean  $3.8944 \pm 2.1$  and WOMAC mean  $1.2500 \pm 1.10978$  p value is 0.000 statistically significant. participants with shorter disease duration, higher VAS score at baseline expressed a better response to GNB, whereas age and gender were not related to the response to GNB. No complications were noted.

**Table No. 1: Verbal numerical rating scale (vnrs)**

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
PR	60	66.00	96.00	79.4000	7.48603
DBP	60	60.00	90.00	74.2667	5.56584
SBP	60	106.00	134.00	122.2667	7.48754
SPO2	60	0.02	0.99	.9683	.12467
RR	60	14.00	16.00	14.6667	.95077
AGE	60	26.00	65.00	44.4833	11.42624
Valid N (listwise)	60				

ANOVA Test P- Value = 0.000 (Significant)

**Table No. 2: Womac Score**

	N	Mean	Std. Deviation	Minimum	Maximum	P-VALUE
PRE-TREATMENT	60	3.0167	0.65073	2.00	4.00	0.000 (Significant)
PRE-DICHARGE	60	0.3000	0.46212	0.00	1.00	
DAY 7	60	0.4000	0.58802	0.00	3.00	
DAY 30	60	1.1667	0.41850	0.00	2.00	
DAY 90	60	1.3667	0.48596	1.00	2.00	
Total	300	1.2500	1.10978	0.00	4.00	

ANOVA Test P- Value = 0.000 (Significant)

## Discussion

The patients had significant pain relief and improvement in knee functions throughout a follow-up period of 3 months. Ultrasound guidance was used successfully for localization of the genicular nerves. The findings of the study showed that there was a significant improvement in pain and satisfaction in the genicular nerve block treatment and it was concluded that block of genicular nerves appears to be a safe, effective, and minimally invasive treatment process for chronic knee osteoarthritis [7]. Local therapy presents an ideal solution. It provides an effective and economic alternative for mounting systemic treatment plans. Local injection of various materials including steroids, methotrexate, and biologics has been proofed in OA with encouraging results our study shows the effect of genicular nerve block on joint inflammation in RA patients. VNRS and WOMAC score for tenderness and swelling were used for assessment. It was

noticed in this study that GNB action is more sustained [8]. In the GNB a strong positive correlation was observed between disease duration and sonographic score. This finding indicates that the shorter the disease duration, the better outcome. This can be attributed to the fact that a longer disease duration is associated more with irreversible damage and poorer outcome [9]

Based on patient interviews and data collection, genicular nerves block can supply significant pain relief beyond 3months, on average greater than 50% pain relief in our patient population. Genicular nerve block is a reasonable option for patients suffering from chronic knee OA pain who do not wish to pursue knee surgery [10,11].

## Conclusion

Nerve block, a new promising local therapy for RA, can control disease activity in knee joints according to clinical and US scales. In conclusion, the results of

this study have shown that genicular nerve block treatment is safe and beneficial in osteoarthritis related knee pain.

### References

1. Breedveld F. C. Osteoarthritis—the impact of a serious disease. *Rheumatology* 2004; 43 (suppl\_1): i4-i8.
2. Kim DH, Choi SS, Yoon SH, Lee SH, Seo DK, Lee IG, Choi WJ, Shin JW. Ultrasound-Guided Genicular Nerve Block for Knee Osteoarthritis: A Double-Blind, Randomized Controlled Trial of Local Anesthetic Alone or in Combination with Corticosteroid. *Pain Physician*. 2018 Jan;21(1):41-52.
3. Khuba S., Tewari S., Kumar S., Gautam S., & Agarwal A. Role of ultrasound in diagnostic genicular nerve block for knee osteoarthritis pain. *Indian Journal of Clinical Anaesthesia*, 2019; 6(4): 565-569.
4. Lebleu J., Fonkoue L., Bandolo E. et al. Lower limb kinematics improvement after genicular nerve blockade in patients with knee osteoarthritis: a milestone study using inertial sensors. *BMC Musculoskeletal Disord* 2020; 21:822.
5. Fonkoue L, Steyaert A, Kouame JK, Bandolo E, Lebleu J, Fossoh H, Behets C, Detrembleur C, Cornu O. A Comparison of Genicular Nerve Blockade with Corticosteroids Using Either Classical Anatomical Targets vs Revised Targets for Pain and Function in Knee Osteoarthritis: A Double-Blind, Randomized Controlled Trial. *Pain Med*. 2021 May 21;22(5):1116-1126
6. Elsaman AM, Maaty A, Hamed A. Genicular nerve block in rheumatoid arthritis: a randomized clinical trial. *Clin Rheumatol*. 2021; 40:4501–4509
7. Kidd VD, Strum SR, Strum DS, Shah J. Genicular nerve radiofrequency ablation for painful knee arthritis: the why and the how. *JBJS Essent Surg Tech*. 2019; 13(9):e10
8. Kim SY, Le PU, Kosharsky B, Kaye AD, Shaparin N, Downie SA. Is Genicular Nerve Radiofrequency Ablation Safe? A Literature Review and Anatomical Study. *Pain Physician*. 2016;19(5):697–705.
9. Davis T, Loudermilk E, DePalma M, et al. Prospective, multicenter, randomized, crossover clinical trial comparing the safety and effectiveness of cooled radiofrequency ablation with corticosteroid injection in the management of knee pain from osteoarthritis. *Reg Anesth Pain Med* 2018; 43:84–91.
10. Chakroborty B., Parvin S., Hossain M. M., & Hossain M. J. Self- Examination of Breast of the Students of Nursing College in Bangladesh. *Journal of Medical Research and Health Sciences*. 2022; 5(12): 2339–2344.
11. McCormick ZL, Reddy R, Korn M, et al. Cooled radiofrequency ablation of the genicular nerves for chronic pain due to knee osteoarthritis: Six-month outcomes. *Pain Med* 2017;18(9):1631–41.