

August 7, 2018

Therapeutic genicular nerve blocks for treating chronic knee pain

Background

The knee joint is innervated by the articular branches of several nerves, which include the femoral, common peroneal, saphenous, tibial and obturator nerves. These articular nerve branches around the knee joint are known as genicular nerves. The superior lateral, superior medial, and inferior medial genicular nerves were identified as possible targets for nerve blocks. Genicular nerve block (GNB) may be performed for diagnosis or perioperative care. Therapeutic genicular nerve blocks for treating chronic knee pain, however, is controversial.

We set out to conduct a search and review of published studies and assess the evidence of therapeutic genicular nerve blocks for treating chronic knee pain. We focus our review on relevant randomized controlled trials (RCTs) and systematic reviews. Searching of Scopus resulted in four publications, including two RCTs and two case studies for GNB. No systematic review on the specific topic was found.

Evidence

In the first RCT, Qudsi-Sinclair et al (2016) compared genicular nerve neurotomy to GNB using a local anesthetic with corticosteroid in patients who had total knee arthroplasty but still experienced chronic pain. This is a very small study with low quality. The authors randomized 33 patients into two arms, but only 28 patients completed the study, resulting in a high differential attrition rate. In addition, the study design was flawed. The authors compared two experiential procedures without a sham control. Nevertheless, the authors showed some statistically significant reduction in pain and an improvement in joint function at 3 months and 6 months, and concluded that there was no difference between the two procedures in terms of pain reduction and function improvement. Detailed evaluation of the data shown in the paper, however, suggested that the changes in pain and function scales were so small that they were not clinically important. For example, the mean NRS value at the baseline was 6.43 (± 1.56) for the GNB group. The value dropped to 5.30 (± 1.80) at 3 months and 5.50 (± 3.51) at 6 months post treatment. The differences in the pain scores compared to the baselines were 1.1 and 0.9, respectively. Overall, we are unable to draw any conclusion from the RCT due to the low quality of the study.

In a recent RCT (Kim et al. 2018), forty-eight patients with chronic knee OA were randomly assigned to either the lidocaine alone group (n = 24) or lidocaine plus triamcinolone (TA) group (n = 24) before ultrasound-guided GNB. Visual analog scale (VAS), Oxford Knee Score (OKS), and global perceived effects (7-point scale) were assessed at baseline and at 1, 2, 4,

and 8 weeks after the procedure. Though the lack of a sham control and a short follow-up period (2 months) are of the shortcomings, the overall quality of the study is good.

The VAS scores were significantly lower in the lidocaine plus TA group than that in the lidocaine alone group at 2 weeks ($P < 0.001$) and 4 weeks ($P < 0.001$) after GNB. The alleviation of pain (a minimal clinically important improvement) in the lidocaine alone group was observed at one week post procedure, but was not sustained at 2 weeks. The clinically important improvement was achieved at 2 weeks in the lidocaine plus TA group, indicating that TA may enhance the analgesic effect of lidocaine in the short term. Although a similar intergroup difference in function was observed at 4 weeks ($P < 0.001$), a clinically important improvement in function lasted for only one week. No patient reported any post-procedural adverse events during the follow-up period. The authors concluded that when combined with a local anesthetic and corticosteroid, GNB could provide short-term pain relief. However, the clinical benefit of corticosteroid administration was not clear, given the potential adverse effects of corticosteroid.

Table 1. Summary of the evidence

Outcome	F/U	RCTs	N	Results/Conclusion	Quality
GNB with local anesthetic vs. local anesthetic + corticosteroid					
VAS; Oxford knee score (OKS)	1, 2, 4 and 8 weeks	Kim 2018	48	No sham control, high differential attrition rate > 10% The nerve blocks with lidocaine alone resulted in clinically significant knee pain reduction at 1 week after GNB, whereas the blocks with lidocaine plus triamcinolone extended the pain relief at 2 weeks. Clinically important improvement in function was observed at 1 week after GNB in both group. The authors concluded that when combined with a local anesthetic and corticosteroid, GNB could provide short-term pain relief (up to 2 weeks). However, the clinical benefit of corticosteroid administration was not clear, given the potential adverse effects of corticosteroids.	●●●○ Moderate
RF neurotomy of GN vs. GN block (After TKA)					
Pain, function (OKS, KSS), AE, disability, QoL (SF-36), analgesic use	3, 6 and 12 months	Qudsi-Sinclair 2016	28	No sham control; poor design and data analyses; “as treated” analysis instead of ITT; high differential attrition rate > 10% The authors showed statistically significant reduction in pain (NRS) and an improvement in joint function during the first 3 to 6 months and concluded that no difference found compared to GN block in pain and function. The changes in NRS and function scales, however, were so small that they were not clinically important. Overall, we are unable to draw any conclusion from the RCT because of the low quality of the study.	●○○○ Very low

Guidelines

The American Society of Anesthesiologists published a practice guideline “Practice Guidelines for Chronic Pain Management” in 2010 [1]. It states in the document “peripheral somatic nerve blocks should *not* be used for long-term treatment of chronic pain”.

Other payers' policies

Table 2. Selected payer's policy on GNBs for knee pain

Payer	Policy	Note
CMS	No NCD identified on the CMS website	
Blue Cross Blue Shield Florida	Nerve block injection of the genicular nerve for the treatment of chronic knee pain is considered experimental or investigational. The available scientific evidence remains insufficient to permit conclusions concerning the effect of this procedure on net health outcomes.	4/15/ 2018
Aetna	Not covered for cluneal, ganglion, genicular, and obturator nerve blocks for chronic pain or for repetitive peripheral nerve blocks for chronic non-malignant pain	2018
Anthem	Genicular nerve blocks and genicular nerve ablation are considered investigational and not medically necessary for the treatment of chronic knee pain, including but not limited to any of the following: <ul style="list-style-type: none"> • Degenerative joint disease; • Osteoarthritis of the knee; • As a treatment prior to knee replacement; • As a treatment following knee replacement; • As a treatment for individuals who are not candidates for knee replacement surgery 	03/29/2018

Conclusions

The evidence regarding genicular nerve block is scant. Though some evidence showed that GNB might provide short-term pain relief, the effectiveness of this procedure on chronic knee pain has not been established. The safety and effectiveness of repetitive anesthetic/steroid injections are unproven.

References

- Adiguzel, E., A. Uran, S. Kesikburun, O. Köroğlu, Y. Demir, and E. Yaşar. 2015. 'Knee pain relief with genicular nerve blockage in two brain injured patients with heterotopic ossification', *Brain Injury*, 29: 1736-39.
- González Sotelo, V., F. Maculé, J. Minguell, R. Bergé, C. Franco, and X. Sala-Blanch. 2017. 'Ultrasound-guided genicular nerve block for pain control after total knee replacement: Preliminary case series and technical note', *Rev Esp Anesthesiol Reanim*, 64: 568-76.
- Hirasawa Y, Okajima S, Ohta M, Tokioka T. 2000. 'Nerve distribution to the human knee joint: anatomical and immunohistochemical study', *Int Orthop*, 24:1-4.
- Kim, D. H., S. S. Choi, S. H. Yoon, S. H. Lee, D. K. Seo, I. G. Lee, W. J. Choi, and J. W. Shin. 2018. '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*, 21: 41-51.

Qudsi-Sinclair, S., E. Borrás-Rubio, J. F. Abellan-Guillén, M. L. Padilla del Rey, and G. Ruiz-Merino. 2017. 'A Comparison of Genicular Nerve Treatment Using Either Radiofrequency or Analgesic Block with Corticosteroid for Pain after a Total Knee Arthroplasty: A Double-Blind, Randomized Clinical Study', *Pain Practice*, 17: 578-88.