Medical Journal of Bakırköy

Med J Bakirkoy 2022;18:77-81
DOI: 10.4274/BMJ.galenos.2022.2022.2-15

Research

Does Application of Genicular Nerve Block in Addition to Intra-articular Steroid Injection Increase Efficacy in Patients with Knee Osteoarthritis?

Diz Osteoartritli Hastalarda Eklem İçi Steroid Enjeksiyonuna Ek Olarak Genikuler Sinir Bloğu Uygulanması Etkinliği Artırır mı?

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ABSTRACT

Objective: Knee osteoarthritis is a disease which is characterized by severe pain and joint stiffness. Intra-articular steroid injections improve pain relief and knee mobility and widely used routinely especially if the inflammation and effusion are present in the joint. Genicular nerve block has been reported to be a new successful method in the management of chronic knee pain related to gonarthrosis. The current study assesss whether genicular nerve block application in addition to intra-articular steroid injection provides a more successful result.

Methods: Study was designed retrospectively and was conducted in the pain clinic of a tertiary care hospital. One hundred ten patients admitted to the outpatient clinic with the diagnosis of chronic knee pain between January 2016 and June 2018, were treated with genicular block with intra-articular steroid injection (group 1) and only intra-articular steroid injection (group 2). The patients were asked to rate pain [visual analog scale (VAS)] before the intervention and at the 1st and 6th months after the intervention.

Results: VAS scores (Mean ± standard deviation) before the intervention group 1 was 7.20±0.99 and group 2 was 7.10±1.00; 1st month after the intervention group 1 was 4.30±2.24 and group 2 was 4.39±2.55; and 6th month after the intervention group 1 was 5.72±1.96, in group 2 was 5.20±2.36. No statistically significant difference was found between the groups in pain scores in all three time periods.

Conclusion: In patients suffering from knee pain due to osteoarthritis, genicular nerve block applied in addition to intra-articular steroid injection does not provide additional benefit in pain scores.

Keywords: Knee osteoarthritis, genicular nerve block, intra-articular steroid injection

ÖZ

Amaç: Diz osteoartriti şiddetli ağrı ve eklem sertliği ile karakterize bir hastalıktır. Eklem içi steroid enjeksiyonlarının ağrıyı azalttığı ve diz hareketlerini iyileştirdiği gösterilmiş olup özellikle eklemde iltihaplanma ve efüzyon varsa rutinde yaygın olarak kullanılmaktadır. Geniküler sinir bloğunun gonartroza bağlı kronik diz ağrısı tedavisinde başarılı yeni bir yöntem olduğu bildirilmiştir. Bu çalışma, eklem içi steroid enjeksiyonuna ek olarak geniküler sinir bloğu uygulamasının daha başarılı bir sonuç sağlayıp sağlamadığını değerlendirmeyi amaçlamaktadır.

Gereç ve Yöntem: Çalışma geriye dönük olarak tasarlandı ve üçüncü basamak bir hastanenin ağrı kliniğinde yapıldı. Ocak 2016-Haziran 2018 tarihleri arasında kronik diz ağrısı tanısı ile polikliniğe başvuran 110 hastaya eklem içi steroid enjeksiyonu ve ek olarak geniküler sinir bloğu (grup 1) veya sadece eklem içi steroid enjeksiyonu (grup 2) uygulandı. Hastalara girişim öncesi ve girişim sonrası 1. ve 6. aylarda ağrı skorları [vizuel analog skala (VAS)] soruldu.

Bulgular: Girişim öncesi VAS skorları (Ortalama ± standart sapma) grup 1 7,20±0,99 ve grup 2 7,10±1,00; girişim sonrası 1. ayda grup 1 4,30±2,24 ve grup 2 4,39±2,55; girişim sonrası 6. ayda grup 1 5,72±1,96, grup 2 5,20±2,36 idi. Her üç zaman periyodunda da ağrı skorlarında gruplar arasında istatistiksel olarak anlamlı bir fark bulunmadı.

Sonuç: Osteoartrite bağlı diz ağrısı olan hastalarda eklem içi steroid enjeksiyonuna ek olarak uygulanan geniküler sinir bloğu ağrı skorları açısından ek fayda sağlamamaktadır.

Anahtar Kelimeler: Diz osteoartriti, geniküler sinir bloğu, eklem içi steroid enjeksiyonu

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Cite as: Çetingök H. Does Application of Genicular Nerve Block in Addition to Intra-articular Steroid Injection Increase Efficacy in Patients with Knee Osteoarthritis? Med J Bakirkoy 2022;18:77-81

Received: 18.02.2022
Accepted: 02.03.2022

INTRODUCTION

Chronic knee osteoarthritis (OA) is a condition that is more common in elderly and is characterized by severe pain, joint stiffness and disability (1). The aim of treatment in patients with OA is to reduce symptoms, minimize functional disability and prevent the progression of structural changes in the affected joints (1). Intra-articular (IA) corticosteroid therapy is widely used for treating the knee OA. IA steroid injections improve acute pain relief and knee mobility, especially during exacerbation of OA associated with joint inflammation and effusion (2).

The knee joint is innervated by the articular sensory branches of various nerves, including femoral, obturator, saphenous, common peroneal and tibial nerves (3). These nerve branches around the knee joint are known as genicular nerves. Under fluoroscopic or ultrasound guidance, several genicular nerves -superior medial, superior lateral and inferior medial genicular nerves- can be easily percutaneously blocked. Genicular nerve radiofrequency (RF) neurotomy has been reported to be a reliable method in the management of chronic knee pain related to OA (4).

This retrospective study aims to investigating whether genicular nerve blocks (GNB) in addition to IA steroid injection is superior on solely IA steroid injections, in terms of postoperative visual analog scale (VAS) scores for the treatment in patients with chronic pain in knee OA.

METHODS

Study was designed retrospectively and was conducted in the pain clinic of a tertiary care hospital. After the Istanbul University, Istanbul Faculty of Medicine Clinical Research Ethics Committee approval (decision no: 1346, date: 21.11.2019); the patients with stage 3-4 knee OA-related radiological changes based on the Kellgren-Lawrence rating scale who treated with GNB with IA steroid injections or solely IA steroid injections were included to the study as inclusion criteria. Exclusion criteria were determined that acute knee pain, severe neurological or psychiatric disorders, knee IA steroid or hyaluronic acid (HA) injection during the previous 6 months, previous knee surgery, having other pathologies in the same extremity that may cause pain, fibromiyalgia.

The patients were divided into 2 groups retrospectively: Patients who received GNB with IA steroid injection were classified as group 1 and patients who received solely IA steroid injection were classified as group 2. In our clinic, both injections are administered to all patients with routine drugs and doses. Triamcinolone acetonide 40 mg was used for IA steroid injection in the both group and 2 mL 1% lidocaine solution for each nerve was used for GNB and blocked superior medial, superior lateral and inferior medial genicular nerves. All procedures were performed under ultrasound guidance.

The patients were asked to rate pain (VAS) before the intervention and at the 1st and 6th months after the intervention during outpatient control visit.

Statistical Analysis

The data analysis was performed using SPSS Version 20.0. The normal distribution of the variables was assessed using the Kolmogorov-Smirnov test. Wilcoxon test was used to compare preoperative and postoperative VAS scores. The Mann-Whitney U test was used to compare the two groups in terms of nonparametric data. Categorical variables were determined by chi-square test. Tests considered statistically significant if $p<0.05$.

RESULTS

During the retrospective evaluation period, 122 patients were included in accordance with the inclusion and exclusion criteria. However, as 12 patients could not be reached, sufficient data could not be obtained, and as a result, 110 patients were included in the study. Sixty nine patients in group 1 and 41 patients in group 2 were included (Table 1, 2).

Mean ± standard deviation VAS scores in the preoperative period in group 1 was 7.20±0.99 in group 2 7.10±1.00, in the postoperative period during first visit in group 1 was 4.30±2.24, in group 2 was 4.39±2.55 and postoperative period at 6th month in group 1 was 5.72±1.96, in group 2 was 5.20±2.36. Between group 1 and group 2 before the intervention VAS scores there were statistically no significant difference ($p>0.05$). Between group 1 and group 2 one month after the intervention VAS scores there were statistically no significant difference ($p>0.05$). Between group 1 and group 2 six months after the intervention VAS scores there were statistically no significant difference ($p>0.05$) (Table 3).

When evaluated within both groups, Preoperative and postoperative first visit and 6th month VAS scores were compared and statistical significance was found ($p<0.05$) (Figure 1).

DISCUSSION

In our clinic, some patients with chronic knee pain due to OA are given only IA steroid injection, while geniculate nerve block is applied to some of them in addition to IA steroid injection. In this study aim was to compare long term efficacy of these two interventional treatment modalities.

Table 1. Age profile of patients

	Group 1					Group 2				
	n	Mean	SD	Maximum	Minimum	n	Mean	SD	Maximum	Minimum
Age	69	63.07	9.60	79	40	41	61.71	9.47	76	45

Group 1 (GNB + IA steroid inj.), group 2 (IA steroid inj.), p>0.05, SD: Standard deviation, IA: Intra-articular, GNB: Genicular nerve blocks

IA steroid injections are used to provide decrease in pain and increase function of the knee joint. Pain decreases dramatically within the first 24 h and this effect persists for 4-8 weeks (5). Responses to IA steroid injections vary in clinical experience, however some randomized controlled trials (6) has shown short-term benefits in the management of chronic pain with knee OA. Although it has been stated that the injection of IA steroids and derivatives have negative effects on the joint cartilage but it has been reported in various publications in the literature that IA steroid injections are effective in relieving symptoms for chronic knee pain and are safe in the long-term period (7,8).

In their study, Raynauld et al. (8) used 40 mg triamcinolone and reported that there was benefit on night knee pain and joint stiffness during 24 months. They also found there was no loss of joint space in repeated corticosteroid injections. In a prospective, randomized, controlled trial comparing the effect of methylprednisolone, betamethasone, and triamcinolone, the positive effect of all three injections lasted for 12 weeks (9). High doses of corticosteroids ≥40 mg triamcinolone (50 mg equivalent of prednisone) are known in the literature to be more effective than low doses over a long time, such as 16 and more weeks (5). In current study was used 40 mg triamcinolone in both group and we think that's why long term benefit was significant.

In patients with knee OA, GNB is mostly used as a diagnostic procedure before RF ablation of the same nerves. However, following the benefit of the diagnostic block of genicular nerves, RF neurotomy of these nerves appears to be an important treatment alternative in patients suffering from chronic pain that does not heal with conventional treatments or is thought to be inoperable due to their comorbidities (10). However, studies have shown that GNB applied with a mixture of local anesthetic and steroid has similar efficacy with the genicular nerve RF thermocoagulation procedure (11).

Most of the studies in the literature are in the form of comparison of RF neurotomy to the genicular nerves with other interventional procedures. For example Sari et al. (10) compared genicular nerve RF neurotomy to IA injections and reported that in 1st and 3rd months there was significant

Table 2. Gender profile of patients

	Group 1		Group 2
	n		n
Gender	Male	16	3
	Female	53	38

Group 1 (GNB + IA steroid inj.), group 2 (IA steroid inj.), p>0.05, IA: Intra-articular, GNB: Genicular nerve blocks

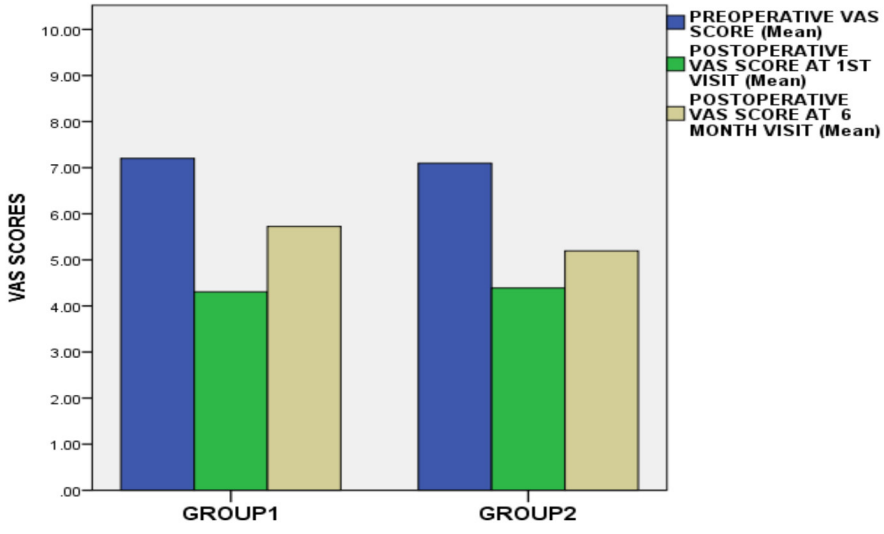

Figure 1. VAS scores of groups
VAS: Visual analog scale

Table 3. VAS score comparison of both groups

		Group 1	Group 2	p-value
VAS score (Mean ± SD)	Before the intervention	7.20±0.99	7.10±1.00	p>0.05
	1st month after the intervention	4.30±2.24	4.39±2.55	p>0.05
	6th month after the intervention	5.72±1.96	5.20±2.36	p>0.05

Group 1 (GNB + IA steroid inj.), group 2 (IA steroid inj.), SD: Standard deviation, IA: Intra-articular, GNB: Genicular nerve blocks, VAS: Visual analog scale

pain reduction in the RF neurotomy-performed group. Choi et al. (4) compared genicular nerves RF neurotomy to the control group in chronic pain with knee patients with OA. They reported that the RF neurotomy group showed superior improvement compared with the control group at both 4 and 12 weeks. Another study showed that genicular nerve RF neurotomy resulted on average in a 60% decrease in baseline chronic knee pain in at least during 6 months (12). In our study RF neurotomy following successful blocks weren't performed. But based on the studies that reminded above, we think that GNB may be effective in the short term, but for long term benefit genicular nerve RF neurotomy should be performed.

GNB has also been compared with non-invasive treatments in patients with chronic knee OA. For example, in the study by Güler et al. (13) two groups were formed to ultrasound guided GNB group and physical therapy group. A comparison was made in terms of both pain and functional parameters. As a result compared to physical therapy, ultrasound-guided GNB helps reduce pain and increasing the functional and physical capacity, with greater retention of effects on the physical capacity seen at 12 weeks (13).

In our study before and after the intervention VAS scores were compared in both groups and the results were found to be significant. However, when the postoperative VAS scores of group 1 and group 2 were compared, our results were not significant and these results indicated that in the management of chronic knee pain IA steroid injection was effective but genicular blocks did not provide additional benefit. In a prospective structured study, contrary to our results, when GNB was added to IA steroid injection, a better analgesic effect and better functional result were obtained (14).

Minimally invasive treatment options for knee patients with OA with chronic pain also include different modalities as IA autologous platelet rich plasma (PRP) and HA injections. HA is a glycosaminoglycan and is a component of the synovial fluid and cartilage matrix (15). Vaishya et al. (16) reported that intraarticular injection of corticosteroid and HA in knee patients with OA with chronic pain relieve the pain temporarily. IA steroids provide relief for approximately 12 weeks, and HA provides relief for up to 6 months.

PRP is prepared from autologous blood by centrifugation to obtain a high-concentration platelet sample (17). In the second edition of the treatment guideline for patients with knee OA published in 2013 by the American Academy of Orthopedic Surgeons study group did not conclusively interpret the evidence for the benefit of IA PRP injection and could not recommend for or against use of IA PRP injection (18).

The current study has several limitations. The study conducted retrospectively. Details of analgesic consumption for 6 months could not be carefully monitored. Questioning functional parameters and patient satisfaction other than pain would have enabled us to reach a clearer result.

Conclusion

This study showed that corticosteroid injection is effective therapeutic modality for chronic pain in knee OA in long-term period. Adding genicular block to IA steroid injection does not show significant benefit. IA steroid injection may be recommended as a long-term useful treatment option for patients with comorbidities who cannot be operated or who do not respond to conservative treatment. Prospective randomized, controlled trials must evaluate the short and long-term effects of genicular block in chronic pain with knee OA as a one of treatment modalities.

ETHICS

Ethics Committee Approval: The study was approved by the Istanbul University, Istanbul Faculty of Medicine Clinical Research Ethics Committee (decision no: 1346, date: 21.11.2019).

Informed Consent: Retrospective study.

Financial Disclosure: The author declared that this study received no financial support.

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