Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/jptcp.v31i3.5022

ULTRASOUND-GUIDED GENICULAR NERVE BLOCK WITH LOCAL ANAESTHETIC AND CORTICOSTEROID FOR PAIN RELIEF IN KNEE OSTEOARTHRITIS AT A TERTIARY CARE HOSPITAL IN KASHMIR VALLEY.

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Abstract:
Background: Chronic knee osteoarthritis (OA) is a frequent disease among the elderly. Intra-articular corticosteroid injection (IACSI) was commonly adopted to alleviate knee OA-related pains. Recently, Genicular nerve block (GNB) has emerged as a new alternative technique. Diagnostic genicular nerve block (GNB) with local anesthetic has been generally conducted before making decisions regarding RF ablation. Although GNB has been recently performed together with corticosteroid, the analgesic effects of corticosteroids for treating chronic pain remain controversial.
Aim: To assess the effects of corticosteroids and local anesthesia during ultrasound-guided GNB in patients with chronic knee OA.
Methods: A profile of 30 Patients of knee osteoarthritis of moderate or higher grade, not responding to conservative treatment of physiotherapy and anti inflammatory drugs, were enrolled for the study. Patients having blood coagulopathies, unfit medical conditions, and local and systemic infections, Kellgren-Lawrence (KL) grade I were excluded.
Results: 15 patients (50%) had KL classification grade II knee osteoarthritis, while 11 patients (36.6%) had KL grade III and 4 patients (13.3%) had KL grade IV knee osteoarthritis among the study population. Mean OKS scores before treatment to OKS score at 24 hours showed very highly significant difference (p=0.0000) while scores remained similar at 4 and 12 weeks.
Conclusion: Ultrasound guided genicular nerve block using corticosteroid injection for knee osteoarthritis seems to be effective in decreasing pain and improving functional outcome in patients with severe osteoarthritis. However, further studies with larger sample size and longer duration of follow up are required to draw robust conclusions.

Keywords: Chronic pain, knee osteoarthritis, genicular nerve block, ultrasound, corticosteroid, local anesthetic, Oxford Knee Score.

Introduction:

Osteoarthritis (OA) of knee is a common degenerative disease responsible for huge burden of pain and disability. Elderly population over 60, around 18% of women and over 10% men are affected. Among Asian population, the prevalence of OA knee is 6% in young over 30 years and 12% among elderly people over 65.[1,2] The incidence of osteoarthritis in India is 28.7%.

The treatment of osteoarthritis of knee is mainly focused on pain relief and improvement of joint function. Surgical and non-surgical modalities are available. Though complex surgical procedures such as high tibial osteotomy and total knee replacements are effective, they are complex and expensive. Non-surgical options are myriad including weight reduction, physiotherapy, NSAIDs, and intra-articular injections of steroids, but not curative.

Generally, a diagnostic genicular nerve block (GNB) with local anesthetic is performed before RF genicular ablation, and a successful response to GNB is considered to indicate the need for RF genicular ablation. However, some studies have suggested that GNB, when administered together with corticosteroid, is as effective as RF genicular ablation.

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.

The objective of this study is to assess the effects of corticosteroids and local anesthesia during ultrasound-guided GNB in patients with chronic knee OA.

Materials &Methods:

This study was conducted over a period of 6 months from January 2022 to June 2022 at the Pain clinic of Dept. of Anesthesiology, Critical Care and Pain Medicine at Government Medical College, Srinagar. Patients of knee osteoarthritis of moderate or higher grade, not responding to conservative treatment of physiotherapy and anti inflammatory drugs, were enrolled for the study. Patients having blood coagulopathies, unfit medical conditions, and local and systemic infections, Kellgren-Lawrence (KL) grade I were excluded.

Patients were placed in 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 6-13 MHz linear 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, which were the junctions of the epicondyle and the shafts of the femur and tibia, and confirmed by Colour Doppler ultrasound.

Accordingly, GNB target points were identified next to each genicular artery because the superior lateral, superior medial, and inferior medial genicularartery travelled along each genicular nerve. After confirming the genicular artery, the needle was inserted in the plane of the ultrasound probe in the long-axis view. After a gentle aspiration, 3 mL injection volume was administered. This method was used to inject 9 ml of 0.2% ropivacaine plus 40 mg of triamcinolone (TA) at 3 separate target sites: the superior lateral, superior medial, and inferior medial genicular nerves. The functional outcome was analyzed using Oxford Knee Score (OKS) which consists of 12 parameters encompassing knee function and pain scores.

The mean OKS values before injection (pre-injection) and at 24 hours and 4 weeks and 12 weeks of follow up visits were compared by paired t statistics, with level of significance set at 95%, using software STATA IC16.

Results:

A total of 30 patients were included in the study. Our patients were between the ages of 40 to 89 years with a mean age of 59.23 years [Table 1].

Table 1: Age distribution among the study population

Age (years)	Frequency	Percentage
40-49	4	13.33
50-59	8	26.66
60-69	9	30.00
70-79	5	16.66
80-89	4	13.33

Table 2: Sex Distribution

In our study out of 30 patients, 12 were males and 18 were females [Table 2].

Sex distribution	Frequency	Percentage
Male	12	40.00
Female	18	60.00

In our study, 15 patients (50%) had KL classification grade II knee osteoarthritis, while 11 patients (36.6%) had KL grade III and 4 patients (13.3%) had KL grade IV knee osteoarthritis [Fig 1].

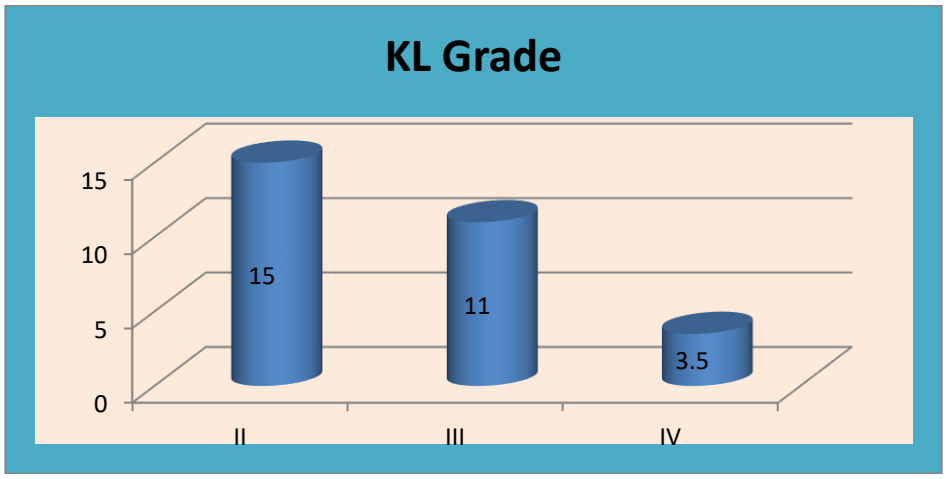

Fig 1.

In our study, 22 patients (73.3%) had primary osteoarthritis, 4 (13.3%) had rheumatoid arthritis (RA), 3 (10%) had gouty arthritis and 1 (3.3%) had arthritis secondary to trauma [Fig 2].

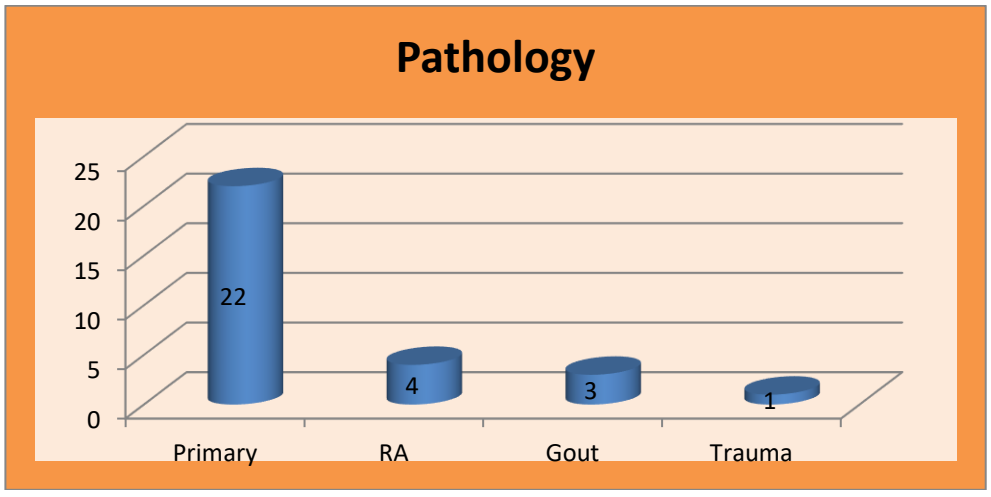

Fig 2.

In our study, the OKS scores of patients pre injection and after 24 hours, 4 weeks and 12 weeks of the genicular block were measured. The paired t comparison of mean OKS scores before treatment to OKS score at 24 hours showed very highly significant difference (p=0.0000) while scores remained similar at 4 and 12 weeks [Fig 3].

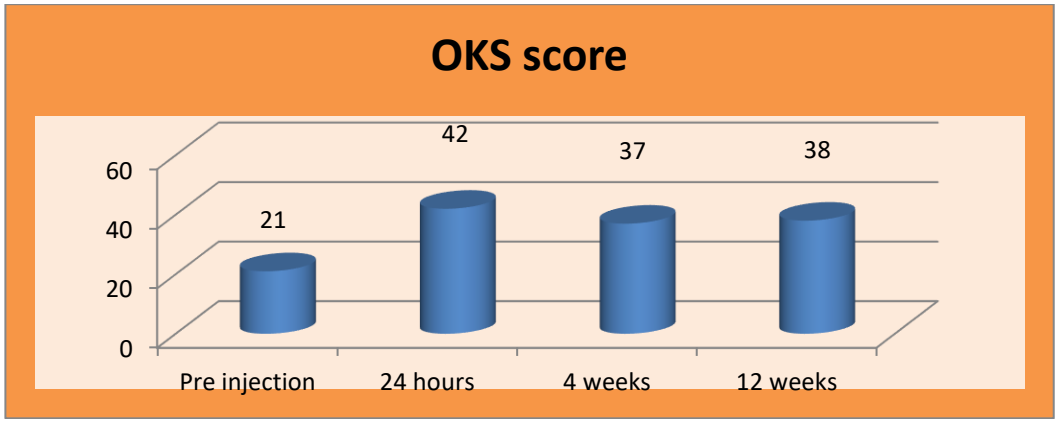

Fig 3.

Discussion

OA is a painful and disabling condition that constitutes a major challenge to healthcare professionals worldwide. It results in large societal and economic burden due to its physical and psychological sequelae. With increase in risk factors such as age, obesity and sedentary lifestyle, the global prevalence of OA is predicted to increase in the coming years.Osteoarthritic pain is traditionally considered nociceptive pain. Furthermore, neuropathic pain in OA has had been recognised and researched in chronic OA and managements targeted towards this component of pain have been researched extensively. Exploration of centrally acting medications for OA resulted in approval of the tricyclic antidepressants (amitriptyline), SNRI (duloxetine) and anticonvulsants (gabapentin and pregabalin) for management of pain. With advancements in technology of musculoskeletal ultrasound, discrimination of structures around knee has been possible. Thus, various image-guided interventions have been studied in recent decades for management of pain. Genicular nerve block is one such intervention, in which nerves around knee are the target.5

The aim of this study was to assess the effectiveness of ultrasound guided genicular nerve block using 40 mg triamcilone and 9 ml 0.2% ropivacaine injection in functional improvement in knee joint OA. Injection genicular nerve blockwere given to patients with grade II, III and IV knee OA who had significant disability, not improving from conservative treatment. These types of patients usually resort to anaelgesic abuse leading to long term complications and dependency on anaelgesics. 6,7

A total of 30 patients were included in our study. The mean age of our patients was 59.23 years. Out of 30, 12 were males and 18 were females. In our study, 15 patients (50%) had KL classification grade II knee osteoarthritis, while 11 patients (36.6%) had KL grade III and 4 patients (13.3%) had KL grade IV knee osteoarthritis. Our demographic parameters and KL grading of patients were similar to the study of Dutta D et al 1.

In this study, significant improvement in KL scores was noted at 24 hours and 4 weeks follow up which was sustained up to 12 weeks. Our findings were similar to the study of Dutta D et al 1 who noted improvement in KL scores at 4 weeks till 6 months. Our findings were in contrast with study by Kim et al8 which showed beneficial effect of intervention peaking at 2 weeks but then showing gradual decline.

The role of corticosteroids in prolonging analgesic effect of anaesthetics was observed by De Oliveira *et al*. in their randomised control trial to study the effect of combining perineural dexamethasone to improve post-operative analgesia in peripheral nerve block.9Combining injection dexamethasone with local anaesthetic during peripheral nerve block for upper and lower extremities resulted in a

better quality of post-operative analgesia and lower pain scores.9Afridi*et al.* in their study obtained either complete or partial response by injecting combination of local anaesthetic and corticosteroid into the greater occipital nerve in patients with primary headache syndromes.10The authors suggested the underlying mechanism of pain relief to be alteration in nociceptive processing and neuroplastic brain pathway mechanism.10

Diagnostic genicular nerve block with local anaesthetic before radiofrequency ablation has been performed in numerous studies. Qudsi-Sinclair *et al*. conducted a study to assess the effectiveness of genicular nerve block as therapeutic modality.11They compared genicular nerve neurolysis using radiofrequency ablation with nerve block of superomedial, superolateral and inferomedial branches of genicular nerve with a combination of local anaesthetic with corticosteroid.11During follow-up, both interventions showed similar effectiveness in improving pain and functional outcomes. This study could not recommend one treatment option over another.11

In our study, we observed a positive outcome throughout the follow-up of 24 hours, 4 weeks and 12 weeks. This outcome is consistent with multiple studies in which relief is observed in knee arthralgia with genicular nerve block in OA knee. Thus, genicular nerve block is an effective option to provide pain relief in OA knee with neuropathic pain component. The ease of performing the intervention and low cost of the consumables required during the procedure, make it a suitable tool for management of OA knee. Genicular nerve block can be a viable option for relief for those patients who either are not getting relief with short-term pain medication or cannot undergo knee replacement for any reason.5

CONCLUSION

Ultrasound guided genicular nerve block using corticosteroid injection for knee osteoarthritis seems to be effective in decreasing pain and improving functional outcome in patients with severe osteoarthritis. However, further studies with larger sample size and longer duration of follow up are required to draw robust conclusions.

Conflict of interest: Nil
Funding: Nil

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