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Original Article

Ultrasound Guided Genicular Nerve Block for Knee Osteoarthritis – Comparing Methylprednisolone and Triamcinolone with Ropivacaine- Randomized Prospective Double Blinded Study

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Abstract

Introduction: Chronic knee osteoarthritis (OA) commonly affects elderly population and is characterized by severe pain, joint stiffness and disability in using the joint. OA is a leading cause of disability worldwide. Genicular nerve block is effective procedure for chronic OA knee.

Aim: This study is to compare Triamcinolone and Methylprednisolone acetate with local anesthetic during ultrasound guided genicular nerve block (GNB) for knee OA.

Methodology: 50 patients were randomly divided into 2 groups. Group–A, 25 patients received 6ml of 0.5% Ropivacaine with 60mg Triamcinolone and Group–B, 25patient received 6ml of 0.5% Ropivacaine with 60mg Methylprednisolone acetate. VAS score and oxford knee score were assessed at baseline, 1, 2, 4 and 8 week intervals.

Results: The difference in VAS score between two groups were statistically insignificant (p value >0.05). Onset of drug in group A was 122.35±10.5 and group B was 117.9±15.4, which was statistically insignificant (p value >0.05). Oxford knee scoring in Group A was 30.1±1.4 and in Group B was 29.7±2.1, which was statistically insignificant (p value >0.05).

Conclusion: While considerable pain relief was achieved in all patients, the efficacy of both the drugs in chronic osteoarthritis is similar. Depending on patient factors either drug can be used in chronic osteoarthritis for pain relief.

Key words: Chronic knee osteoarthritis, Genicular nerve block, Methylprednisolone acetate, Triamcinolone

INTRODUCTION

Chronic osteoarthritis knee (OA) tends to affect elderly people and is characterized by severe pain, joint stiffness, and disability. Chronic osteoarthritis knee is often not effectively managed with prescribed medications.[1] Total knee joint arthroplasty may be a successful surgical option for cases that fail to respond to conservative treatments. However, surgery is associated with increased morbidity and mortality among patients with chronic knee OA, and its use is limited in high-risk patient with comorbidities.[2] Patients with chronic knee pain that has failed to respond to conservative care may be candidates for a genicular nerve block. This procedure is based on a theory that blocking the nerve supply to a painful area may alleviate pain and restore function. The knee joint is innervated by the articular branches of various nerves, including the femoral, common peroneal, saphenous, tibial, and obturator nerves. These branches around the knee joint are known as genicular nerves. Several genicular nerves can be easily approached with a needle under fluoroscopic guidance. Patients can get a diagnostic genicular nerve block to determine if this will provide adequate relief.A Genicular nerve block is a procedure where these nerves are anesthetized with local anesthetic injected through small needles. It generally takes 5 to 10 minutes for the procedure.[3]

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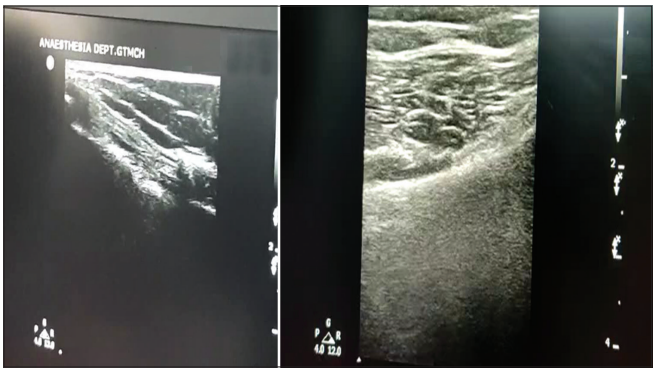
Therefore, in the present study, we aim to evaluate the efficacy comparing Triamcinolone and Methylprednisolone acetate with local anesthetic during ultrasound guided genicular nerve block (GNB) for knee OA.

METHODS

After approval by the institutional Ethics Committee, 50 patients were selected for this study. The patients included were between 40 to 70 years, both sexes, having grade II osteoarthritis knee whose pain duration more than 2 months. Patient who underwent prior knee surgery, morbidly obese (BMI>35kg/m2), who has connective tissue disorder, prior steroid injection within past 3 months, ASA III & IV categories and patient on anticoagulation medication were excluded from study.

Among the 50 patients selected, 48 patients were randomised using computerised randomization after excluding the patients with exclusion criteria. The randomised patients gave their informed, written consent to participate in this study. Group-A patients receiving 6ml of 0.5% Ropivacaine with 60mg Triamcinolone and Group- B patients receiving 6ml of 0.5% Ropivacine with 60mg Methylprednisolone acetate.

No premedications or sedatives were used. The patients were asked to stop all analgesic medication before procedure. Patient placed in supine position with pillow under the popliteal fossa to alleviate discomfort. High frequency linear probe 5-12MHZ placed parallel to long bone shaft and moved up or down to identify the epicondyle of the long bones. The genicular arteries were identified near the periosteal areas, which are the junctions of the epicondyle and the shafts of the femur and tibia.



Accordingly, GNB target points should be next to each genicular artery because the superior lateral, superior medial and inferior medial genicular artery traveled along with each genicular nerve.

The infero lateral area was spared because of associated peroneus muscle weakness which was responsible for plantar flexion and eversion of foot. After confirming the artery location, 22G needle inserted and tip placed next to genicular artery, a gentle aspiration performed and Group A received 2ml of 0.5% Ropivacaine with 20mg of triamcinolone and Group B received 2ml of 0.5% Ropivacaine with 20mg of methyl prednisolone acetate (depot) injected at 3 separate targets.

After the procedure, all of the patients were advised to continue using any previously prescribed medications when their symptoms were persisted, whereas, they were advised to stop or reduce current medication when their symptoms were alleviated. The patients were prohibited any additional medications or physiotherapy regimens at the 8-week post procedure period.

Before each procedure, the patients were instructed in the use of a visual analog scale (VAS) (range: no pain to unbearable pain) and Oxford Knee Score and baseline values were obtained.

OKSs were based on self-administered, joint-specific 12-item questionnaires. Each question was scored from 1 to 5, with one representing either the best outcome and/or the fewest symptoms. The scores from each question were summed to yield overall scores ranging from 12–60, with 12 representing the optimal outcome.

Outcome measure were assessed according to hospital visits at baseline and at 1,2,4 and 8 weeks after the procedure.

The statistical analysis used in this study were mean, standard deviation and Fisher's exact test was used. The data analysis was performed using SPSS Version 11.0

RESULTS

The demography data as per the Figures 1 and 2 shows that there is no much difference the age and sex distribution between two groups, thus not affecting the results of the study. The VAS score in Group A is 2.8±0.7 and Group B is 3.2±0.5. The difference in VAS score between two groups were statistically insignificant (p value >0.05) [Figure 3]. Onset of drug in group A was 122.35±10.5 and group B was 117.9±15.4, which was statistically insignificant (p value >0.05) [Figure 4]. Duration of action in Group A was 12.1 and in Group B was 15.4 [Figure 5]. Oxford knee scoring in Group A was 30.1±1.4 and in Group B was 29.7±2.1, which was statistically insignificant (p value >0.05) [Figure 6].

DISCUSSION

When performing GNB under ultrasound guidance,we used the genicular arteries as landmarks. The proportion of successful responders between the 2 groups during the follow-up period. Superior lateral, superior medial, and inferior medial genicular arteries were easily identified by color Doppler at the junctions of the epiphysis with the shaftsof the femur and tibia. Some studies have shown that genicular nerves were visible alongside the genicular arteries on ultrasound scans.[4,5] In this study, we verified that those nerves were distinguishable usingthe same ultrasound method. However, thegenicular nerves might frequently be unidentifiable via ultrasound. As the genicular nerves mostly travelled along the arteries, the GNB targets should be placed next to each genicular artery, regardless of genicular nerve visualization. Accordingly, the present study demonstrated that GNB could be successfully performed under ultrasound guidance, thus corroborating other ultrasound-based studies.[5,6] Although the addition of TA to Ropivacaine during GNB doesn't appeared to yield superior relief of knee pain upto 4 weeks after the procedure compared to GNB with Ropivacaine and triamcinolone, clinically significant knee pain relief was only sustained for 2 weeks after reassessing VAS scores according to the concept of a minimal clinically important improvement for the intermediate base score tertile in a prior study (change in VAS scores > 27.4 mm). However, after reassessing the OKSs according to the minimal important changes, with reference to a prior study (change in OKS> 9 points), the clinical improvements in functional

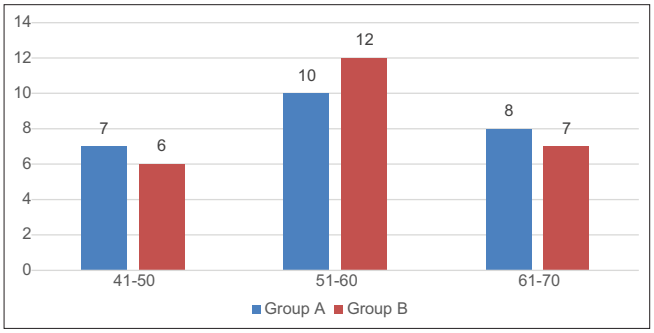


Figure 1: Age distribution

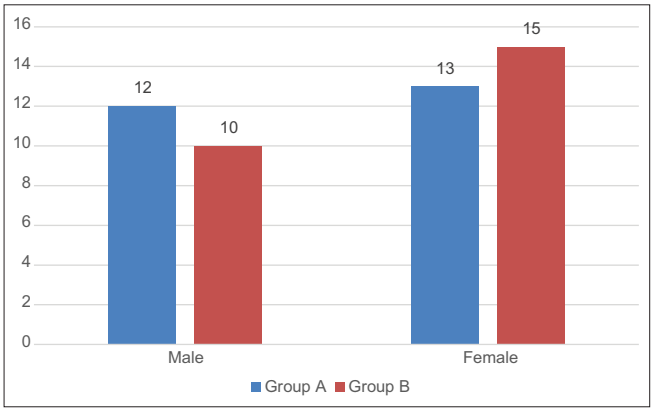


Figure 2: Sex distribution

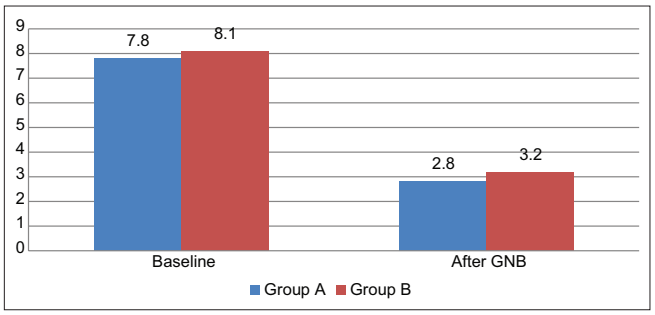


Figure 3: VAS Score

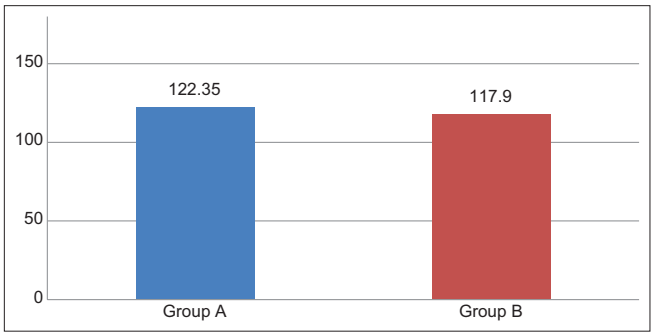


Figure 4: Onset Of Action

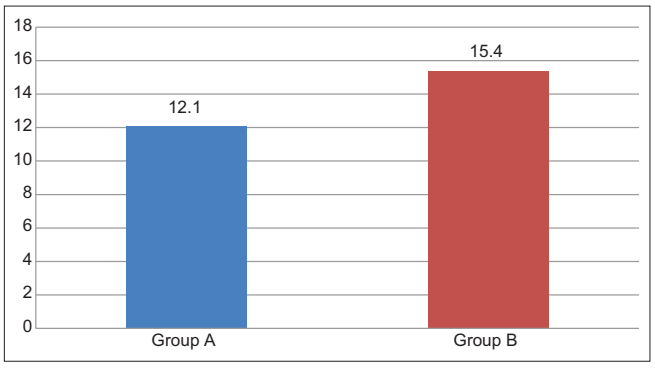


Figure 5: Duration Of Action

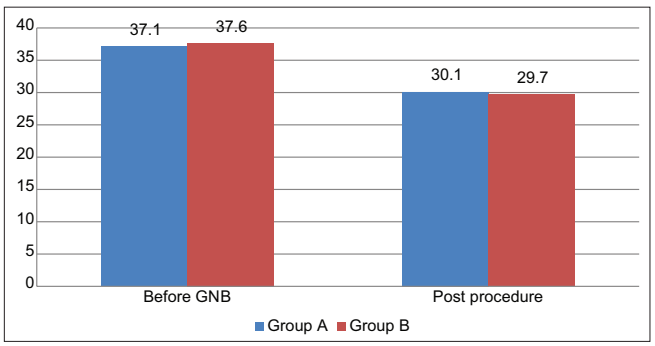


Figure 6: Oxford Knee Scoring (OKS)

capacity only persisted for one week in both groups. Moreover, there were no significant successful responders and MQS in both the groups at only 2 weeks after the procedure. Therefore, the addition of corticosteroid therapy to ultrasoundguided GNB under a local anesthetic might not provide significant benefits when compared to GNB with a local anesthetic with methyl prednisolone.

This study had several limitations that warrant consideration. First, we did not evaluate the postprocedural plasma cortisol concentrations. An injection of steroidsinto an epidural space can suppress the pituitary axissystem in a dose-dependent manner. Although we used a single 20 mg dose of TA, cortisol depression might still have occurred in some patients. Additionally, the optimal steroid type or dose is unknown, and a different dose or type might have yielded different results.

CONCLUSION

While considerable pain relief was achieved in all patients, the efficacy of both the drugs in chronic osteoarthritis is similar. Depending on patient factors either drug can be used in chronic osteoarthritis for pain relief.

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