Original Article

Comparison of analgesic and functional outcomes of Intra-articular Ketorolac versus Triamcinolone Acetone Injection in Patients of Knee Osteoarthritis

Soban Sarwar Gondal[1], Abeera Zareen[2], Muhammad Haroon Anwar[3], Jawad Zaheer[4], Muhammad Salim[5]

[1] Consultant Neurosurgeon, Rawalpindi Medical University, Rawalpindi.
[2] Assistant Professor, Department of Anesthesiology, Rawalpindi Medical University, Rawalpindi.
[3] Medical Officer, Rawalpindi Medical University, Rawalpindi.
[5] Professor, Department of Anesthesiology, Rawalpindi Medical University, Rawalpindi.
[6] Professor, Department of Anesthesiology, Islamic International Medical College, Rawalpindi.

Author's Contribution
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[3] *Experimentation/Study conduction*
[3] *Analysis/Interpretation/Discussion*
[2] *Manuscript Writing*
[4] *Critical Review*
[4] *Facilitation and Material analysis*

Corresponding Author
Dr. Muhammad Haroon Anwar,
Medical Officer,
Rawalpindi Medical University,
Rawalpindi.
Email: haroonanwar22@gmail.com

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Abstract

Objective: To compare the analgesic and functional outcomes of intra-articular ketorolac with corticosteroids in patients of knee osteoarthritis (OA).

Materials and Methods: In this randomized double-blind comparative study, we included patients of knee OA who were planned for intra-articular injections from January-2020 to December-2020 in the Department of Anesthesia and Pain Medicine at Rawalpindi Medical University. Patients having symptomatic knee OA of Kellgren-Lawrence grades 2 or 3 and age 40-70 years were allocated to two groups using block randomization, each block contained 30 patients and received an injection of either triamcinolone (Group T) or ketorolac (Group K). VAS score and Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) score were noted at 1 week, 1 month, and at 3 months of injection.

Results: Mean baseline WOMAC score was 46.60±5.64 in group K and 47.0±5.27 in group T (p-value 0.74). Mean WOMAC score was reduced significantly at 1st week and 1 month and 3 months follow-up in both groups, with an insignificant statistical difference in group K and T (p-value 0.39, 0.18 & 0.15 respectively). The baseline VAS score was 7.02±1.34 in group K versus 7.27±1.03 in group T (p-value 0.36). VAS score was also reduced at 1 week, 1 month, and 3 months follow-up, however the mean VAS at intervals was not statistically different between group K and T with a p-value of 0.13, 0.08, and 0.49 respectively. Treatment was successful in 22 (55%) patients in group K versus 24 (60%) patients in group T (p-value 0.65).

Conclusion: Intraarticular ketorolac has similar functional and analgesic outcomes as that of triamcinolone.

Keywords: Knee osteoarthritis, ketorolac, triamcinolone.

Introduction

Osteoarthritis (OA) is one of the progressing Musculoskeletal disorders affecting joints, the common sites of joint involvement are hip and knee joints.[1,2] Roughly about 250 million population suffer from OA every year worldwide. The prevalence is rising every year because of the increase in obesity and other OA-related comorbidities in the general population.[3] Approximately 10% of the world men population and 13% of women's population over 60 years suffer from OA.[4] Among all cases, knee arthritis accounts for >85% cases of OA.[5]

Primary OA of the knee is a type of arthropathy associated with inflammation. This inflammation causes a release of inflammatory mediators such as histamines and bradykinins and damages the articular and adjoining structures. The released inflammatory mediators sensitize nociceptors and modulate pain perception.[6,7]

The treatment of knee OA involves both conservative and surgical options. Conservative options include; weight loss, exercise, non-steroidal anti-inflammatory drugs (NSAIDs) and analgesic medications, bracing, and intra-articular injections.[8]

Intra-articular therapy involves the administration of corticosteroids, NSAIDs, hyaluronic acid, and platelet-rich plasma (PRP). The corticosteroids are the gold standard intra-articular therapy in knee OA patients.[9,10] Corticosteroids achieve these goals using several mechanisms such as inhibiting the release of cytokines, inflammatory cell adhesion & migration.[11] Hepper et al in a systematic review of outcomes of corticosteroids administration with placebo drugs reported that intra-articular corticosteroids administration significantly improves pain and knee movements as compared to placebo drugs.[12] However, corticosteroids are associated with varying amounts and duration of pain control.[13] Moreover, repeated administration of steroids is associated with a higher risk of cartilage breakdown, articular cartilage elasticity loss, and repeated joint infections.[14,15] Other drugs which are used for pain relief are NSAIDs. Ketorolac is an NSAID with strong analgesic. Since the last decade, it is being used worldwide for pain relief in arthroplasty, arthroscopy, and other concomitant procedures and has been reported to be safe and effective in these patients.[17] Some studies have suggested that NSAIDs can be alternative to corticosteroids for intra-articular administration as they have fewer side effects such as damage to the articular cartilage, ligaments, and knee kinetic functions.[16] However, limited literature is available regarding the efficacy of ketorolac in comparison to corticosteroids for intra-articular injection in knee OA patients. Therefore, in this study, we compared analgesic and functional outcomes of intra-articular ketorolac with corticosteroids in patients of knee OA in terms of VAS score and Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) score were noted at 1 week, 1 month, and at 3 months following the intervention.

Materials and Methods

Our pilot randomized comparative study included 60 patients with sample size calculated according to Open-Epi Calculator with a two-sided significance level (1-alpha): 95, Power (1-beta, % chance of detecting): 80, Ratio of sample size, Unexposed/exposed: 1, Percent of unexposed with the outcome: 5, Percent of exposed with the outcome: 59, Odds ratio: 27, Risk/Prevalence ratio: 12, Sample size 30 in each group so 30+30=60. Our study duration was of 12 months i.e., 1st, January 2020 to 31st, December 2020 in the Department of Anesthesia and Pain Medicine at Rawalpindi Medical University. Ethical approval was taken from IRB. 1 day before the intervention, the patients were informed regarding adverse effects such as pain at the injection site, swelling after injection, risk of damage to surrounding tissues such as ligaments, nerves, or bone, and informed consent was taken. A total of 60 patients having symptomatic OA of Kellgren-Lawrence grades 2 or 3 and age 40 to 70 years were included. Patients who had a recent intra-articular injection (past 3 months), having traumatic OA, drug abuse patients, pregnant females, and having an allergy to the study medications were excluded.

Patients were allocated a computer-generated random number and were divided into two groups with the T group receiving Triamcinolone (80mg) and the K group receiving Ketorolac (30mg). Each group had 30 patients.

Before injections, patient vital monitoring which included Blood pressure, Pulse rate, Respiratory rate, and Oxygen saturation were measured. During the procedure, 1.0% lidocaine injection was given to anesthetize the superficial skin and tissues, and then under aseptic techniques and ultrasonographic guidance medications were injected in joint space while the patient was in a supine position.

Following drugs were injected:

- Triamcinolone (80 mg) to the patients belonging only to the T group.
- Ketorolac (30 mg) to the patients belonging only to the K group.
- 5 ml (0.5%) lidocaine to both groups.
- 2.5 ml (25 mg) sodium hyaluronate to both groups.

After injecting the drugs, the syringe was withdrawn, the bandage was applied and vital monitoring was done every 15 minutes for 1h and then follow-up was performed at 1 week, 1 month, and at 3 months.

Data were collected according to a self-structured questionary having two parts (Attached in Annexure A). Baseline study characteristics such as age, body mass index (BMI), gender, laterality, duration, and intensity of pain as well as VAS score and Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) score were noted before intervention. The overall treatment response was assessed using the VAS scale, Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) score at 1 week, 1 month, and 3 months intervals. Patients having good and excellent results were labelled as having a successful outcome.

Data were analyzed with SPSS v23 software. Baseline and study characteristics of participants were compared using chi-square and independent sample t-tests for qualitative and quantitative variables respectively.

Results

Baseline characteristics are demonstrated in Table 1 whereas outcomes have been shown in Table 2.

Table 1: Baseline Characteristics

	Group K	*Group T*	*p-Value*
Age (Y)	55.6±9.2	57.2±8.30	0.42
Gender; Male/Female	14 (35%)/26 (65%)	16 (40%)/24 (60%)	0.64
OA Grade; 2/3	23 (57.5%)/17 (42.5%)	25 (62.5%)/15 (37.5%)	0.64
Laterality; Right/Left	18 (45.0%)/22 (55.0%)	17 (42.5%)/23 (57.5%)	0.82
VAS Score	7.02±1.34	7.27±1.03	0.36
WOMAC Score	46.60±5.64	47.0±5.27	0.74

Table 2: Comparison of Study Outcomes

	Group K	*Group T*	*p-Value*
WOMAC Score			
At 1st week	32.60±3.05	33.22±3.13	0.39
1 Month	22.65±2.49	21.92±2.35	0.18
3 Months	21.55±2.87	20.62±2.89	0.15
VAS Score			
At 1st week	3.12±0.51	3.30±0.0.53	0.13
1 Month	2.70±0.79	2.97±0.62	0.08
3 Months	2.15±0.57	2.25±0.71	0.49
Treatment Success			
Yes	22 (55.0%)	24 (60.0%	0.65
No	18 (45.0%)	16 (40.0%)	

Discussion

In our study, we compared the analgesic and functional outcomes in patients of knee OA who received ketorolac with those who received corticosteroids as intra-articular injections. Those having good and excellent results on follow-up were declared to have successful outcomes. In our study, the VAS score decreased over the period of time following the intervention whereas WOMAC scores improved. Our study did not show any statistically significant difference regarding analgesic and functional outcomes, with 3 months success rate of 55% in the ketorolac group and 60% in the corticosteroids group. Above mentioned findings are consistent with a number of studies.[18-20] Jianda et al in a study of 84 patients of knee OA comparing corticosteroids with ketorolac reported similar analgesic and functional outcomes, with a success rate of 59.5% in corticosteroids and 57.1% in the k group.[18]

In our study, there was an insignificant difference between the mean WOMAC score at 3 months follow up with score being 21.55 ± 2.87 for the Ketorolac group while for the Corticosteroid group it was 20.62 ± 2.89 (p-value 0.15). Similarly, the VAS score showed no statistical difference at 3 months follow up with the mean score being 2.15 ± 0.57 for the Ketorolac group and 2.25 ± 0.71 for the Corticosteroid group (p-value 0.49). Our findings are consistent with those of Jianda et al.[18] In his study the mean WOMAC score at 3 months follow-up was 22.81 ± 4.46 in corticosteroids and 21.98 ± 4.35 in the ketorolac group and the mean VAS score was 2.20 ± 0.52 in the corticosteroids group and 2.26 ± 0.63 in ketorolac group with insignificant p-values of 0.18 and 0.70 respectively.[18] In another study mean VAS scored decreased in both patient groups

that either received Ketorolac or Triamcinolone and no statistical difference was found (p-value=0.98).[19] However, patients receiving corticosteroids have a better functional outcome as compared to those receiving NSAIDs.[19]

In a study by Jurgensmeier et al other scales were used to measure analgesic and functional outcomes.[20] But still, the type of drug was an insignificant variable when considering the outcome and there were no statistical differences in the outcomes when drugs were considered singly.[20]

The institutional cost price of Ketorolac injection per patient was Rs.30 whereas Triamcinolone injection costs about Rs.734 per patient. As there is no statistical difference between analgesic and functional outcome following either intra-articular injection of NSAIDs or Corticosteroid, therefore treatment of knee OA with intra-articular Ketorolac injection is cost-effective. In a number of studies, NSAIDs were proven to be cost-effective as compared to steroids.[20,21]

This study is limited by a smaller study population, however, we included only a homogenous population and the control of strict inclusion and exclusion criteria made our results reliable. Studies with a larger sample population are needed that can explore statistically significant differences that these small sample studies failed to explore.

Conclusion

Intraarticular ketorolac has similar functional and analgesic outcomes as that of triamcinolone and is a cost-effective treatment for knee OA.

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