

Clinical Outcome following Intra-articular Triamcinolone Injection in Osteoarthritic Knee at the Community: A Randomized Double Blind Placebo Controlled Trial

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ABSTRACT

Background

Knee pain is one of the common complaints patients present with in any community based health camps and Osteoarthritis of knee is a usual diagnosis. Injecting a long acting steroid is a common practice to alleviate the symptoms of osteoarthritic knee.

Objective

To evaluate the clinical outcome of injecting Triamcinolone acetanoid in osteoarthritis of knee in a community set up over a randomized double-blind placebo control trial.

Method

A prospective, randomized, double blind, placebo control trial was carried out in community after obtaining the ethical clearance from the IRC. Patients with clinically diagnosed osteoarthritis of knee were injected either Triamcinolone or Placebo after recording the baseline scores of the knee by Knee injury and Osteoarthritis Outcome Score (KOOS) – Physical Function Short form (KOOS-PS), the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) and Visual Analogue Scale (VAS). The same tools were used at two, six and at twelve weeks post injection to evaluate the functional outcome and pain.

Result

One hundred and seventeen patients were available for analysis among which, 55(48.7%) patients received Triamcinolone and 58(51.3%) received placebo. The baseline status of knees of two groups was comparable at the start of study. There was significant pain relief in the group receiving Triamcinolone at two and six week but not in twelve weeks. Group receiving placebo had pain relief only for first two weeks. Functional outcome was significantly improved compared to baseline in both the groups until six weeks however, in the triamcinolone group, it was significant until twelve weeks. No major complications were noted.

Conclusion

Intra-articular injection of Triamcinolone acetanoid is effective in symptoms control and improving functional outcome in clinically diagnosed osteoarthritis of knees in community set up during health camps.

KEY WORDS

Community, Health camps, Intra-articular injection, Knee, KOOS-PS, Osteoarthritis, WOMAC

INTRODUCTION

Osteoarthritis (OA) of knee is one of the common causes of chronic knee pain. Symptomatic OA of knee is considered fourth leading cause of disability worldwide.¹ In United States, the estimated incidence rate is 240 per 100,000 person-year and it is considered a major public health problem, resulting in early retirement and joint replacement.^{2,3} Overall prevalence of OA knee in India is considered as 24.9% and particularly in the Jammu and Kashmir state, which is predominantly a mountainous state, the prevalence is even higher, as much as 42.4%.^{4,5} No epidemiological studies on OA knee have been conducted in Nepal so far as of our knowledge, however, similar results are expected as majority of geography of the country is mountainous and both the countries share socio economic and cultural similarities.

Dhulikhel Hospital, a community conceived Kathmandu University Hospital, provides comprehensive health care services via its numerous outreaches and frequent specialized health camps in its catchment area which are in majority mid hilly terrains. Patient complaining of knee pain is one of the common musculoskeletal problems patients present with, in such camps. Community based studies in neighboring countries like Tibet, India and Iran have found knee pain, particularly of osteoarthritis of knee joint, is one of the major complaints the patients present with while seeking health care.⁶⁻⁹ Only few literatures are available from Nepal which also mentions musculoskeletal problems, specifically knee pain and back pain as one of the major problems patients present while seeking health care services.¹⁰⁻¹²

The main objective in the management of OA knee is pain reduction, improved range of motion of joint and minimizing functional impairment. To achieve these objectives, various pharmacological and supportive management modalities are available. Intra articular injection of Triamcinolone, a long acting steroid, is one of the commonly practiced, minimally invasive treatment options available. Injecting an osteoarthritic knee is even more common practice in mobile health camps where the patients have one best chance of seeking treatment for his or her knee problems. There have been very few articles, which assessed the effectiveness of such practice in community setups. The present study is hence undertaken to evaluate effectiveness of intra articular Triamcinolone injections in clinically diagnosed osteoarthritic knees.

METHODS

A prospective, randomized double blind placebo controlled study was carried out after obtaining ethical clearance from the Institutional Review Committee and the informed written consent was also obtained from the patients. All the patients with clinically diagnosed osteoarthritis of knees, presenting to the health camps in the community,

organized by Department of Community Programs and Department of Orthopedics and Traumatology of Dhulikhel Hospital over one and a half years, from August 2015 to January 2017 were included in the study. The clinical diagnosis of osteoarthritis was established according to the criteria of American College Rheumatology (ACR). Other criteria to be included into the study were patients who would be available for follow up evaluation, either by visiting to the health center/hospital or consenting to provide information on telephone about the condition of their knees. The baseline status and the condition of patient's knee at follow up of two weeks, six weeks and twelve weeks after the injection was assessed by Knee injury and Osteoarthritis Outcome Score (KOOS) – Physical Function Shortform (KOOS-PS), the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) for the overall functional outcome assessment and Visual Analogue Scale (VAS) from 0 to 10 was used for assessment of pain.

In our study design, we scored KOOS-PS from no difficulty (0) to extreme difficulty (100). This is in accordance with KOOS-PS original article which was developed in 2008 as a stand alone short measure of function under the auspices of Osteoarthritis Research Society International (OARSI) and OMERACT.¹³ Then we used a nomogram to convert the raw summed scores of KOOS-PS of 0 – 28 into to standard KOOS-PS score of 0 – 100, (0 representing NO DIFFICULTY and 100 representing EXTREME DIFFICULTY). Similarly, the WOMAC scores ranging from 0 (best score) to 96 (worst score) based on the three subdomains of pain, stiffness, and difficulty in performing daily activities was used with. The crude score was then expressed in terms of percentage score, rating from 0 to 100.

Patients diagnosed with other diseases (Rheumatoid Arthritis or gouty arthritis etc.) and osteoarthritis already under medication, patient with history of known allergy to steroids were excluded from the study. Patients meeting the inclusion criteria were randomized into two groups Group 1 and Group 2, either receiving intra articular corticosteroid (Triamcinolone acetone) or a placebo (Normal Saline) with a lucky draw method. A health assistant, who was not involved in the research, maintained a record of blinding code and the medications given to the particular patient and returned the documents to the principal investigator in a sealed envelope after completion of each camp. The eligible patients received intra-articular injection from supero-lateral corner of the knee under sterile precautions. After intra-articular injection, all the patients received oral Aceclofenac 100 mg once a day for seven days and physiotherapy for the knee by a trained physiotherapist accompanying the health camp. At two weeks, then at six weeks and finally at twelve weeks, patients were followed up either at the community health center of Dhulikhel Hospital or through the telephone, regarding their knee status using the same tools as used in collecting the baseline data at the time of health camp. For the simplicity

of analysis, one patient was considered as one unit for analysis irrespective of the laterality of knees because pain and functional limitation was assessed irrespective to one or both knees affected. After all the information was collected, the sealed envelopes were opened de-coding the blinding codes and data analyzed by Paired T test for the same group of patients in their follow up and Independent sample T test to compare the outcomes in two groups. Other categorical variables regarding the epidemiological information were tested by Chi square test. P value less than 0.05 was considered to be significant.

RESULTS

One hundred and seventeen out of 171 patients could be traced to the final follow up with complete information. Fifty-five candidates received the triamcinolone where as fifty-eight of them received placebo.

There was significant pain relief (improvement on VAS) in both the groups, either receiving the triamcinolone or placebo, as compared to their respective baseline status until two weeks, however at 6 weeks this effect was statistically significant only for the group, receiving drug. By 12 weeks, the pain relief (VAS) was not statistically significance in both groups from its baseline score. Significant improvement in the functional outcome (KOOS-PS and WOMAC) knee scores were seen until 12 weeks in the group receiving triamcinolone and until 6 weeks in placebo group. (fig. 1a, 1b and 1c) (Tables 1)

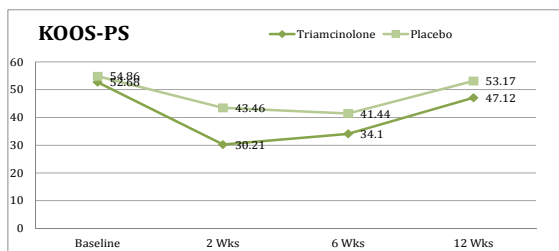


Figure 1a. Trends of KOOS-PS scores between the two groups

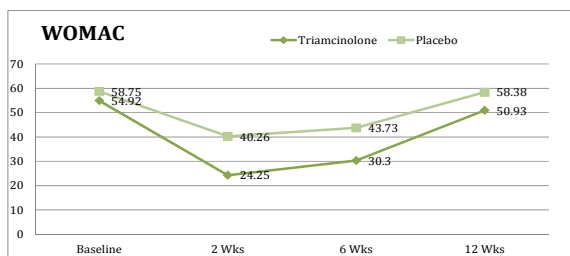


Figure 1b. Trends of WOMAC Scores between the two groups

When the mean scores were compared, at two weeks and six weeks, there were significant differences between the scores of the group, receiving triamcinolone to the group receiving placebo. By the twelfth week, the functional scores were still significant (though the strength was less) between the two groups according to KOOS-PS and

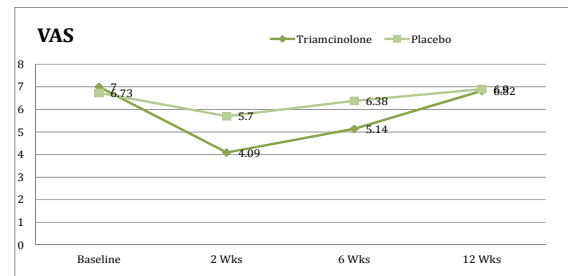


Figure 1c. Trends of VAS Scores between the two groups.

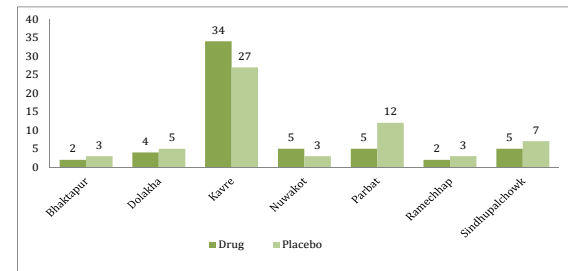


Figure 2. District wise distribution of the two groups

WOMAC, but there was no difference in the pain score according to the VAS. (Table 1)

The epidemiological data showed no differences between the groups as per gender and age distribution. (Table 2) The patients hailed mostly from mid hilly region of the country where the hospital organized health camps (fig. 2).

No major complications were encountered in any of the patients following the intra articular injection, however, one patient had swelling and erythema of the knee, which subsided after conservative management.

DISCUSSION

The study population in this research comes mostly from the mid hilly region of the country where due to the geographical terrain, they need to walk up and downhill and their cultural habits necessitate them crossed leg sitting and squatting postures. Osteoarthritis of knee joint definitely troubles people with this type of lifestyle. Knee pain (suggestive of OA) is one of the common complaints of middle-aged people in any orthopedic health camps in organized in the community.⁶⁻¹² Injecting long acting steroid, like triamcinolone, to the knees is a common practice as it seems logical to target therapy directly to the joint and avoid the potential side effects of systemic administration of the drugs. The current study has shown that it is beneficial to use steroid in osteoarthritis of knee. Majority of the literatures support the findings of this study. Almost all studies agree on reduction of pain, however different articles mention different durations till which the effect lasts. The range extends from three weeks to six months. Jones and Donerty et al in a double-blind, placebo controlled trial showed intra articular steroid (methyl prednisolone) significantly improved knee pain till three

Table 1. Functional outcome score at Baseline and Week two, six and twelve weeks follow up

	BASELINE	WEEK 2		WEEK 6		WEEK 12	
	Mean (SD)		Paired T test as compared from BASELINE SCORE		Paired T test as compared from BASELINE SCORE		Paired T test as compared from BASELINE SCORE
KOOS PS							
Triamcinolone	52.6(13.8)	30.2(3.7)	0.000	34.1 (4.3)	0.000	47.1 (11.3)	0.000
Placebo	54.9(14)	43.4(6.2)	0.000	41.4 (11.2)	0.000	53.2 (12.5)	0.177
Independent Sample T Test	0.399	0.000		0.000		0.007	
WOMAC							
Triamcinolone	54.9(14.4)	30.2(3.7)	0.000	30.2 (3.7)	0.000	50.9 (12.7)	0.016
Placebo	58.8(13.1)	43.4(6.2)	0.000	43.4 (6.2)	0.000	58.4 (11)	0.818
Independent Sample T Test	0.135	0.000		0.000		0.001	
VAC							
Triamcinolone	7 (1.4)	4.1 (1.2)	0.000	5.1 (1.2)	0.000	6.8 (1.2)	0.296
Placebo	6.7 (1.4)	5.7 (1.1)	0.000	6.4 (1.3)	0.079	6.9 (1.1)	0.316
Independent Sample T Test	0.301	0.000		0.000		0.714	

Table 2. Epidemiologic information (Gender and Age Distribution)

		Triamcinolone	Placebo	Total	P value
		N(%)	N(%)		
Gender	Male	22 (48.9)	23 (51.1)	45 (100)	0.978 (Pearson Chi - Square)
	Female	35 (48.8)	37 (51.4)	72 (100)	
	Total	57 (48.7)	60 (51.3)	117 (100)	
Age	Number	57	60		.967 (Independent T test)
	Mean	67.4	67.1		
	Std. Dev	5.4	5.2		

weeks which was no longer significant at eight weeks.¹⁴ Friedman et al. and Ravauel et al. in their separate articles found an initial upward trend in improvement in pain upto three to four weeks then there was a downward trend until eight to twelve weeks, when it touched the baseline again.^{15,16} Baig et al. showed that the single dose of steroid injection (Triamcinolone acetone) could control pain upto three months.¹⁷ Similar findings were also shown by Gaffney who injected Triamcinolone Hexacetone in osteoarthritic knees and its effect lasted as long as three months.¹⁸ Long term pain relief up to six months or one year were shown by Valtone and Raynauld et al. respectively, however they have used multiple injections.^{19,20} In the current study, we used triamcinolone single dose and this was effective in reduction of pain till six weeks but not at twelve weeks. It may be due to the fact that our study population was from hilly geographic terrain, and walking on such terrain would aggravate the knee pain in osteoarthritis. Multiple injections may benefit our group of population for longer duration of symptoms control as shown in study done by Raynauld et al. This has to be studied further.²⁰ Majority of the articles have studied on improvement of pain following steroid

injection, only few literatures studied on the functional outcome. Those who have considered functional outcome improvement, they have used various tools to assess the same. Baig MS has used Patients’ Global Assessment and Doctor’s Global Assessment to assess overall improvement, same or worse from the baseline to the follow up. They have shown that majority of patients (81.5% to 92.1 %) improved from baseline over the time.¹⁷ Gaffney et al. used distance walked in one minute (WD) and Health Assessment Questionnaires modified for lower limb function (HAQ) as measures for functional outcome measurement.¹⁸ They showed significant improvement in the overall scores in both the steroid group and the placebo group at six weeks follow up, however the improvement in steroid groups was statistically significant (p<0.001) than in the placebo group (p<0.05).¹⁸ The current study, which utilized KOOS-PS and WOMAC score for the overall evaluation of the functional status of knee, is in agreement with the study from Gaffney et al. which revealed the functional outcome of the knee improved in both the groups, steroid or placebo injection, until six weeks, however, the improvement in the steroid group was very significant shown by the statistically

significant differences between the scores at two weeks and six weeks between the two groups.¹⁸ The improved functional score was sustained in steroid group even upto twelve weeks, which was not observed in the placebo group.

There are literatures which mentioned redness and or swelling of the knees post injection. Munigangaiah et al. had a case report of bilateral septic arthritis following steroid injection in the knee which required arthroscopic debridement.²¹ Similarly, Shemesh et al. followed six cases of knee infection needing surgical management after knee injection for osteoarthritis, out of which three of them received steroid injection and the remaining three had hyaluronic acid.²² In a survey among the doctors who have encountered knee infection followed by intra-articular injection, Charalambous et al. reported there were 24 doctors (12.6%) who experienced this misfortune in their practice.²³ In our study, except for some minor problems, we did not encounter any major complications. This could be because of our small sample size, which with larger population, the chances of seeing more complications would have also increased. On the other hand, it may be due to the injection technique, which was adequately aseptic. Contrary to a common belief, steroid may cause damage to articular cartilage in long run, Raynaud et al. had shown at one and two year follow up evaluation, there was no difference noted between the steroid group

and placebo group with respect to loss of joint space over time.²⁰ Our study has some limitations that the evaluation tools, WOMAC and KOOS-PS that we used, have not been validated to be used in Nepali language, the language used by study population. Some of the patients who could not come to the outreach or hospital for follow up, were interviewed on telephone provided and consented by the participants at the time of injection. The analysis is also based on the information acquired on telephone regarding their symptoms, which may be biased.

CONCLUSION

Intra articular steroid injection (Triamcinolone acetonide 40 mg) is effective for pain control for at least six weeks however functional outcome is improved for at least twelve weeks in cases of osteoarthritis of knee joints.

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