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OUTCOME OF INTRA-ARTICULAR STEROID INJECTION IN OSTEOARTHRITIS OF KNEE: A ONE YEAR EXPERIENCE

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Abstract

A retrospective-interventional study was conducted in the department of Physical Medicine and Rehabilitation, Chittagong Medical College Hospital, over a period of 12 Months from September, 2007 to September, 2008. Total 52 patients, who satisfied the ACR classification criteria for osteoarthritis of knee were initially enrolled. To see the effect of intra-articular steroid in symptomatic relief of OA knee injection methyl-prednisolone 40-60 mg was introduced in the joint. Patients followed up weekly for two weeks and assessed using following variables: visual analogue scale (VAS, 0-10 cm) for joint pain, joint tenderness (0-4), and joint range of motion. Significant improvement ($p<0.05$) was noted in above variables after treatment with injection steroid.

Key words : osteoarthritis of knee; intra-articular steroid; outcome

Introduction

Knee osteoarthritis (OA) is a disease characterized mainly by cartilage degradation, which is reflected clinically by a gradual development of pain, stiffness, and loss of motion of the joint [1]. OA is the single most common cause of disability in older adults, with 10% of patients aged 55 or more having painful disabling osteoarthritis of the knee[2]. Pain relief is still a primary goal in treating patients who have knee OA[3]. Intra-articular (I/A) corticosteroid injections have been used for decades in clinical practice for pain relief and control of local inflammation in OA[4,5,6,7,8,9,10]. Therapeutic joint injection with corticosteroid for pain relief was 1st reported by Hollander in 1951 for arthritic joint disease (OA & RA)[11]. I/A corticosteroid injections are part of the treatment paradigm suggested in the American College of Rheumatology (ACR) practice guidelines for the treatment of knee OA[12]. However, this practice is still controversial because there is fear that these injections, especially when used repeatedly as long term treatment, could promote joint destruction and tissue atrophy[13,14,15]. Conversely, studies both in vitro and in vivo in experimental models have shown that corticosteroid injections can be effective in reducing progression of structural changes [16,17,18,19,20]. There are 3 commonly practiced approaches (lateral, medial, and anterior) for knee joint aspiration. The lateral approach is generally held to be the best for arthrocentesis because thick medial intra-articular fat fad may result in dry tap in some patients. Among the long acting steroid injection methyl-prednisolone is the preferred as because it does not produce underlying fat atrophy. The recommended dose for knee joint is 40-60 mg[21,22]. In this study, an attempt had been made to ascertain the outcome of intra-articular methyl-prednisolon injection in the management of OA knee joint on lateral approach.

Methods and materials

A retrospective-interventional study was conducted in the department of Physical Medicine & Rehabilitation, Chittagong Medical College Hospital over a period of 12 months from September, 2007 to September, 2008. Patients satisfying the ACR classification criteria for OA knee joint were initially enrolled and those found to have RA, septic arthritis, TB arthritis, peripheral neuropathy, unstable knee joint, overlying skin infection, history of steroid injection within previous 3 months, >3 repeated injection, injection hyaluronate within previous 6 months, loose body in the joint were excluded from the study. Necessary investigations were done to

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exclude all these possible conditions. To see the effect of injection steroid was placed keeping the joint in extension. The patella was located by palpation and was the main landmark for localizing the entry site. During the procedure the patella was lifted and the skin was penetrated using a large gauze needle at 45^0 angle and advanced under the patella toward the medial aspect of the joint. The needle was advanced into the joint, while applying the negative syringe pressure until synovial fluid started to enter the syringe. The fluid aspiration can be aided by applying pressure to medial aspect of the joint[21]. Knee joint was aspirated on lateral approach using 18 G needle and, injection methyl-prednisolone, 40-60 mg was placed with 22 G needle. Following injection the joint was wrapped with 4 inch crepe bandage and patients were instructed to take rest at least 24 hours[24]. Antibiotic flucloxaciline 500 mg 6 hourly for 5 days and fluconazole 50 mg for 14 days with immuno-compromised conditions were prescribed. Patients were followed up weekly for two weeks and assessed using following variables: visual analogue scale (VAS, 0-10cm) for joint pain, grading of joint tenderness23 (0-4), and joint range of motion (ROM). Joint ROM was measured using Goniometer (360 degree system). Although initially 52 patients were enrolled, 22 were discarded from the study because of inadequate and missing data. Finally data were analyzed with remainder 30 patients using all medical records and student's 't' test was used for statistical analysis. Data were presented as mean ± standard deviation (SD), and p <0.05 accepted as statistically significant.

Result

Out of 52 patients, maximum number of patients 33(63.47%) were female in sex. Only 19(36.53%) were male and male and female ratio was 1:1.74. Average age at presentation was 56 ± 3.1 years. Distribution of patients according to age group revealed that maximum number of patients (35, 67.30%) were in 50-59 age range. 09(17.30%) and 06(11.53%) patients were in 60-69 and 70-79 age group respectively. Only 02(3.84%) patients were in above 80 plus age group (Figure-1). Average body weight was 58 ± 3.1 kg (Table-I). On socio-economic status evaluation revealed that 33(63.47%) patients came from rural, and 19(36.53%) from urban area. Left knee joint was found to be involved in 20 cases and right side involved in 9 patients. On clinical evaluation sign of effusion was revealed in 49 patients. Bulge sign for mild effusion, patellar ballotment test for moderate effusion, and fluctuation test for huge effusion was evaluated in 25, 18, and 6 patients respectively. On radiological evaluation following were the common findings: reduced joint space, marginal osteophytic lipping, and soft tissue swelling (Table-II).

Table I : Demographic data of OA knee joint (n=52).

Parameter	Distribution
Sex (no, %)	52
Male	19 (36.53%)
Female	33 (63.47%)
Average age at presentation (mean ± SD, years)	56 ± 3.1
Body weight (mean ± SD, kg)	56.30 ± 3.1
Occupation (no, %)	
House wife	18 (34.61%)
Service	12 (23.07%)
Day worker	13 (25.18%)
Cultivator	4 (7.69%)
Businessman	3 (5.75%)
Others	2 (3.84%)
Residence (no, %)	52
Rural	19 (36.53%)
Urban	33 (63.47%)

SD = Standard Deviation

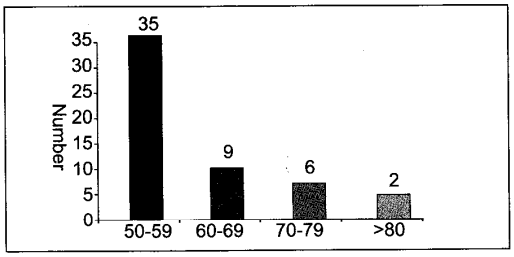

Fig 1 : Shows the age distribution of patients irrespective of sex. Maximum patients were in 50-59 age range. 9 and 6 patients were in 60-69 and 70-79 age group respectively. Only 2 patients were in 80 plus age group.

Among them, radiological osteophytes (femoral condyle, tibial condyle, upper and lower pole of patella) were found in all the 52 patients. VAS joint pain score, joint tenderness score before intervention was 2.10 ± 0.62 and 1.57 ± 0.57 respectively. ROM was restricted in all patients and mean joint range was 30-100 degree. Average aspirated fluid volume was 30 ml (mean) and color was clear to yellowish. Only 3 patients reported post-injection flare up

within few hours of injection and successfully treated with ice compression and indomethacine 75 mg with omeprazole. The condition was improved within 3 days. Joint pain score, joint tenderness score, and ROM was measured after 1st and 2nd wk of intervention. Finally data were analyzed using pre-treatment and after treatment score and significant improvement was noted in above variables following I/A steroid injection (Table-III).

Table II : Variables before and after intervention of OA knee joint with Injection methyl-prednisolone (40-60 mg).

Variables	Pre-treatment (n=52)	After 1st week (n=40)	After 2nd week (n=30)	p value*
VAS (0-10 cm) (mean ± SD)	7.39± 2.26	4.10 ±2.07	2.00 ±1.88	<0.001
Joint tenderness (0-4) (mean ± SD)	1.57 ±0.57	1.00± 0.54	0.98± 0.57	<0.05
ROM (degree) (mean)	30-100^0	20-110^0	10-130^0	<0.01

* t test was done to measure the level of significance.

Table III : Clinico-radiological presentation of OA knee (n=52).

Parameter	Distribution (no, %)
Joint involved	
Right	20 (38.46%)
Left	22 (42.30%)
Both	10 (19.23%)
Signs of effusion	
Bulge sign	25 (48.07%)
Patellar ballotment test	18 (34.61)
Fluctuation test	06 (11.53%)
Absent	03 (5.76%)
Fluid analysis	
Color	clear to yellowish
Volume (ml, mean)	30
Radiological findings*	
Osteophytic lipping	25 (48.07%)
Reduced joint space	10 (19.23%)
Both	27 (91.52%)

* overlap presentation

Discussion

Osteoarthritis is the most common form of joint disease sparing no age, race or geographic area. Its prevalance increase with advancing age. Under the age of 55 years, the joint distribution of men and women is similar but there is more rapid age related increase in the prevalance of generalized OA in women than in man. It affects nearly 10% of the population over the age of 60. Risk factors include obesity, knee injury, previous knee surgery, occupational bending, and lifting. It is more common in active housewives and commonly found in middle class people[25,26,27,28].

Here in this recent study, out of 52 maximum number of patients (33,63.47%) were female in sex. Average age at presentation was 56 ± 3.1 years. Average body weight was 58 ± 3.1 kg. On evaluation of age distribution of patients, maximum patients (35, 67.30%) were in 50-59 age range. 09(17.30%) and 06(11.53%) patients were in 60-69 and 70-79 age group respectively. Only 02(3.84%) patients were in above 80 plus age group. Evaluation on socio-economic perspective; lower, middle and higher class distribution was 15, 30, 7 patients respectively. All these findings were closely resemble to above studies. Left knee joint was found to be involved in 22 cases and right side involved in 21 cases. Both knee joints were involved in 9 patients.

Both joints can be affected in osteoarthritis with or without effusion and sign of effusion can be evaluated by following ways: bulge sign for mild effusion, patellar ballotment test for moderate effusion, and fluctuation test for huge effusion. Joint tenderness can be localized along and proximal to joint line also in patellar border. On radiological evaluation following were the common findings in OA knee: reduced joint space, marginal osteophytic lipping, and soft tissue swelling[29,30]. In our recent evaluation, sign of effusion was evident in 49 patients and bulge sign for mild effusion was found in maximum number (25) of patients. Patellar ballotment test for moderate effusion, and fluctuation test for huge effusion was evaluated in 18 and 6 cases respectively. On radiological evaluation following were the common findings: reduced joint space, marginal osteophytic lipping, and soft tissue swelling and radiological osteophytes (femoral condyle, tibial condyle, upper and lower pole of patella) were found in all the 52 patients. Osteoarthritis is a slowly evolving articular disease characterized by a gradual development of joint pain, stiffness and loss of full range of motion. In

our recent trial ROM was found to be restricted in all the 52 patients with joint pain. The average aspirated fluid volume was 30 ml (mean) and it was clear to yellow in color.

Clinical OA is a complex interaction of degradation and repair of the cartilage, bone and synovium with secondary components of inflammation and chondrocytes from OA patients have been demonstrated to be deficient in glucocorticoid receptors[31,32,33,34,35]. The resulting decreased responsiveness of OA cells of circulating glucocorticoid may be among the factors that lead to an increase level of cytokine and metalloprotease synthesis in degraded cartilage [36]. It is therefore logical to consider interventions that could control inflammation in OA patients. The anti-inflammatory effects of synthetic glucocorticoids serve as a basis for such a therapeutic approach[16,17].

In this recent trial significant improvement was noted in joint pain, tenderness, and range of motion following I/A steroid injection. Post-injection flare up can occur following steroid injection that is mostly occur in the 1st 24-72 hours and usually disappear within 3 days.24 Here in this study only 3 patients were reported with post-injection flare up that was mostly on the 1st 24 hours, all the patients were succesfully treated with local ice compression along with oral indomthacine 75 mg with omeprazole 20 mg. Although significant improvement was noted in joint pain, tenderness, and range of motion; we could not evaluate long-term effectiveness of intra-articular steroid injection particularly in this knee condition.

Conclusion

Intra-articular steroid can be a treatment option for providing symptomatic relief of OA knee and better functional outcome. Further study is recommended to see the long-term effect of steroid injection in OA knee.

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