

EFFECT OF INTRAARTICULAR STEROID INJECTION IN ADDITION TO PHYSICAL MODALITIES IN OSTEOARTHRITIS KNEE

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Abstract

Context: Osteoarthritis (OA) is the most common form of arthritis accounting for about 30% of general physician visits. Intra-articular (IA) corticosteroid injections have been used for decades in clinical practice for pain relief and control of local inflammation in OA. In the present study a combined therapy of long acting intra-articular injection in addition to physical modalities of OA knee was given to find out the functional improvement and clinical outcome of the patient.

Methods: It was a prospective interventional non-randomized clinical study conducted in the Department of Physical Medicine & Rehabilitation, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, from October, 2011 to March, 2012. Fifty four patients between 35 and 75 years without consideration of gender with a history of not less than three months knee pain with radiographic confirmation of primary osteoarthritis were selected purposefully. Then they were divided randomly in group A and B, having 27 patients in each group. Group A received NSAID (non steroidal anti-inflammatory drugs) i.e. aceclofenac 100mg twice daily for 10 days + omeprazol 20mg twice daily for 10 days + MWD (micro wave diathermy 20 minutes for 14 days. + therapeutic exercise + ADL (activities of daily living), while Group B received 80mg intraarticular triamcinolon acetone injection once followed by NSAID i.e. aceclofenac 100mg twice daily for 10 days + omeprazol 20mg twice daily for 10 days + MWD 20 minutes for 14 days. + therapeutic exercise + ADL. In both groups the patients were observed for six weeks.

Results: The mean of age of patients in group A and B were 52.33±9.62 years and 52.29±9.67 years respectively. In group A, 9 (33.3%) were male and 18 (66.7%) were female. In group B, 10 (37.0%) were male and 18 (63.0%) were female. Mean visual analogue scale (VAS) during pre treatment in group A and group B were 6.22±1.60 and 7.15±1.56 respectively. Mean range of motion (ROM) during pre treatment in group A and group B were 117.33±13.05 and 112.37±19.01 respectively. Mean time taken to walk 50 feet during pre treatment in group A and group B were 18.22±2.39 and 18.81±2.13 minutes respectively. Mean Western Ontario and Mc Master Universities (WOMAC) index in group A and group B were 60.85±15.86 and 67.33±16.33 minutes respectively. After treatment in both groups visual analogue scale (VAS), range of motion (ROM), time taken to walk 50 feet and Western Ontario and Mc Master Universities (WOMAC) index gradually decreased and range of motion (ROM) gradually increased, which were statistically significant. However, the study conducted with small sample size in a single centre in Dhaka city, which may not be representative for the whole country.

Key words: Osteoarthritis, knee joint pain, steroid injection.

J Dhaka Med Coll. 2014; 23(1) : 48-54.

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Introduction:

Osteoarthritis (OA) is the most common form of arthritis accounting for about 30% of general physician visits¹. It may be defined as a heterogeneous group of conditions that lead to joint symptoms and signs which are associated with defective integrity of articular cartilage, in addition to related changes in the underlying bone and at the joint margins². It is usually classified as either primary (idiopathic) or secondary (associated with a known condition). Although OA is present by histologic or radiographic criteria in nearly 80% of people by the age of 80 years, only half have symptoms³, and these are often variable and intermittent. All though variable in its presentation and course of OA often carries significant morbidity⁴, related to its high prevalence, the reduced ability of those affected to perform both occupational and non-occupational activities⁵. Osteoarthritis is no longer considered a 'degenerative' or 'wear and tear' arthritis, rather involves dynamic biomechanical, biochemical and cellular process⁶. Although articular cartilage is at the center of change, OA is currently viewed as a disease of the entire joint and therefore, the failure of the joint as an organ⁷. Although symptoms are often unilateral, evidence of OA is almost always present bilaterally. However, even when symptoms are bilateral, there is a tendency for one side to be more symptomatic than the other. Unilateral disease may suggest OA secondary to trauma. In contrast to systemic inflammatory arthritis, OA lacks constitutional symptoms. OA is characterized clinically by pain, swelling of joint and limitation of motion. Pathologically & Radio logically the disease is characterized by focal erosive lesions, cartilage destruction, subchondral sclerosis, cyst formation and large osteophyte at the margin of the joints⁸. Diagnosis of OA knee is based on clinical and substantiated by radiological investigation.

The objectives in managing the patient with OA knee are: reducing/eliminating pain and stiffness, maintain/improve mobility, optimizing function and hence minimizing disability. Therapeutic approaches include pharmacological analgesics e.g. NSAID,

intraarticular agents, glucosamine, hyaluronic acid and topical capsaicin, non-pharmacological e.g. patient education, exercise, personal contact, physiotherapy, assistive device, patellar tapping appropriate footwear and surgical intervention may be needed⁹. According to American College of Rheumatology (ACR) for mild symptomatic OA, treatment may include non-pharmacologic methods (patient education, physical & occupational therapy and other therapies), and pharmacologic therapy including non-opioid oral and topical (i.e. applied to skin) analgesics. For patient who is unresponsive to this regimen, the use of non steroidal anti-inflammatory drugs (NSAIDs) is considered appropriately. A corticosteroid injection is recommended for patients with knee OA, particularly when signs of local inflammation with joint effusion are present. Heat therapy is frequently prescribed to patients with symptomatic knee osteoarthritis (OA). Deep hyperthermia via localized micro wave diathermy (MWD) is effective in several musculoskeletal painful conditions¹⁰⁻¹⁶. Intraarticular (IA) corticosteroid injections have been used for decades in clinical practice for pain relief and control of local inflammation in OA¹⁷⁻²⁴. Intraarticular corticosteroid injection can be subside local inflammation with pain reduction and it can also reduce progression of structural changes²⁵.

Published studies of the effect of a long acting corticosteroid intraarticular injection followed by physical modalities application in OA knee was scanty, moreover, there were less study on the functional impact of these combined therapy based on validated instruments, such as the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) in knee OA. As OA knee involves dynamic biomechanical, biochemical and cellular process⁶, its management also include a combination of non-pharmacologic therapy, pharmacologic therapy. Hence, in this study a combined therapy of long acting intra-articular injection in addition to physical modalities of osteoarthritis of knee is given to find out the functional improvement and clinical outcome of the patient.

Methods:

This prospective interventional non-randomized clinical study was conducted in the outpatient department of Physical Medicine & Rehabilitation, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, from October, 2011 to March, 2012. Study population were patients having primary mono or bilateral knee osteoarthritis with pain lasting for at least 6 months and having limitation/difficulty of movement of knee joint and osteoarthritis with radiological findings. Patients who were unwillingness to sign informed consent, previous surgery of the affected knee, intraarticular injections with steroids or hyaluronic acid, congenital or acquired inflammatory or neurological diseases involving the knee, taking chronic NSAID or steroid treatment, pregnancy or breastfeeding and contra indications to intraarticular injection were excluded from the study. The 54 patients were divided randomly in group A & B. Group A received NSAID (non steroidal anti-inflammatory drugs) i.e. aceclofenac 100mg twice daily for 10 days + omeprazol 20mg twice daily for 10 days + MWD (micro wave diathermy 20 minutes for 14 days. + therapeutic exercise + ADL (activities of daily living), while Group B received 80mg intraarticular triamcinolon acetonide injection once followed by NSAID i.e. aceclofenac 100mg twice daily for 10 days + omeprazol 20mg twice daily for 10 days + MWD 20 minutes for 14 days. + therapeutic exercise + ADL. In both groups the patients were observed for six weeks. Study parameters used to assess the disease activity & functional capability of the patients were: 1) Visual analogue scale (VAS), 2) Range of motion (ROM) and 3) Western Ontario and McMaster Universities (WOMAC) index. After taking the formal consent of the patient, details history was taken and a preset data form was filled up for every patient. Past history of illness & any systemic disease was inquired cautiously. Clinical examination was done systematically. Base line investigations were done e.g. CBC, ESR & Hb%, RBS, Serum creatinine, urine for R/M/E, serum uric acid & SGPT. X-ray of the affected knee joints were also done. All reports

were properly recorded in the data sheet. Treatment was delivered in each group as per scheduled. Every patient was followed up in each week with up to six weeks. Data were analyzed by SPSS version 16.0.

Results:

The mean of age of patients in group A and B were 52.33±9.62 years and 52.29±9.67 years respectively (table-I). In group A, 9 (33.3%) were male and 18 (66.7%) were female. In group B, 10 (37.0%) were male and 18 (63.0%) were female (table-II). In Group A, highest number of patients had knee pain in both joins (48.1%) followed by right knee pain in 11 (40.7%) patients. Only 3 (11.1%) patients had pain in the left knee joint. In group B, more than half of the patients had knee pain in both joins (51.9%) followed by right knee pain in 9 (33.3%) patients. Only 4 (14.8%) patients had pain in the left knee joint (table-III). Mean visual analogue scale (VAS) during pre treatment in group A and group B were 6.22±1.60 and 7.15±1.56 respectively. Mean range of motion (ROM) during pre treatment in group A and group B were 117.33±13.05 and 112.37±19.01 respectively. Mean time taken to walk 50 feet during pre treatment in group A and group B were 18.22±2.39 and 18.81±2.13 minutes respectively. Mean Western Ontario and Mc Master Universities (WOMAC) index in group A and group B were 60.85±15.86 and 67.33±16.33 minutes respectively. After treatment in both groups visual analogue scale (VAS), range of motion (ROM), time taken to walk 50 feet and Western Ontario and Mc Master Universities (WOMAC) index gradually decreased and range of motion (ROM) gradually increased, which were statistically significant.

Table I
Distribution of patient by age group

Age group	Group		p value
	Group-A	Group-B	
<40	02 (07.4)	03 (11.1)	
40 - 49	12 (44.4)	09 (33.3)	
50 - 59	07 (25.9)	09 (33.3)	
60 and above	06 (22.3)	06 (22.3)	
Total	27 (100.0)	27 (100.0)	
Mean ± SD	52.33 ± 9.62	52.29 ± 9.67	0.989

Student's 't' test was done to measure the level of significance. Figures within parentheses indicate percentage.

Table II*Distribution of patients by sex*

Sex	Group		p value
	Group-A	Group-B	
Male	09 (33.3)	10 (37.0)	
Female	18 (66.7)	17 (63.0)	
Total	27 (100.0)	27 (100.0)	0.776

Chi-square test was done to measure the level of significance. Figures within parentheses indicate percentage.

Table III*Distribution of patient by knee pain (n=54)*

Knee pain	Group		p value
	Group-A	Group-B	
Right	11 (40.7)	09 (33.3)	
Left	03 (11.1)	04 (14.8)	
Both	13 (48.1)	14 (51.9)	
Total	27 (100.0)	27 (100.0)	0.827

Chi-square test was done to measure the level of significance. Figures within parentheses indicate percentage.

Table IV*Distribution of patient according to characteristics of pain (n=54)*

Analysis of pain	Group		p value
	Group-A	Group-B	
Onset			
Gradual	26 (96.3)	22 (81.5)	0.083
After trauma	01 (03.7)	05 (18.5)	
Site of pain			
Localized in knee	24 (88.9)	23 (85.2)	0.685
Knee & Other Joints	03 (11.1)	04 (14.8)	
Time of occurrence			
Morning	13 (48.1)	16 (59.3)	0.413
Evening	14 (51.9)	11 (40.7)	
Duration of pain			
Constant	20 (74.1)	22 (81.5)	0.513
Intermittent	07 (25.9)	5 (18.5)	
Radiation of pain			
Yes	01 (03.8)	03 (10.7)	
if yes, type			
Both	01 (03.8)	03 (10.7)	
Severity of pain			
Mild	04 (14.8)	01 (03.7)	0.348
Moderate	13 (48.1)	16 (59.3)	
Severe	10 (37.0)	10 (37.0)	

Chi-square test was done to measure the level of significance. Figures within parentheses indicate percentage.

Table V*Distribution of patient according to examination of the knee (n=54).*

Examination of the knee		Group		p value
		Group-A	Group-B	
Contour	Normal	03(11.1)	02 (07.4)	0.639
	Swelling	24(88.9)	25 (92.6)	
Local	Absent	03(11.1)	04 (14.8)	0.685
	Swelling Present	24(88.9)	23 (85.2)	
Local	Normal	12(44.4)	08 (29.6)	0.260
	Temperature Raised	15(55.6)	19 (70.4)	
Eliciting fluctuation	Absent	02(07.4)	01 (03.7)	0.552
	Present	25(92.6)	26 (96.3)	
Leg length discrepancy	Yes	02(07.4)	01 (03.7)	0.552
	No	25(92.6)	26 (96.3)	
Deformity	Genu varus	07(25.9)	10 (37.0)	0.379
	No deformity	20(74.1)	17 (63.0)	

Chi-square test was done to measure the level of significance. Figures within parentheses indicate percentage.

Table VI*Distribution of patient according to test of patella (n=54)*

Test of patella		Group		p value
		Group-A	Group-B	
Position	Normal	20 (74.1)	14 (51.9)	0.091
	Shifted-high	07 (25.9)	13 (48.1)	
Shape	Normal	21 (77.8)	16 (59.3)	0.143
	Broadening	06 (22.2)	11(40.7)	
Mobility	Normal	08 (29.6)	09 (33.3)	0.770
	Painful	19 (70.4)	18 (66.7)	
Tenderness	Present	22 (81.5)	25 (92.6)	0.224
	Absent	05 (18.5)	02 (07.4)	
Patellar tap	Present	23 (85.2)	24 (88.9)	0.685
	Absent	04 (14.8)	03 (11.1)	

Chi-square test was done to measure the level of significance. Figures within parentheses indicate percentage.

Table VII

Distribution of patient according to VAS (n=54)

Treatment period	Group		p value
	Group-A	Group-B	
Pre treatment	6.22 ± 1.60	7.15 ± 1.56	0.036
After 1 week	5.22 ± 1.58	5.30 ± 1.54	0.862
After 2 week	4.85 ± 1.70	3.92 ± 1.46	0.037
After 3 week	4.25 ± 1.70	3.29 ± 1.51	0.032
After 4 week	4.07 ± 1.66	2.48 ± 1.45	0.001
After 5 week	3.48 ± 1.78	1.92 ± 1.17	0.001
After 6 week	3.04 ± 1.72	1.33 ± 1.10	0.001

Student's 't' test was done to measure the level of significance.

Table VIII

Distribution of patient according to ROM (n=54)

Treatment period	Group		p value
	Group-A	Group-B	
Pre treatment	117.33±13.05	112.37 ± 19.01	0.269
After 1 week	119.67±12.03	118.18 ± 12.92	0.665
After 2 week	121.66±11.29	122.03 ± 10.80	0.902
After 3 week	122.92±10.51	125.44 ± 8.96	0.348
After 4 week	124.81±9.62	128.29 ± 6.84	0.132
After 5 week	125.96±9.25	129.96 ± 5.48	0.059
After 6 week	127.29±8.60	131.67 ± 4.35	0.022

Student's 't' test was done to measure the level of significance.

Table IX

Distribution of patient according to time taken to walk 50 feet (n=54)

Treatment period	Group		p value
	Group-A	Group-B	
Pre treatment	18.22 ± 2.39	18.81 ± 2.13	0.341
After 1 week	17.18 ± 2.30	17.14 ± 2.10	0.951
After 2 week	16.81 ± 2.18	15.96 ± 1.81	0.125
After 3 week	16.40 ± 2.42	15.33 ± 1.90	0.076
After 4 week	15.96 ± 2.28	14.78 ± 2.02	0.049
After 5 week	15.40 ± 2.60	14.44 ± 1.86	0.125
After 6 week	15.07 ± 2.49	13.62 ± 2.04	0.024

Student's 't' test was done to measure the level of significance.

Table X

Distribution of patient according to WOMAC index (n=54)

Treatment period	Group		p value
	Group-A	Group-B	
Pre treatment	60.85 ± 15.86	67.33 ± 16.33	0.145
After 1 week	53.96 ± 15.54	55.63 ± 14.91	0.689
After 2 week	47.74 ± 15.97	47.03 ± 15.21	0.869
After 3 week	41.18 ± 15.74	38.96 ± 14.49	0.592
After 4 week	35.89 ± 15.46	30.96 ± 13.74	0.222
After 5 week	30.89 ± 16.11	22.48 ± 11.58	0.032
After 6 week	25.29 ± 15.30	13.85 ± 9.62	0.002

Student's 't' test was done to measure the level of significance.

Discussion:

This study was aimed to explore the effects of combined therapy of long acting intraarticular injection in addition to physical modalities of OA knee and to find out the functional improvement and clinical outcome of the patient. 54 patients were included in the study. Intraarticular (IA) corticosteroid injections have been used for decades in clinical practice for pain relief and control of local inflammation in OA. Intraarticular corticosteroid injections are part of the treatment paradigm suggested in the American College of Rheumatology (ACR) practice for the treatment of knee OA²⁴. Intra articular corticosteroid injection can be subside local inflammation with pain reduction and it can also reduce progression of structural changes²⁵. Godwin & Dawes²⁶ in a systematic review with meta-analysis showed that intraarticular corticosteroid injection results in clinically and statistically significant reduction in osteoarthritic knee pain 1 week after injection. Treatment effects were consistent with previous studies by Ravaud et al.²⁷; Friedman & Moore²⁸; Dieppe et al.²⁹ and Jones & Doherty³⁰. Gaffney et al.³¹ showed that single intraarticular injection of triamcinolone acetone to patients with knee osteoarthritis provided short term pain relief and increased benefit was associated with both clinical evidence of joint effusion and successful aspiration of synovial fluid at the time of injection.

Uthman et al.³² have studied 70 patients fulfilling the American College of Rheumatology criteria for primary knee osteoarthritis who were randomly chosen to receive intraarticular injections of a corticosteroid (40 mg triamcinolone acetonide) or a vehicle, at three month intervals, for a prospective period of two years. At the one and two year follow up evaluations, the patients injected with triamcinolone acetonide showed a trend toward greater symptom improvement, especially at the first year follow up, for the WOMAC pain subscale, night pain assessment, and the range of movement ($p = 0.05$) compared with patients injected with saline. Moreover, in a study by Raynauld et al.³³ showed that knee pain and stiffness were significantly improved throughout the two year study, by repeated injections of triamcinolone acetonide compared with saline injections.

However, one limitation of the present study was that it was conducted in a single centre in Dhaka city, which may not be representative for the whole country. Small sample size was also a limitation of this study. Due to time constraint patients were observed for six weeks only.

Conclusion:

Despite the lack of strong, convincing, and reproducible evidence that intraarticular therapy significantly alters the short term outcome and even less so the progression of osteoarthritis, corticosteroid injection is one of the mainstays of the management of osteoarthritis, in particular, osteoarthritis of the knee. In the present study there was statistically significant difference found in VAS, ROM, time taken to walk 50 feet and WOMAC index between the groups.

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