

Original Article

PRE AND POST TREATMENT COMPARATIVE STUDY OF MENISCUS TEARS TREATED WITH INTRAARTICULAR STEROID INJECTION

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ABSTRACT

Objective: To evaluate the safety and efficacy of long-term intraarticular (IA) steroid injections for knee pain related to meniscus tear.**Methods:** In this study 50 patients with meniscus tear of the knee received IA injections of triamcinolone acetonide 40 mg (50 patients) into the knee every 3 months for up to 2 years. The clinical efficacy measure of primary interest was the pain subscale from the Western Ontario and McMaster Universities OA Index (WOMAC). Efficacy measures of secondary interest were the total score on the WOMAC, physician's global assessment, patient's global assessment, patient's assessment of pain, range of motion (ROM) of the affected knee, and 50-foot walking time. Clinical symptoms were assessed just before each injection.**Results:** The steroid-injected knees showed a trend toward greater symptom improvement, especially at 1 year, for the WOMAC pain subscale, night pain, and ROM values ($P < 0.001$). Using area under the curve analyses, knee pain and stiffness were significantly improved throughout the 2-year study by repeated injections of triamcinolone acetonide in type1, type2 and degenerative meniscus tear.**Conclusion:** This study support long-term safety of IA steroid injections for patients with symptomatic knee with meniscus tear without any deleterious effects. It is also clinically effective to relive symptoms.**Keywords:** Intra-articular steroid injection, Meniscus tears

INTRODUCTION

Meniscus tears represent one of the most common injuries to the knee and may be the most common indication for knee surgery in the adult patient. The incidence of meniscus injuries treated by meniscectomy has been estimated at 61 per 100,000.¹ Meniscus injuries can be divided into 2 groups: traumatic tears and degenerative tears. Traumatic tears occur in a younger population and are usually the result of a discrete traumatic episode. Degenerative tears are thought to progress from intrasubstance degeneration within the menisci.¹ Magnetic resonance imaging (MRI) has shown intrasubstance degeneration of the menisci in patients as young as 30 years.²

The diagnosis of meniscus injury continues to evolve and is based on clinical and radiographic findings. Multiple tests have been suggested to enhance the diagnosis of meniscus injury by physical examination, including posterior joint line tenderness, McMurray's test, and the Apley compression and distraction test, among others.³⁻⁶ In studies comparing these tests, joint

line tenderness has been 60% to 90% sensitive and specific.^{4,6-8} Magnetic resonance imaging diagnosis of degenerative meniscus tears has also been shown to have a high degree of accuracy.⁹⁻¹¹ Previous studies have shown similar efficacy in diagnosis between clinical examination and MRI.⁷⁻¹² Other studies conclude MRI is most useful in patients with a history consistent for a meniscus tear but an inconclusive physical examination.^{12,13}

Numerous studies have evaluated the effectiveness of operative treatment of meniscus tears¹⁴⁻¹⁸; however, there is a paucity of literature evaluating the effectiveness of nonoperative treatment. To date, we have found only 1 prospective study of nonoperative treatment of meniscus tears.¹⁹ Therefore, we designed a descriptive study to evaluate a nonoperative-based treatment protocol for patients with the clinical diagnosis of a degenerative medial meniscus tear and to determine if a significant percentage of patients with degenerative medial meniscus tears improve with nonoperative treatment and do not elect operative treatment. We hypothesized that a clinically signifi-

cant percentage of patients will improve to a satisfactory level with nonoperative treatment and will decline operative treatment.

Intra-articular Injection steroid is commonly used as a therapeutic strategy for treatment of articular disorders. These steroids are powerful anti-inflammatories that provide short- and medium-term relief and are used by most orthopedic surgeons and rheumatologists.⁵⁻⁷ Corticosteroids reduce the inflammatory reaction by limiting the capillary dilation and permeability of the vascular structures. These compounds restrict the accumulation of polymorphonuclear leukocytes and macrophages and reduce the release of vasoactive kinins. Additionally, corticosteroids may inhibit the release of arachidonic acid from phospholipids, thereby reducing the formation of prostaglandins, which contribute to the inflammatory process. Bupivacaine or lidocaine are the most frequently used; bupivacaine is preferred in our department because it offers extended anesthetic effect.

Knee joint injections are often performed blindly with good success, especially in the presence of a knee effusion. In patients who do not have an effusion, correct placement can be more difficult. Jackson and colleagues²⁰ found a 71% and 75% rate of accurate placement in those patients injected from the anterolateral and anteromedial approaches, respectively. A blind patellofemoral approach resulted in a higher accuracy (93%), a success rate that has been reproduced. Patients who have inadvertent extra-articular injections have been shown to have decreased response, compared with those with proper placement. Although most procedures can be performed without imaging guidance, obese patients or patients who have patellofemoral arthritis may be sent for imaging-guided knee injection. Knee joint injections may be diagnostic and therapeutic with the intra-articular placement of local anesthetic and steroid. In randomized trials, steroid has shown good short-term improvement in symptoms, compared with placebo.⁶ Novel therapies, such as hyaluronic acid, are also used. Small amounts of these novel therapies are expensive, and imaging is often used to ensure correct intra-articular delivery.

OBJECTIVES

This study was conducted with an objective to Evaluate and correlate clinical findings of meniscal injuries treated with intraarticular steroid injection at SMIMER hospital.

MATERIALS AND METHODS

This is descriptive study of all patients come in the O.P.D of orthopaedic SMIMER hospital diagnosed meniscus tear with clinically and radiologically

Inclusion criteria: Patient with Age-more than 18 yr-55yr; any gender; Grade 1 and Grade 2 meniscus tear; and/or Degenerative tear were included in the study.

Exclusion criteria: Patients with having following conditions were excluded: 1) Patients with diagnosis of Anterior cruciate ligament and posterior cruciate ligament injury based on clinical and MRI findings; 2) Bucket handle tear and Grade 3 tear; 3) Acute trauma; 4) previous surgery on affected knee; 5) Serious systemic diseases like diabetes and hypertension; and 6) Bleeding diathesis

The study was carried out over a period of two years from November 2011 to October 2013 in the SMIMER hospital, surat.

Methods of collection of data: Study participants were evaluated clinically and radiographically. Radiographs were performed to rule out osteoarthritis, including a weight-bearing anteroposterior view of both knees, a weight-bearing 30° flexed-knee posteroanterior view of both knees, a lateral view, and a 30° axial view of the affected knee. Number of cases selected for the study is 50.

Clinical examination tests: Following clinical test were performed: 1) Medial joint line tenderness; 2) Lateral joint line tenderness; 3) McMurray's test; and 4) Apley's grinding test.

All patients enrolled in the study had a closed MRI (1.5 Tesla) performed on the knee. Patients who did not present to the initial clinic visit with an MRI had an MRI performed before their second clinic visit. A standard musculoskeletal knee MRI protocol was used. All MRIs were read by a fellowship-trained musculoskeletal radiologist at our institution, including MRIs performed at outside institutions.

Ethical approval and consent of all patients taken before starting of study.

TECHNIQUE

Various approach used for intraarticular injection steroid in knee joint. But most effective approach is superolateral 91% (95% CI 84-99%). The lateral mid-patellar approach, the anterolateral approach, and the anteromedial approach resulted in the lowest pooled accuracy rates, 85% (95% CI 68-100%), 67% (95% CI 43-91%) and 72% (95% CI 65-78%), respectively.

To perform the lateral superolateral approach (the most commonly reported²¹), the patient is placed in supine position with a small pillow placed under the knee to place the articulation in slight flexion. The lateral aspect of the suprapatellar recess is punctured with a standard 20- to 22-gauge needle after lateral subluxation of the patella. The intra-articular position of the needle tip can be confirmed by the aspiration of joint fluid. In either case, any excess of joint effusion within the articulation should be aspirated before the injection. After injection the knee was wrapped with compressive elastic bandage. Cold application was performed.

Patients received IA triamcinolone hexacetonide 40 mg (50 patients) in the target knee every 3 months up

to 2 year. Clinical symptoms were assessed just before each injection. Improvement was determined by WOMAC²² (Western Ontario and McMaster Universities Osteoarthritis Index) pain subscale, night pain, and range of motion. Area under the curve analyses were used to show that knee pain and stiffness were significantly improved throughout the 2 year study by the steroid injections.

If the patient did not improve satisfactorily after 3 month of injection steroid, arthroscopy was offered. If the patient chose to continue nonoperative treatment, the one more time injection steroid were continued and follow-up was scheduled for 3 month. At each of the follow-up appointments, if symptoms persisted, arthroscopy was offered.

For the purpose of data analysis, patients were divided into 3 treatment groups: type 1, type 2 and degenerative meniscus tear. Each patient's WOMAC score recorded; special attention was given to the initial and final scores for both scales. The initial scores represented the status of the patients' knees before any treatment was given. The final scores represented the status of the patients' knees after treatment was completed. The two-sample equal variance, dependent Student *t* test was used to evaluate differences within treatment groups. Significance was determined at *P*<.001

RESULTS

From November 2012 to October 2013, 50 patients were enrolled in the study. 28 men and 22 women had a mean age of 39.14 years (range, 21-55 years). There were 24 right knees and 26 left knees of patients. In this study 76% patients have type 1 and 2 meniscus tear and 24% patients have degenerative meniscus tear.

Table 1: Age Distribution and Sex Distribution of Participants

	Patients (n=50) (%)
Age	
21-25	5 (10)
26-30	9 (18)
31-35	5 (10)
36-40	9 (18)
41-45	4 (8)
46-50	7 (14)
51-55	11 (22)
Sex	
Male	28 (66)
Female	22 (44)

The type 1 group had 19 patients: 11 men and 8 women. The type 2 group had 19 patients: 10 men and 9 women. The degenerative group had 12 patients: 4 men and 8 women. Mean age for the type 1 group was 35.7 years. Mean age for the type 2 group was 33.7 years. Mean age for the degenerative group was 53.0 years.

Table 2: Side and Grade Type Distribution of Participants

	Patients (n=50) (%)
Side	
Right	24 (48)
Left	26 (52)
Type	
Type 1	19 (38)
Type 2	19 (38)
Degenerative	12 (24)

The initial and final WOMAC scores for all patients were 50.9 and 82.27, respectively. In type 1 meniscus tear, initial and final WOMAC scores 50.49 and 83.63 respectively. In type 2 meniscus tear initial and final WOMAC scores 50.39 and 79.91. In Degenerative meniscus tear initial and final WOMAC scores 52.38 and 83.28.

Table 3: WOMAC Score of Participants

	Initial	Final	P value
Type 1 Meniscus Tear	50.49	83.63	<0.001
Type 2 Meniscus Tear	50.39	79.91	<0.001
Degenerative Meniscus Tear	52.38	83.28	<0.001

DISCUSSION

Medial meniscus tears represent a large portion of knee injuries that require surgery in the middle-aged patient.^{14,16,17} This study prospectively evaluated patients with a clinical diagnosis of a degenerative medial meniscus tear and their response to a treatment protocol that included an intra-articular injection steroid. Patients with degenerative medial meniscus tears typically present with joint line pain and an atraumatic history. Osteoarthritis can present with similar symptoms and is a common cause of pain in the knee in this patient population.

Patients with both osteoarthritis and meniscus tears have poorer outcomes when treated with arthroscopic meniscectomy and may in some cases be better suited for high tibial osteotomy or total knee arthroplasty.¹⁶

This study focused on isolated type1, type2 and degenerative meniscus tears.

The clinical diagnosis of medial meniscus tears is highly accurate.^{4,6-8} Despite this, it has become routine for some orthopedic surgeons to confirm the diagnosis of a meniscus tear with MRI. Magnetic resonance imaging has been found to be highly sensitive and specific for detecting meniscus tears⁹⁻¹¹; however, in this study and previous studies, clinical examination was as effective as MRI at diagnosing a meniscus tear.^{7,12}

The goal of this study was to evaluate a role of intra-articular injection of steroid in type1, type2 and degenerative meniscus tears. All three groups still significantly improved overall from initial to final WOMAC scores (*P*<0.001).

The surgical treatment for meniscus tears, arthroscopic partial meniscectomy, has been shown to have good to excellent results in the majority of patients.^{16,18}

However, as this study shows, a significant portion of patients with meniscus tears improve to satisfactory levels with treatment of intraarticular injection steroid and do not proceed with operative treatment. Only 3 person did not improve with intraarticular injection steroid and finally converted in to arthroscopic meniscectomy.

The strengths of this study include the simplicity of the treatment protocol and the prospective design. The treatment protocol can be easily incorporated into an orthopedic surgeon's practice. Joint line tenderness was chosen as the basis of the clinical examination in these patients because it has been shown to be highly effective in the past and is easily reproducible.^{4,6-8} Although previous studies have shown that combining joint line tenderness with other clinical tests for meniscus pathology enhances the sensitivity and specificity for meniscus tears,^{3,6} this study's results show that when joint line tenderness is present in patients meeting the inclusion criteria, it is highly effective at diagnosing a meniscus tear. This study's average follow-up was relatively short at 1 year; however, it was significantly longer than the 6-month follow-up of the only other prospective study of nonoperative treatment of meniscus tears in the literature.¹⁹

CONCLUSION AND RECOMMENDATIONS

This study provides prospective evidence of the effectiveness of a nonoperative-based treatment of intraarticular injection steroid protocol for type1, type2 and degenerative medial meniscus tears.

Our findings support the long-term safety of IA steroid injections for patients with symptomatic meniscus tear. No deleterious effects of the long-term administration of IA steroids on the anatomical structure of the knee were noted. Moreover, long-term treatment of meniscus tear with repeated steroid injections appears to be clinically effective for the relief of symptoms of the disease.

Patients who elect operative treatment fail nonoperative treatment within the first few months; therefore, we recommend an initial course of nonoperative treatment of intraarticular injection steroid for all patients with a clinical diagnosis of a degenerative medial meniscus tear prior to considering surgery.

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