European Review for Medical and Pharmacological Sciences 2013; 17: 3192-3196

Arthroscopic debridement compared to intra-articular steroids in treating degenerative medial meniscal tears

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Abstract. – OBJECTIVES: Virtually all early cases of knee osteoarthritis have degenerative medial meniscus lesions accompanying the chondral defects on MRI. It is difficult to determine if the symptoms are caused by the unstable meniscus or by osteoarthritis, hence unclear guidance towards treatment. We, therefore, aimed to determine the clinical improvement following arthroscopic meniscectomy compared to intraarticular administration of corticosteroids for degenerative ruptures of the medial meniscus in the presence of early stage medial compartment knee osteoarthritis.

PATIENTS AND METHODS: We included 120 consecutive cases of nontraumatic symptomatic knees which had degenerative lesions of the medial compartment (cartilage and meniscus) on MRI's. They were randomized to receive either intraarticular steroid injection or arthroscopic debridement. We also analyzed the correlation between BMI, age, gender, MRI, intraoperative aspect of the meniscus and cartilage and clinical improvement using the Oxford Knee Score up to one year. At one month there was significant improvement of the scores for all the examined cases. Also at one month, the arthroscopic group performed better in terms of symptom improvement. This was maintained for 79% of the knees in the arthroscopic group and 61% in the intraarticular steroid injection respectively, out of those available for follow up at one year.

RESULTS: At one month, symptoms reappeared for 12 patients in the steroid group and 7 in the arthroscopy respectively. Gender and age did not correlate with treatment, whereas extrusion of the meniscus, bone marrow edema, duration of the clinical symptoms, obesity and a low preoperative score were negative prognostic factors.

CONCLUSIONS: Degenerative medial meniscal tears, in the presence of osteoarthritis, can only marginally benefit from arthroscopic debridement over intraarticular steroid injections in short term follow up. When considering individual cases, factors become more predictive when analyzed in group.

Key Words:
Meniscus, Degenerative osteoarthritis, Arthroscopy, Corticosteroids.

Introduction

Osteoarthritis is the most prevalent chronic joint disease and the knee is one of the most affected locations. For the advanced stages in the elderly, total knee arthroplasty is the treatment of choice with favorable outcomes. However, for younger patients and early stages there is no consensus regarding the best option. The majority of such patients present with degenerative lesions of the medial side. Data from literature showed that unicompartmental replacements yield less favorable outcomes compared to total knees replacements, with higher revision rates especially in younger, more active patients. In addition, a high tibial osteotomy will only be useful in cases with relatively important varus deformity. Frequently, the initial presentation of these type of cases consists of symptomatic medial compartment knees without such clinically apparent deformity.

The MRI (magnetic resonance imaging) is the current standard imaging technique to evaluate treatment options. Virtually, all such cases will have degenerative medial meniscus lesions accompanying the chondral defects. Nevertheless, these meniscal lesions have been shown to appear numerous also in asymptomatic knees and common in the general population with an increase with age[1]. In addition, the prevalence of articular cartilage damage in patients undergoing arthroscopic surgery for meniscal lesions increases with age, weight, medial compartment and knee contractures[2]. It is, therefore, difficult to determine if the pain is caused by the unstable meniscus or by

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osteoarthritis, since the degenerative rupture of the meniscus can merely be an effect of knee osteoarthritis and an incidental finding on a MRI performed for painful osteoarthritis. In addition, in the literature there is no consensus about the preoperative factors predictive for the relief of pain following arthroscopic meniscectomy in the presence of early stage knee osteoarthritis. The treatment options for such cases include physiotherapy, intraarticular injections of hyaluronic acid and steroids while arthroscopic debridement, as conservative method to alleviate symptoms until progression of disease and age, will deem suitable for joint replacement procedure. Most patients will receive a combination of these procedures. In recent years, evidence of efficacy lack for arthroscopic debridement in knee osteoarthritis and changes in reimbursement has led to a decline of this procedure[3].

The most important study in this respect has been performed by Moseley et al[4] which performed a sham controlled randomized trial with similar result between the intervention (arthroscopic debridement) group and placebo group. These findings were intensely contested, especially regarding gender distribution, sample selection and treatment options. Attempts to identify predictive preoperative guidelines to outline the patients which will benefit most from arthroscopic debridement have not been conclusive. In addition, Englund et al[5] found that isolated meniscal tears, treated by partial meniscectomy, are associated with a high risk of radiographic and symptomatic tibio-femoral OA at long term follow-up. These findings can only weaken the arthroscopic debridement success. Nevertheless, some prognostic factors have been identified. Meredith et al[6] found that greater size of meniscal resection and female gender have the strongest and consistent associations with radiographic evidence of osteoarthritis. Furthermore, cartilage degeneration, size of meniscal resection, laxity of the anterior cruciate ligament and prior surgery were also strong predictors of worse functional outcomes. In addition, general factors, such as preoperative health status and litigations, also had worse functional outcomes. Fabricant et al[7] have shown that female gender and advanced osteoarthritis are negative predictors of short-term recovery from arthroscopic partial meniscectomy whereas age, body mass index and amount of meniscal damage showed no association with the recovery throughout the first postoperative year. Conservative treatment has also produced consistent results for early stages of medial compartment degeneration. Bellamy et al[8] found short-term benefits of intra-articular steroids in the treatment of knee osteoarthritis and of hyaluronic products showing slightly more durable outcomes, with both solution safe. Kirkley et al[9] showed that arthroscopic surgery for osteoarthritis of the knee provides no additional benefit to optimized physical and medical therapy. Koyonos et al[10] compared the benefit of local steroid administration after knee arthroscopy and found an improved pain and function at an early time point but no a lasting difference compared with only local anesthetic injection.

We, therefore, aimed to determine the clinical improvement following arthroscopic meniscectomy in comparison with intra-articular administration of corticosteroids for degenerative ruptures of the medial meniscus in the presence of early stage medial compartment knee osteoarthritis.

Patients and Methods

For this purpose we took in account 120 consecutive cases regarding 114 patients with non traumatic symptomatic knees which had degenerative lesions of the medial compartment (cartilage and meniscus) on MRI's. They were randomized to receive either intra-articular steroid injection (1 ml of betamethasone in 4ml of lidocaine 1%) or arthroscopic debridement. Patient demographics are summarized in Table I. Based on the Outerbridge classification and preoperative, one month and one year postoperative Oxford Knee Scores, we also analyzed the correlation between BMI (body mass index), age, gender, preoperative MRI (magnetic resonance imaging) and intraoperative aspect of the meniscus and cartilage[11]. In order to compare the two means, data were analyzed using both descriptive statistics and unpaired t-test procedure. Processing was done using GraphPad Prism 6 (GraphPad Software, Inc). The study was approved by our Hospital Ethics Committee and all measures were taken to ensure patients safety and privacy including intervention if one of the techniques proved unequivocal superiority (Figures 1 to 4, Tables I and II).

Results

For all the examined cases, there were significant improvement of the scores at one month. At the same time the arthroscopic group performed better in terms of symptoms improvement. This

Table I. Descriptive statistics of the patient's data at the point of index surgery.

N	Female	Age (SD)	BMI (SD)	Onset of symptoms (months)
Steroid injection=60	46	57.6 (7.8)	31.9 (6.2)	3 (1.7)
Arthroscopic debridement=60	49	59.2 (7.5)	32.7 (6.4)	3 (1.5)

SD – Standard deviation of the mean for 95% confidence interval; BMI – Body mass index.

Table II. Oxford Knee Scores.

N	Initial examination (SD)	One month (SD)	One year (SD)
Steroid injection	30.3 (3.5)	39.9 (3.9)	34.7 (3.8)
Arthroscopic debridement	29.1 (3.7)	42.8 (3.1)	36.1 (3.6)
$p <$	0.0705 n.s.	0.0001	0.0641 n.s.

SD – standard deviation of the mean for 95% confidence interval.

was detected into 79% of the knees in the arthroscopic group and into 61% in the intra-articular steroid injection, respectively, out of cases available for follow up at one year. At one year only 4.2% (5) have been converted or (1) programmed for a total knee replacement. All patients were available for the one month follow-up. 48 patients from the injection group and 50 patients from the arthroscopy group were available for the one year follow-up. At one month, symptoms reappeared for 12 patients in the steroid group and 7 in the arthroscopy group, respectively. These received another intra-articular steroid injection. By one year, 10 cases received arthroscopic debridement which amended the symptoms in 7 cases. Gender and age did not correlate with treatment, whereas extrusion of the meniscus, bone marrow edema and duration of the clinical symptoms, obesity and a low preoperative Oxford score represented negative prognostic factors. Even though we could correlate the degree of the cartilage destruction to postoperative improvement of symptoms, we could not determine a cut-off value.

Discussion

None of these factors could be interpreted isolated and we could not find a distinctive cut-off value. The most part of these factors are present preoperatively and the symptoms will not be satisfactorily amended by neither a single intra-articular corticoid injection nor the arthroscopic meniscectomy. One of the strong points of the study is to compare, on MRI's, the two most commonly used treatment methods for symptomatic knees with degenerative lesions of the me-

Figure 1. ***A,*** AP X-ray: internal compartment OA (osteoarthritis) stage II (Kellgren-Lawrence), stable knee. ***B,*** Coronal MRI: internal tibial plateau bone edema, important MCL (medial collateral ligament) inflammation, in possible connection with meniscal extrusion, mirrored chondral lesions, Crues III meniscal rupture of the posterior horn; external discoid meniscus.

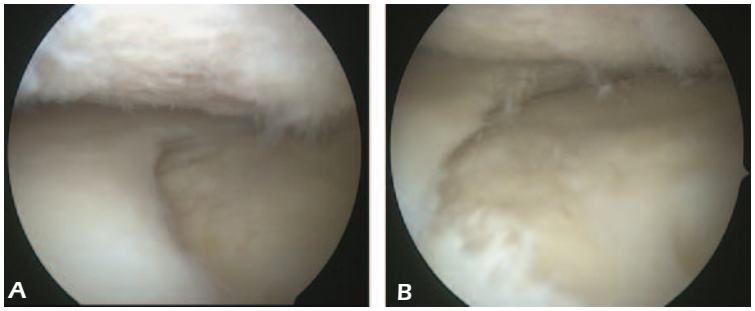

Figure 2. ***A,*** Arthroscopic view of the same case: Cartilage lesions Outerbridge III, complex degeneration of the meniscus; normal external compartment. ***B,*** After partial meniscectomy; Female patient with intermittent symptoms for 6 weeks; persistent and important symptomatic improvement at 1 year; Oxford scores: 28/41/38.

Figure 3. ***A,*** AP X-ray: internal compartment OA stage III (Kellgren-Lawrence), mild genum varum, MCL (medial collateral ligament) insufficiency, unstable knee. ***B,*** Coronal MRI: mirrored bone edema, MCL inflammation, mirrored focal chondral lesions, Crues IV meniscal rupture of the posterior horn with extrusion.

dial meniscus. Even though it is a randomized trial with over 80% of follow-up attendance, there are numerous factors we did not take into consideration, such as the influence of physiotherapy between one month and one year, the amount of oral non-steroidal anti-inflammatory drugs or analgesics. We also did not normalize the cases for meniscal extrusion, which has been shown to correlate with a progression of the arthritis[12]. The factors which adversely affected the outcomes in our series were similar to those identified in the literature.

Kijowski et al[13] compared preoperative MRI's with clinical outcomes after partial meniscectomy and found a severity of cartilage lesions, bone edema, amount of meniscal extrusion, overall joint degeneration and a longer or root meniscal tear to be predictors of poorer outcomes. Literature reviews found evidence to strongly support the use of intra-articular corticosteroid injections for knee osteoarthritis with improvement that can last up to one year[14]. The presence of effusion without synovitis, severity of disease and greater symptoms at baseline may all improve the response to intra-articular steroid injections[15]. Initial favorable results with nonsurgical therapy for arthritic knees that ultimately converged to arthroscopic meniscectomy have also been reported. In one study[16], arthroscopic surgery followed by exercise was not found superior to the same exercise therapy alone.

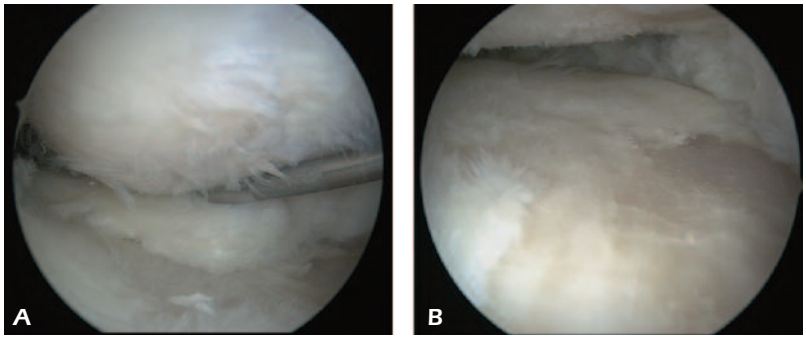

Figure 4. ***A,*** Arthroscopic view of the same case: Mirrored chondral lesions Outerbridge IV, complex, unstable degeneration of the meniscus; external compartment chondral lesions stage II. ***B,*** After subtotal meniscesctomy; Female patient with intermitent symptoms for 6 months, persistent under conservative treatment; Transient symptomatic improvement (only at 1 month), considered for TKA; Oxford scores: 23/30/27.

Nonetheless, in the same cohort, one third of the patients from the exercise group still had disabling knee symptoms after exercise therapy that improved after arthroscopic meniscectomy. Another recent multicenter, randomized, controlled trial involving symptomatic patients with meniscal tears and mild-to-moderate osteoarthritis (METEOR) performed by Katz et al[17] also found little difference between arthroscopic meniscectomy and physical therapy in this population. However, they also had an important number of patients from the physical therapy group which eventually underwent to arthroscopic surgery.

Conclusions

Degenerative medial meniscal tears, in the presence of osteoarthritis, can only marginally benefit from arthroscopic debridement over intra-articular steroid injections in short term follow up. When considering individual cases, factors become more predictive when analyzed in group. However, the preoperative evaluation could appear difficult and, in some instances, the symptoms are predominantly determined by exacerbation of arthritis.

Acknowledgements

A special thank to Cristina Nuta, MD for contributing to the postoperative physical therapy.

Conflict of Interest

The Authors declare that there are no conflicts of interest.

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