© J ORTHOP TRAUMA SURG REL RES
18(6) 2023
Research Article

The value of arthroscopic debridement of degenerative arthritis in knee joint

JASIM MOHAMMED ASKAR, ALI TOAMA YOSIF, AKRAM GATEA YASIR AL-SHUWAILI
Al-Shafaa General Hospital, Basrah Health Directorate, Ministry of Health, Basrah, Iraq

Statistics

Figures	00
Tables	03
References	14

Received: 05.06.2023; Manuscript No. jotsrr-23- 101385;
Editor assigned: 07.06.2023, PreQC No. jotsrr-23- 101385 (PQ);
Reviewed: 17.06.2023, QC No. jotsrr-23-101385 (Q);
Revised: 19.06.2023, Manuscript No. jotsrr-23-101385 (R);
Published: 23.06.2023, DOI. 10.37532/1897-2276.2023.18(6).98

Address for correspondence:
Ali Toama Yosif, Al-Shafaa General Hospital, Basrah Health Directorate, Ministry of Health, Basrah, Iraq
Medicalresearch10@yahoo.com

Abstract

Introduction: Articular cartilage is vulnerable to irreversible traumatic injury and degenerative disease. Debridement of damaged articular cartilage is a common arthroscopic procedure performed. Its use is not without controversy. Our aim of the study is to assess the value of arthroscopic debridement of degenerative arthritis of the knee joint.

Methods: 23 patients were conducted between December 2019 and November 2022 in Basrah General Hospital. All patients were subjected to radiological examination standard anteroposterior, lateral view, and special view (skyline view). MRI was done on all patients. All patients were followed up clinically by Lysholm Scoring. A standard arthroscopic procedure was done. Procedures included lavage, meniscectomy, and removal of detached fragments of articular cartilage. Only ACL reconstruction was done in one case. Postoperative management, dressing with a compression bandage and ice packs, and antibiotics. Two groups of patients, were Group 1(under 40 years), 18 patients, and Group 2(above 40 years), 5 patients. Secondary degeneration is more than primary degeneration.

Results: Males were 17 and females were 6. The medial condyle was more prone to degeneration because more subjected to stress load, meniscal injury was the common intra-articular structure injured associated with articular cartilage damage, especially the medial meniscus. There was excellent control of pain and improved function in 78.3% were under 40 years with traumatic causes in grades 2 and 3 than in those with traumatic causes (21.7%) in grades 4.

Conclusion: Arthroscopic debridement is a temporizing procedure with good patient satisfaction. The complication after articular cartilage debridement are rare and mimic those following diagnostic arthroscopy.

Keywords: Meniscectomy, debridement, arthroscopy, meniscal injury

INTRODUCTION

The function of articular cartilage is to provide for smooth, pain-free gliding of the joints during skeletal motion. The architecture of articular cartilage is such that it provides a low coefficient of friction to allow smooth motion throughout a lifetime. However, normal function requires maintenance of the structural properties and the metabolic function of cartilage [1].

Articular cartilage is vulnerable to irreversible traumatic injury and degenerative disease. Damaged articular cartilage has a limited ability to heal without intervention owing to two primary factors: lack of a vascular response, and a relative absence of an undifferentiated cell population to respond to injury. The rationale for early surgical intervention for articular cartilage injuries is based on the symptomatic nature of focal chondral lesions and the potential for these lesions to progress. The surgical management of articular cartilage defects is based on several underlying principles, including the reduction of symptoms, improvement in joint congruence and force distribution, and prevention of additional cartilage damage [1].

Both partial and full-thickness lesions have limited capacity for repair. The avascular nature of articular cartilage and the limited stem cell population limit the healing response following injury. In addition, the constant load of articular cartilage, particularly in the knee, creates a challenging mechanical environment for an appropriate healing response [1].

Debridement of damaged articular cartilage is a common arthroscopic procedure performed. Its use is not without controversy, because the biologic or biomechanical basis for its effectiveness has never been fully elucidated Debridement does not restore the articular surface to its normal, pristine state. It is thus not surprising that the expected result is amelioration, not elimination, of symptoms. Nevertheless, its relatively low morbidity makes it a popular treatment for joint symptoms that have not responded to conservative measures. Key factors in the successful use of chondral debridement are great care in patient selection and proper patient education regarding realistic postoperative expectations [2].

Lee et al and Outerbrige independently classified the macroscopical changes of chondral diseases into 4 grades [3,4]. These two similar classifications for articular cartilage are based on arthroscopic findings.

The Modified International Cartilage Repair Society Chondral Injury Classification System, classifies chondral injuries based on the amount and depth of the cartilage lesion. Most commonly, these lesions are classified using the modified Outerbridge system (Table 1). Other important factors that affect the ability of cartilage lesions to heal with operative treatment include the location and size of the lesion, the depth and condition of the subchondral bone, the condition of the surrounding normal cartilage, and coexisting knee pathology. In addition, it is important to recognize any bony deficiency that may alter the treatment plan for the repair of chondral injuries.

In addition to classifying lesions by depth and size, it is important to consider other factors when determining the appropriate treatment. These include whether the defect is acute or chronic, the defect's location, associated ligamentous instability, the integrity of the meniscus, and tibiofemoral or patellofemoral malalignment. Many patient factors must also be considered, including age, activity level, occupation, expectations, body weight, presence of systemic disease, and results of previous treatment attempts. The standard classification system of cartilage lesions differentiates four different grades according to their signal and their depths and is analogous to the arthroscopic classification system defined by Noyes et al.:

Table 1. Modified outerbrige classification of cartilage lesion

Grade	Description
I	Softening of articular cartilage
II	Fibrillation or superficial fissures of cartilage
III	Deep fissuring of cartilage without exposed bone
IV	Expoded subchondral hone

1. Grade 1 is defined as signal abnormalities within the cartilage (arthroscopically corresponding to softening of the cartilage),
2. Grade 2 as a focal cartilage lesion less than 50% of the diameter of the cartilage,
3. Grade 3 as a lesion of more than 50% of the cartilage diameter.
4. Grade 4 as a full thickness cartilage lesion.

Radiologically hyaline cartilage can be under one of three pathological processes. It can be thinned in arthropathy or trauma, thickened, or calcified [5-8].

Treatment is nonoperative (NSAID medications, physical therapy, intra-articular corticosteroid or hyaluronic acid injections, and nutritional supplementation with chondroitin and glucosamine sulfate) and operative treatment include arthroscopic debridement, osteotomy, arthroplasty, osteochondral and autologous chondrocyte implantation, mosiacoplasty and Arthrodesis [9].

The study aimed to assess the value of arthroscopic debridement of degenerative arthritis in knee joint.

MATERIAL AND METHOD

This is a clinical prospective study conducted between December 2010 and November 2011 in Basrah General Hospital. The study includes 23 patients who were subjected to arthroscopic debridement with a range of age 35.5 years old. They were selected from private clinics and outpatient departments. Patients were divided into 2 groups, those below 40 years

1. Group 1 include patients (secondary degeneration), and those above 40 years.
2. Group 2 includes 5 patients (primary degeneration).

The criteria for our patient selection are based on clinical and imaging studies, 15 patients have pain and locking, and other 3 patients in addition to that have given way all of these have grade 2 medial meniscal tears, and the remaining 5 patients, 2 of them squatting, not beyond 90 degrees and instability, often in daily activities, and other 3 patients have pain after walking less than 2 Km with periodical limping. The initial evaluation of the patients included history taking and proper physical examination according to the special formula prepared for this purpose. All patients were subjected to radiological examination standard weight-bearing anteroposterior in full extension, a non-weight bearing 45-degree-flexion lateral view, and a special view (skyline view). MRI was carried to all patients to assess the state of other intra-articular structures (meniscal injury and the nature of anterior cruciate ligament) and also to show the extent of articular cartilage lesion. The arthroscopic debridement was carried out in all patients, marking the affected site, the preoperative antibiotic was given (ceftriaxone 1 gm), and the procedure was carried out under general anesthesia and was performed under the effect of an Esmarch rubber tourniquet. The patient is in a supine position on the operating table. The legs were pendulous or flexed 90 degrees using a leg holder The non-operative leg should be well padded to prevent potential.

The operative extremity is then prepared and draped in the standard surgical fashion with any of the commercially available drapes. The anterolateral and anteromedial portals were chosen. The joint is distended with normal saline fluid, Initial diagnostic arthroscopy to inspect the entire articular surface of the knee, probing and looking for damaged articular cartilage; the extent of articular cartilage damage and whether it involves the weight-bearing surface should be noted. Completion of the diagnostic arthroscopy includes visualizing and probing the cruciate ligaments and menisci for tears and assessing the medial and lateral gutters for loose bodies. An accessory portal can be established to help reach a difficult area of damaged cartilage in the knee such as posteromedial and postro lateral, arthoscopic procedure includes meniscectomy, lavage, and removal of detached

fragments of articular cartilage. Postoperative treatment dressing with a compression bandage and application of an ice pad. The patient discharge home usually after (1-2 days) with treatment continue for 5 days-7 days and instructed for non-weight bearing for 3 weeks, pair of axillary crutches, and partial weight bearing allowed for another 3 weeks. Full weight bearing, followed by a progressive return to daily home activities as tolerated, with the encouragement of quadriceps muscle exercise. They checked for the development of any complications (haemarthrosis, infection, and increasing pain). They are followed weekly until 3rd month by Tenger Lysholm Scoring prepared in the form of a table attached to the questionnaire [10]. KOSS (Knee Osteoarthritis Scoring System) assessment is not available in our locality. Statistical Package for the Social Science (SPSS) system was used for comparative analysis of the data in this study, and using P-value.

RESULTS

The patients were divided into 2 groups, the first group was less than 40 years and the other more than 40 years, because degenerative changes start after 40 years in a normal patient who was not subjected to trauma. According to sex, we are found male patients more than female patients because of their job or sport. Chondral degeneration affects the articulating surfaces unequally and in different degrees of severity, thus the anatomical site of the knee joint is an imported parameter in the distribution of patients in our study. The knee joint contains many imported intra-articular structures, if these structures are affected or damaged leading to degeneration as squally or complication to that damage or effect, we remember the most affected structure, (meniscus & ACL) in our study. The involved side is another factor that determines the distribution of our patient in the study because the process can occur

Table 2. Variables

		No.	%	
Age (years)	Group 1 >40 years	18	78.3	
	Group 2 >40 years	5	21.7	
Sex	Male Patients	17	73.9	
	Female patients	6	26.1	
Anatomical site	Medial condyle	17	73.9	
	Lateral condyle	1	4.4	
	Bicondyla	1	4.4	
	Patellofemoral	4	17.3	
Degeneration with ACL		7	30.5	52.1
Degeneration with meniscus	medial meniscus	10	43.4	
	lateral meniscus	2	8.7	
Combined		9	17.4	
Side of injury	Right knee	14	60.8	
	Left knee	9	39.2	
Clinical presentation	Pain and locking	15	65.5	
	Pain, locking, and giving way	3	13	
	Squatting, not beyond 90 degrees, instability after daily activities	2	8.5	
	Marked pain during walking >2 Km and occasional locking	3	13	
Etiology	Traumatic causes	20	86.9	
	Atraumatic causes	3	13.1	
Grade	Grade I	-	-	
	Grade II	15	65.3	
	Grade III	5	21.7	
	Grade VI	3	13	
Arthroscopic procedure	Debridement, lavage, and meniscectomy	18	78.3	
	Debridement of the degenerative meniscus, plico, lavage and detached fragments of articular cartilage removal	4	17.1	
	Debridement, lavage and ACL reconstruction	1	4.6	
Complications	No complication	21	91.3	
	Pain and stiffness	2	8.7	

Table 3. Show clinical assessment of patients by final Lycholm score after 3 months

Type	No.	Pre-arthroscopical scoring	Post-arthroscopical scoring
1°	3	Poor	Fair
	2	Poor	Good
2°	15	Fair	Excellent
	2	Fair	Good

*The p-value is very significant<0.05

on any side of the body. The selection of patients was based on certain clinical presentations, the patient minimally has 2 features of mention. The majority of patients have a definitive cause (trauma). Arthroscopic grading was an imported parameter in our study, more than half of patients have grade 2 articular cartilage injury. Some patients have 3 arthroscopic steps, other have 4 or 5. Fortunately, we have not faced any complications apart from mild pain and stiffness (Table 2).

At the end of follow-up, all patients were assessed clinically by Lycholm score which is parameter r of outcome (Table 3).

DISCUSSION

The present study is designed to study the value of arthroscopic debridement of articular cartilage of a degenerative knee. Debridement of damaged articular cartilage is a common arthroscopic procedure performed There is a controversial opinion about the procedure because the biologic or biomechanical basis for its effectiveness has never been fully elucidated. Debridement does not restore the articular surface to its normal. All patients selected had degeneration in different grades Group 1, includes 18 patients (78.3%), while Group 2 includes 5 patients (21.7%), this is directly related to the activity of patients in Group 1 and this means secondary degeneration is more than primary degeneration.

Articular cartilage injury is more in male patients 17 (73.3%), this reflects that male patients are more prone to injury because of their work or sport than females patient. The medial condyle was the commonest site for degeneration because subjected to more stress load. The meniscal injury was the commonest intra-articular structure associated with cartilage damage, in 12 patients (52.1%), especially the medial one because it is anatomy more subjected to injury during daily life activities. Group 1 (78.3%) with traumatic causes have a good or excellent improvement in pain and function, while atraumatic causes in Group 2 (21.7%) have fair to good improvement, compared to the study performed by Federico and Reider , Friedman et al, Feder et al and McLaren et al [11-14]. We believe that arthroscopic debridement is an effective means of treatment for mild to moderate degenerative joint disease after the failure of conservative measures. Patients with traumatic chondrosis had a significantly greater improvement. Arthroscopic debridement is a temporizing procedure with good patient action. Arthroscopic debridement and lavage improves function and faction in grade 283. Patients in grade 4 also improved to a lesser extent arthroscopic debridement and lavage is a good treatment alternative in young patients. The complication after articular cartilage debridement and mimics those following arthroscopy.

CONCLUSION

Articular cartilage damage is common in degenerative knee secondary to ligamentous injury in active patients. It is more common in males, this reflects that male patients are more prone to injury because of their work or sport. The complications after articular cartilage debridement are rare and mimic those following arthroscopy. Patients with traumatic chondrosis had a higher percentage of good or excellent results after arthroscopic procedures compared with traumatic cases. Arthroscopic debridement of the knee may improve function and decrease pain but is not a curative procedure for the short term.

References:

1. *Verma NN, Cole BJ, Romeo AA. Arthroscopic repair of SLAP lesions. In Textbook of Arthoscopy 2004 :159-68. WB Saunders.*
2. *Dandy DJ. Arthroscopic debridement of the knee for osteoarthritis. J. Bone Jt. Surg., Br. vol. 991;73(6):877-8.*
3. *Lee SH, Suh JS, Cho J, et al. Evaluation of chondromalacia of the patella with axial inversion recovery–fast spin-echo imaging. J. Magn. Reson. Imaging: Off. J. Int. Soc. Magn. Reson. Med.,001;13(3):412-6. [Google Scholar] [Cross ref]*
4. *Outerbridge RE. The etiology of chondromalacia patellae. 1961. Clin. Orthop. Relat. Res. 2001 (389):5-8. [Google Scholar] [Cross ref]*
5. *Lund F, Nilsson BE. Radiologic evaluation of chondromalacia patellae. Acta Radiol. Diagn. 1980;21(3):413-6.*
6. *Buckwalter JA. Roughley PJ, Rosenberg LC. Age-related changes in cartilage proteoglycans: quantitative electron microscopic studies. Microsc Res Tech. 1994;28(5):398-408.*
7. *Calvo E, Palacios I, Delgado E, et al. High-resolution MRI detects cartilage swelling at the early stages of experimental osteoarthritis. Osteoarthr. Cartil. 2001;9(5):463-72.*
8. *Vähäsarja V, Kinnuen P, Serlo W. Arthroscopy of the acute traumatic knee in children: prospective study of 138 cases. Acta Orthop. Scand. 1993;64(5):580-2.*
9. *Anbari A, Yanke AB, Cole BJ. Chondroplasty and Microfracture. InOpertaive Techniques: sports knee surgery 2008:167-177. WB Saunders.*
10. *Tegner YE, Lysholm JA. Rating systems in the evaluation of knee ligament injuries. Clin. Orthop. Relat. Res. (1976-2007). 1985 ;198:42-9.*
11. *Federico DJ, Reider B. Results of isolated patellar debridement for patellofemoral pain in patients with normal patellar alignment. Am. j. sports med. 1997;25(5):663-9.*
12. *Friedman MJ, Berasi CC, Fox JM et al Preliminary results with abrasion arthroplasty in the osteoarthritic knee. Clin. Orthop. Relat. Res. 1984 ;182:200-5.*
13. *Feder OI, Levy BJ, Gruson KI. Routine plain radiographs in the setting of atraumatic shoulder pain: are they useful?. JAAOS-J. Am. Acad. Orthop. Surg. 2018;26(8):287-93.*
14. *McLaren AC, Blokker CP, Fowler PJ, et al. Arthroscopic débridement of the knee for osteoarthrosis. Canadian journal of surgery. J. can. chir. 1991;34(6):595-8.*