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ORIGINAL ARTICLE

Arthroscopic Debridement and Synovium Resection for Inflammatory Hip Arthritis

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Key words: hip arthroscopy; inflammatory arthritis; debridement

Objective To evaluate the efficacy of arthroscopic surgery in inflammatory hip arthritis.

Methods A retrospective clinical study was conducted inspecting 40 hips in 36 patients of inflammatory arthritis. There were 17 cases of ankylosing spondylitis, 11 cases of rheumatoid arthritis, and 8 cases of psoriatic arthritis. The joints were irrigated and the inflamed tissues were debrided with arthroscopy. The patients were followed up with Harris hip score, Oxford hip score, Visual Analog Scale (VAS), and magnetic resonance imaging (MRI). Statistical analysis was performed using Student *t* test.

Results All of the 36 cases were followed up for 46-103 months, averaging 67.2 ± 8.4 months. Harris and Oxford scores increased from 66.9 ± 12.1 and 69.4 ± 16.4 before operation to 78.4 ± 19.3 and 80.2 ± 18.8 after operation, respectively ($P < 0.05$). VAS score decreased from pre-operative 8.5 ± 2.5 to post-operative 7.2 ± 2.5 ($P < 0.05$). All the patients showed improved joint range of motion. MRI revealed alleviation of hip synovitis. The results were classified as excellent in 8 patients, good in 17 patients, fair in 8 patient, and poor in 3 according to Harris hip score. Twenty-seven patients were satisfied with the operative outcomes as they regained normal daily activities.

Conclusions Arthroscopy-assisted joint debridement and synovium resection is an effective procedure for hip lesion in inflammatory arthritis. The inflammatory lesion might be thereby controlled and the symptoms be relieved.

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INFLAMMATORY arthritis is a generic name covering different types of arthritis, including rheumatoid arthritis (RA), ankylosing spondylitis (AS), psoriatic arthritis (PsA), juvenile spondyloarthropathy (jSpA),

and Lyme arthritis.¹ With inflammatory arthritis, it is likely that pathophysiological pathways that directly or indirectly result in bone and cartilage degradation are preferentially activated in articular tissues from the early phase of the disease. The synovium or joint lining becomes inflamed and ultimately damages the articular cartilage and subchondral bone.^{2,3} Commonly, it leads to swelling of the joint associated with severe pain and dysfunction, even ankylosis and/or joint deformity. Lesions in inflammatory ar-

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thropathy can be treated conservatively or surgically. Arthroscopic irrigation and synovectomy have been proved effective for the knee joints with apparent synovitis.⁴⁻⁶ This minimally invasive technique has been gradually introduced into the treatment for diseases of other joints such as wrist, elbow, ankle, and shoulder with satisfactory results.³ However, its application in hip lesions is rarely reported.

Hip is the largest synovial joint in human body. Any diseases involving the hip might produce more significant symptoms and functional disturbance than those involving the ankle or knee. It may be the onset location in some cases of seronegative spondyloarthropathy (SpA). Certain stages of RA may also involve the hip. However, the dense soft tissue enveloping the hip limits instrument maneuverability.⁷ There is at present no report of arthroscopic irrigation and debridement for hip lesion in patients with inflammatory arthropathy. This study evaluated the efficacy of arthroscopy in this type of patients.

PATIENTS AND METHODS

Patients

A retrospective review was performed with the records of the patients treated in Department of Orthopedics of both the Second Artillery General Hospital PLA and Chinese PLA General Hospital. Those patients who were confirmed to have inflammatory arthropathies were identified. Between May 2002 and October 2007, 42 consecutive patients (47 joints) with inflammatory arthritis underwent arthroscopic debridement and synovium resection in the hip joints. Of the 42 patients, 6 (7 joints) were lost in follow-up, thus the study was carried out with the remaining 36 patients. The 36 patients included 19 women (21 joints) and 17 men (19 joints), with a mean age of 27.5 ± 5.2 years (12-47 years) at the time of surgery; 17 cases were with AS, 11 with RA, and 8 with PsA. All the patients were referred to rheumatologists for final diagnosis. Detailed demographic data are shown in Table 1.

The decision of surgery was based on the patients' history, physical examination, plain radiographs or computed tomography scans of sacroiliac and hip joints, and

magnetic resonance imaging (MRI) scans of both hips. All the patients investigated in this study demonstrated hip symptoms, especially pain, for less than 2 years which had failed to respond to standard conservative treatment including rest, physical therapy, and medication. Fifteen patients complained of consistent pain which was aggravated by activity, 9 had problems in walking. In physical examination, 15 patients had positive result in Thomas test, 29 had positive result in Patrick's test, and 20 positive in Log Rolling Test.

Pre-operative radiography revealed uniform diffuse joint space loss in 8 hips when compared with the contralateral hips. Subchondral sclerosis and/or cyst were found in 10 hips, and osteophytes in 6 hips. Sixteen patients had abnormal changes in their sacroiliac joints. Pre-operative MRI revealed that all the 40 hips had joint effusion, indicating the existence of certain kinds of synovitis. Hip arthroscopy was contraindicated for apparent hip ankylosis.

Operative procedure

Thirty patients were operated under epidural anaesthesia, 6 were under general anaesthesia. The patients were placed supine on the fracture table with the hip in extension at approximately 25 degrees of abduction and neutral rotation. After distraction of the joint was confirmed with fluoroscopy, the anterolateral portal was established through which the scope was inserted to inspect the central portion of acetabulum, femoral head, and peripheral portion of the joint. The scope was rotated posteriorly, and the posterolateral portal was established under arthroscopic and fluoroscopic control. The motorized shaver or radiofrequency instruments were introduced *via* the posterolateral portal into the joint and exchanged with the arthroscope when necessary. In the cases with osteophytes blocking the approach, the problem was solved by either adjusting the direction of instruments or penetrating the osteophytes with a trocar. The hypertrophied and congested synovium, cartilage flap, and loose bodies were removed. The degenerated labrum and visible osteophyte were debrided, the joint cavity was lavaged, and the removed synovium was sent for biopsy.

Table 1. Demographic data of the 36 patients with inflammatory arthritis

Demographic items	Disease		
	AS	RA	PsA
Age (year)	23.4	29.5	35.7
Sex (male/female)	11/6	2/9	4/4
Average time from diagnosis to surgery (months)	16.5	18.2	15.7
Number of cases	17	11	8

AS: ankylosing spondylitis; RA: rheumatoid arthritis; PsA: psoriatic arthritis

The arthroscopic appearance of the articular cartilage was classified into 5 grades according to Outerbridge classification: grade 0, no abnormalities; grade 1, softening and swelling of the cartilage; grade 2, fragmentations or fissuring in an area of 1 cm or less in diameter; grade 3, fragmentations or fissuring in an area of more than 1 cm in diameter; and grade 4, erosion of the cartilage to bone.

Aftertreatment

The patients were kept in bed and allowed to practice flexion, abduction, adduction, and rotation of the hip after operation. On the second post-operative day, walking practice with crutches was advised to improve muscle strength and range of motion. Standard medication was continued in accordance with the rheumatologists' consultation.

All the patients were interviewed, examined, and surveyed with a questionnaire to establish the function status of the hip according to Harris hip and Oxford hip scores at regular intervals. Pain was assessed with Visual Analog Scale (VAS). Harris hip score was classified as excellent (90-100), good (80-89), fair (70-79), and poor (0-69). MRI images were also applied to evaluate the changes within the joints.

Statistical analysis

Paired-*T* test was performed for statistical analysis with Microsoft Excel 2003. Data were presented as means±SD. *P*<0.05 was considered statistically significant.

RESULTS

Pre-operative findings

Arthroscopy revealed that all the 40 hips had certain degree of synovitis. The synovium was congested, effused, and appeared purple in colour in 9 hips. There were floating substances in 29 hips, loose bodies in 7 hips, cartilage flaps in 10 hips, pannus on cartilage in 24 hips, and labrum lesion in 12 hips. The biopsy results of all the hips revealed some degree of chronic synovitis. According to Outerbridge classification, 11 hips were grade 0, 5 hips were grade 1, 12 hips were grade 2, 8 hips were grade 3, and 4 hips were grade 4.

Follow-up results

The 36 cases (40 joints) were followed up for 46-103 months, 67.2±8.4 months in average. At the final follow-up, 30 patients reported improvement in limb functions and reduction of pain, while the 6 patients who had joint space loss and osteophytes did not respond well to the procedures. Three of them had bilateral involvement and 5 still had claudication during walking. Eight patients complaint of mild low back pain, which could be reduced by rest. No other adverse events were reported. MRI revealed that all the cases of synovitis were alleviated to some extent. No spontaneous joint fusion was found. At the final follow-up, no patients took hip arthroplasty or other invasive treatment on the operative hip.

Harris, Oxford, and VAS scores

The post-operative Harris and Oxford hip scores were significantly higher than the pre-operative scores (*P*<0.05), the post-operative VAS score was significantly lower than the pre-operative one (*P*<0.05) (Table 2). According to Harris hip score, there were 8 excellent cases, 17 good, 8 fair, and 3 poor. Twenty-seven cases (75.0%) returned to normal daily activities and felt satisfied about the surgery.

DISCUSSION

Inflammatory arthritis commonly refers to a group of arthritis, such as RA, SpA, and PsA, which share common pathological features. The synovium is the starting location for the deposition of the antigen-antibody complexes and becomes inflamed as part of a systemic disease. An inflammatory reaction then occurs, leading to the proliferation a highly vascular tissue known as pannus. Typically, the surface of the synovium becomes hypertrophic and oedematous, with an intricate system of prominent villous fronds that extends into the joint cavity, which leads to the cartilage erosion, and eventually destruction of the joint.^{8,9} Intra-operative findings in the present study identified these changes. The gross changes and symptoms like pain or stiffness that are characteristic of inflammatory arthritis are the result of chronic synovial inflammation. Inflammatory arthritis of the hip is always characterized by a dull, aching pain in the groin, lateral side of thigh, or buttocks.

Table 2. Pre- and post-operative Harris, Oxford, and VAS scores of the 36 patients[§]

Time-points	Harris hip score	Oxford hip score	VAS
Pre-operative	66.9±12.1	69.4±16.4	8.5±2.5
Post-operative	78.4±19.3	80.2±18.8	7.2±2.5
<i>P</i>	<0.05	<0.01	<0.05

§: plus-minus values are means±SD.

VAS: Visual Analog Scale.

The pain is usually worse in the morning and alleviated by activity, but vigorous activity can result in increased pain and stiffness. It may limit movements of the hip or even make walking difficult.⁶

Inflammatory arthritis is usually treated with non-steroidal anti-inflammatory drugs and disease-modifying antirheumatic drugs. With advanced joint damage, arthrodesis or arthroplasty are usually recommended. As the synovial tissue is a primary target of many types of inflammatory arthritis, synovectomy has been identified as an effective method for the pathologic joints. For patients with symptomatic synovitis or inflammatory arthritis, open techniques are less advantageous. For this reason, minimally-invasive approaches to the involved joints have been developed despite the difficulty. Arthroscopy, developed primarily to assist the diagnosis of arthritis, has been introduced into treatment of inflammatory arthritis for several decades. It enables the selection of synovial tissue under direct vision.^{3,10-14} The arthroscopic technique is superior to conventional surgical synovectomy in the following aspects: less post-operative morbidity, minimal surgical trauma, shorter hospital stay, and earlier rehabilitation. Pathological changes in the shoulder, elbow, and wrist responded well to this minimally invasive procedure.¹⁰ However, few reports have been published on the clinical outcome of arthroscopy-assisted treatment for hip lesion in inflammatory arthritis.

As hip is the most deeply recessed joint in the body, it is difficult to access the hip with arthroscopy. Arthroscopy of the hip has advanced significantly in the 1990s. The techniques and indications have become better defined, instrument improved, and surgeons performing the procedures progressed to the point fully competent for labral repairs. Meticulous attention to proper positioning and portal placement is paramount for safe and successful arthroscopy of the hip.¹¹ This study on the effect of hip arthroscopic synovectomy and debridement in patients of inflammatory arthritis demonstrated encouraging results. The procedure exhibited advantages of arthroscopic technique described above. After follow-up of more than 4 years, the surgical outcome showed significant improvement in functional scores. According to these results, arthroscopic synovectomy and debridement might be an effective therapy for medication-unresponsive patients of inflammatory arthritis.

Some precautions are worth-mentioning for this procedure. The patient must be correctly positioned and padded. Numerous complications of hip arthroscopy are associated with traction-related injury, including neurovascular traction injury (pudendal, sciatic, femoral nerve or

femoral artery), compression injury to the perineum inducing soft tissue pressure necrosis, and scope trauma. Inflammatory arthritis always affects the spine, which means slow and gentle traction might be necessary to avoid the post-operative low back pain. It has been reported that the safe range by joint distraction is 10-15 mm. The distraction force should be minimal, no more than what is required to maintain sufficient space to maneuver instruments. The traction time should also be as short as possible. Scuffing of the articular surface is possible because the confines of the joint are tight, especially when large osteophyte exists on the rim of the joint.¹²⁻¹⁴ Surgeons need to discuss with the patients to reach a reasonable expectation of the effect of the procedure. During the operation, the pathologically changed synovium or pannus, which releases proteinases leading to erosions in the cartilage, should be removed as much as possible to protect the cartilage. Radiofrequency could complete synovectomy and hemostasis at the same time. After operation, the patients should consult rheumatologists for suggestions of regular medication.

Besides Harris, Oxford, and VAS scores, this study routinely evaluated the patients' inflammatory status with erythrocyte sedimentation rate and C-creative protein both before and after operation. However, these 2 indices might be influenced by the type or dose of medication, therefore not included in the analysis. When evaluating the hips with MRI, we focused on the volume of joint fluid and severity of synovium edema. If the joint fluid reduced and the synovium edema relieved, the hip synovitis was considered alleviated.

Generally, it is suggested that hip arthroscopy be contraindicated for hip ankylosis. Besides, apparent joint space loss and osteophytes in the involved hip might also forecast poor result of hip arthroscopy. In these cases, if the patients do not respond well to medication, primary hip arthroplasty might be a better operative choice.

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Introduction of *Obstructive Sleep Apnea in Adults*

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Obstructive sleep apnea (OSA) in adults is a common disease, usually associated with cardiovascular disease and metabolic syndrome. Though involving many medical disciplines, it is often overlooked by physicians. In the past two decades, the population of obese people has greatly increased. As obesity is a major risk factor of OSA, it is possible that the incidence of OSA will rocket in the near future. Thus, it is necessary and important to educate physicians about OSA. The intention of the book *Obstructive Sleep Apnea in Adults—Relationship with Cardiovascular and Metabolic Disorders* is to provide physicians with the diagnostic and therapeutic strategies of OSA.

The book is divided into 6 chapters. The first chapter introduces the diagnostic and therapeutic options for OSA according to the document of American Academy of Sleep

Medicine. Chapter 2 clarifies the pathophysiologic mechanisms by which OSA contributes to the development and progression of cardiovascular and metabolic disorders. Chapter 3 defines the associations between OSA and obesity, glucose metabolic disorder, and liver function impairment. Chapter 4 to Chapter 6 discuss the relationships of OSA with vascular endothelial dysfunction, autonomic nerve dysfunction, and cardiovascular diseases, and the results of studies investigating the effect of OSA treatment on the concomitant cardiovascular diseases.

This book contains plenty of diagrams and illustrations. It is simple, concise, thorough, and easy for consultation. It would provide great help for clinical practitioners in understanding and managing OSA.