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Arthroscopic Treatment of Femoroacetabular Impingement in Patients over 60 Years Old: Preliminary Report of a Pilot Study

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Abstract

The objective was to evaluate short-term outcomes of patients of more than 60 years old, who underwent arthroscopic treatment for femoroacetabular impingement (FAI). The study design was a nonrandomized controlled clinical trial; this was a prospective study in 15 patients (15 hips) over 60 years old. Inclusion criteria were symptomatic FAI, no prior surgeries of the affected hip, and osteoarthritis Tonnis classification grade I or II. Exclusion criteria were multiple or large (≥5 mm) chondral defects or subchondral bone cysts in the acetabulum or the femoral head seen on magnetic resonance imaging (MRI). Radiographs and MRI arthrograms were used for the imaging assessment in all cases. Procedures performed arthroscopically included labrum resection, acetabuloplasty, and femoral osteoplasty in all cases. The Harris Hip Score was applied preoperatively and 2 years postoperatively. At 2 years postoperatively, the average increase in the Harris Hip Score was 21 points (mainly pain reduction) from a mean preoperative score of 66 points to a mean postoperative score of 87 points; this difference was significant ($P < 0.05$). Three cases (20%) had poor outcomes and required a total hip replacement during the first year after the surgery. Poor results were associated with Tonnis grade II osteoarthritis and Outerbridge grade III or IV chondral defects. Arthroscopic treatment of FAI of patients over 60 years old showed a significant Harris Hip Score increase as a result of excellent and good short-term clinical results in most of the patients of our study. Nevertheless, despite strict selection criteria for very well-selected patients, we observed an early failure rate of up to 20%.

Keywords

arthroscopy, femoroacetabular impingement, osteoarthritis, cysts

Introduction

The classic form of surgical treatment for mild to advanced osteoarthritis in patients over 60 years old has been a prosthetic joint replacement. Less invasive procedures may potentially delay the need for a hip arthroplasty. This would be a very appealing alternative of treatment for physiologically young patients who would likely require a revision hip arthroplasty at some point.

Femoroacetabular impingement (FAI) is a common cause of hip pain affecting people of different ages[1-3] and leads to important degenerative changes in the hip joint. FAI corresponds to an anatomical alteration either in the femoral head-neck junction (cam-type impingement) or in the acetabular rim (pincer-type impingement), which causes a conflict between the 2 corresponding anatomical structures during joint motion. Typical injuries secondary to FAI include labral tears and cartilage delamination. These are most frequently found at the anterosuperior aspect of the acetabulum due to abnormal contact between the femur and the acetabulum during flexion of the hip.[4-7] The combination of cam and pincer types is found in around 86% of cases.[7] FAI is recognized as a cause of secondary osteoarthritis of the hip.[7-11]

In a recently published study, Bardakos et al.[12] identified 2 radiological parameters (the medial-proximal femoral angle and the "posterior wall sign"), which may predict the

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progression of osteoarthritis in patients with FAI. Moreover, these authors also elucidated that at least one third of the cases reported did not present signs of progression of their arthritic condition, underlying the clinical perception that mild to moderate osteoarthritis in patients with FAI will not necessarily progress rapidly in all cases.

Although most patients over 60 years old with symptomatic degenerative changes have an advanced intra-articular disease, some individuals may have a focal and limited source of pain such as a torn labrum. A less invasive procedure to treat only the limited damaged area in order to preserve bone stock would be extremely prized.

Hip arthroscopy has been in practice for a long time; however, it has had an explosive growth during the last few years. Modern imaging technology for the assessment of the hip joint has made possible the description of new pathologies affecting this joint, such as FAI. This pathology has popularized the arthroscopic form of approach to the hip joint in many centers around the world.[13-15] The indications for this technique have been expanded for the management of a wide spectrum of intra-articular and extra-articular entities including FAI, loose bodies, intra-articular neoplasias, fascia lata release, chondral injuries, among others.[16-20]

Hip arthroscopy may be useful for the management of patients over 60 years old with mild osteoarthritis due to FAI. The source of pain might be a degenerative labral tear acting like a degenerative meniscal tear in the knee. In these patients, the resection of a torn labrum can alleviate the symptoms. Focal chondral defects are another source of pain; good results can be expected with arthroscopic techniques. These patients would otherwise be candidates for a joint replacement.

Focally damaged intra-articular structures, such as acetabular labral tears, could potentially accelerate the degenerative process itself.[21] Young patients (under 45 years old) have been the ideal candidates for hip arthroscopy; however, older patients with FAI and absent or mild osteoarthritis may benefit with this technique as well.

The purpose of this study was to evaluate the short-term outcomes of patients over 60 years old who underwent arthroscopic treatment for FAI. Our hypothesis was that very well-selected patients, over 60 years old, undergoing arthroscopic treatment for FAI, could expect fair to excellent results in most cases, at least in the short term.

Methods

A prospective study was performed in patients over 60 years old. The study was approved by the institutional review board, and informed consent was obtained from the patients prior to entering the study. Inclusion criteria were symptomatic FAI not responsive to nonsurgical management, imaging studies (plain X-rays and magnetic resonance imaging [MRI] arthrograms) compatible with FAI, no prior surgeries around the affected hip, absence of advanced degenerative intra-articular disease, and osteoarthritis grade I or II according to the Tonnis classification.[22]

Table 1. Preoperative Radiological Findings

No. of Cases	Coxa Profunda	Protrusio Acetabuli	Combined Cam/ Pincer	Dysplasia	Tonnis Grade I	Tonnis Grade II
15	13	2	15	0	10	5

The nonsurgical management for these patients prior to the surgery included intra-articular corticosteroids applied at the time of the magnetic resonance arthrogram (MRA). Patients were excluded if one of the following was present: hip dysplasia, defined as a Wiberg angle <20°; history of inflammatory arthritis; and history of osteonecrosis or fracture (acetabular or proximal femur).

For the imaging analysis, the set of plain radiographs included pelvis anterior-posterior (AP) view and AP and cross-table view of the affected hip. The radiographs were studied in order to find any anatomical abnormality such as coxa profunda, protrusio acetabuli, dysplasia, and bump or flattening of the femoral head-neck junction; special attention was given to any articular space narrowing (**Table 1**).

An MRI arthrogram was performed. All the cases showed a torn and calcified labrum. In our experience, patients younger than 60 years old tend to have less signs of calcification in the labrum. At the time of the arthrogram, a lidocaine test (intra-articular shot of lidocaine) was applied, and the result was positive (temporary relief of pain) in all the cases. This was performed to make sure of the intra-articular source of pain.

All of the patients had a combined type (pincer and cam) FAI. In the magnetic resonance images, special attention was given to the presence of diffuse degenerative changes, multiple or large (5 mm or more) chondral defects, and/or subchondral bone cysts. These patients were ruled out of the study as a total hip replacement was elected as a better alternative for them. Forty patients initially considered candidates for hip arthroscopy (based only on radiographic findings) were ruled out of the study because of the above-mentioned features.

Fifteen patients matched the study criteria and underwent hip arthroscopy. Regarding the technical data of the hip arthroscopy, we used the supine position for the procedures and a 2-portal (anterior and anterolateral) technique in all cases. We also included intraoperative image intensifier monitoring for an optimal femoral head-neck junction osteoplasty and acetabuloplasty.

The procedures performed were acetabuloplasty, labrum debridement, and osteoplasty of the femoral head-neck

junction. A functional test of hip motion under direct arthroscopic visualization to rule out any abnormal contact between the femoral head-neck junction and the acetabular rim was performed at the end of the procedure as well.

The average age at the time of surgery was 63.3 years (range, 60-70 years). The procedures were performed by the same surgeon. Patients had an average follow-up of 34.6 months (range, 24-45 months) at the time of the last evaluation. There were no patients lost to follow-up.

Chondral lesions found during the arthroscopy were classified using the Outerbridge[23] classification. For the clinical evaluation of the patients, the Harris Hip Score[21] was applied preoperatively and 2 years postoperatively. Preoperative and postoperative Harris Hip Scores were compared with the Wilcoxon test. According to the preoperative grade of osteoarthritis (Tonnis classification), the relative risk for poor results was calculated.

The rehabilitation program included walking with 2 crutches as tolerated from the first day after surgery. Patients were encouraged to walk with one crutch beginning the third week and to walk without any assistance devices beginning the sixth week as tolerated. Full weight-bearing was progressively achieved. Continuous passive motion devices were used for 12 hours starting immediately after the surgery. Stationary bicycle was also indicated beginning the day after to prevent capsular adhesions and joint stiffness.

Results

The average increase in the Harris Hip Score was 21 points (range, 3-29) measured at 24 months postoperatively, from a mean preoperative score of 66 points (range, 62-75) to a mean postoperative score of 87 points (range, 68-94). Most of the preoperative lack of points was due to pain items that were solved after surgery. This difference was statistically significant ($P < 0.05$) according to the Wilcoxon test.

All of the patients had at least Outerbridge[23] grade II lesions in the acetabulum; 4 (27%) cases had grade III defects, and 2 (13%) cases had grade IV lesions. On the femoral side, 6 (40%) patients had Outerbridge grade II defects; there were no grade III or IV lesions.

Six patients (40%) had excellent results (over 90 points), and 6 patients (40%) were rated as good (81-90 points) according to the Harris Hip Score, with an almost complete return to their previous status. Three patients had poor results (20%), requiring a total hip replacement. In these patients, the average Harris Hip Score was 67 points (range, 62-69), with a mean final score of 70 points (range, 66-72) at the time of the total hip replacement. Two of these patients had osteoarthritis Tonnis grade II, and the remaining case had grade I. Relative risk for poor outcomes in Tonnis grade II versus grade I was 4:1. In these 3 cases, total hip replacement was performed during the first year after the hip arthroscopy, without any technical complications related to the previous surgery.

Table 2. Abnormalities Found in Patients Who Had Poor Results

Poor Results	Tonnis	Outerbridge Defects Found	Acetabular Abnormalities	Femoral Abnormalities
Patient 1	Grade II	Grade 3 (acetabulum)	Coxa profunda	Bump
Patient 2	Grade II	Grade 4 (acetabulum)	Coxa profunda and retroversion	Bump
Patient 3	Grade I	Grade 4 (acetabulum)	Coxa profunda	Bump

Note: All patients required a total hip replacement during the first year postarthroscopy.

Poor results were associated with complex acetabular chondral defects, Outerbridge grade III (2 cases) and IV (1 case), and a subchondral cyst ≥5 mm in size that was underestimated on MRI in 1 patient (**Table 2**). Postoperative radiographs showed a correction of the bony abnormalities of the femur and the acetabulum (**Figs. 1 and 2**).

There were no major complications with the exception of the 3 cases that required Total Hip Arthroplasty (THA) before 1 year of follow-up. We had minor complications: 3 cases of psoas tendinitis that were resolved with physical therapy in 2 cases, and 1 case that required a cortisone injection 3 months after the surgery. There were no other complications.

Discussion

Hip arthroscopy is a minimally invasive technique with a growing demand. The current indications are numerous and will probably expand over time. Although hip arthroscopy offers a minimally invasive approach for the treatment of FAI, the entire rehabilitative process may take up to 6 to 12 months. Although mostly recommended for young individuals with an overall good articular status, very well-selected older patients (>60 years old) may benefit from this technique.

Evidence regarding hip arthroscopy for osteoarthritis associated with FAI is quite limited in peer-reviewed literature. Moreover, the studies have critical differences in their design, which preclude them from being compared.

Helenius et al.[24] reported good results in the short term for patients with primary hip osteoarthritis undergoing hip arthroscopy with or without debridement of loose cartilage. The patients reported in this study are different from the ones reported in our study, in which the degenerative changes are suspected to be secondary to FAI rather than of a primary etiology. The procedures performed in both studies are quite different.

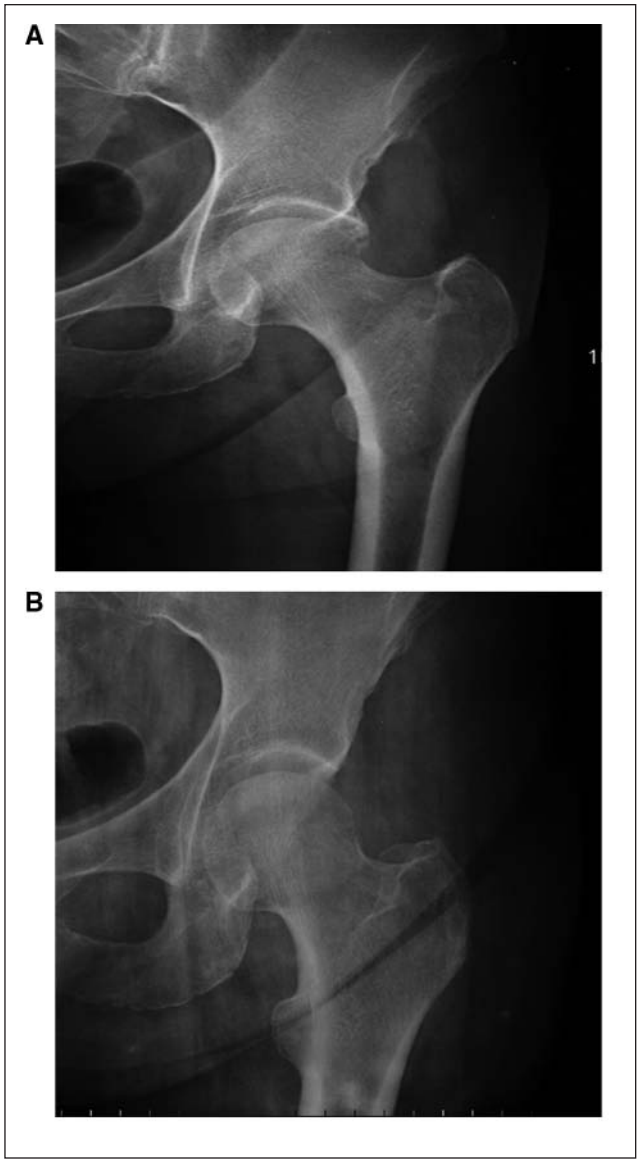

Figure 1. (**A**) Preoperative anterior-posterior (AP) view of the left hip of a 62-year-old female. There is a coxa profunda and overcover of the femoral head. There are radiological signs of calcification of the posterosuperior labrum. This patient had a preoperative Harris Hip Score of 67. (**B**) Two-year postoperative AP view of the left hip. Overcover of the femoral head was eliminated. The postoperative Harris Hip Score was 86.

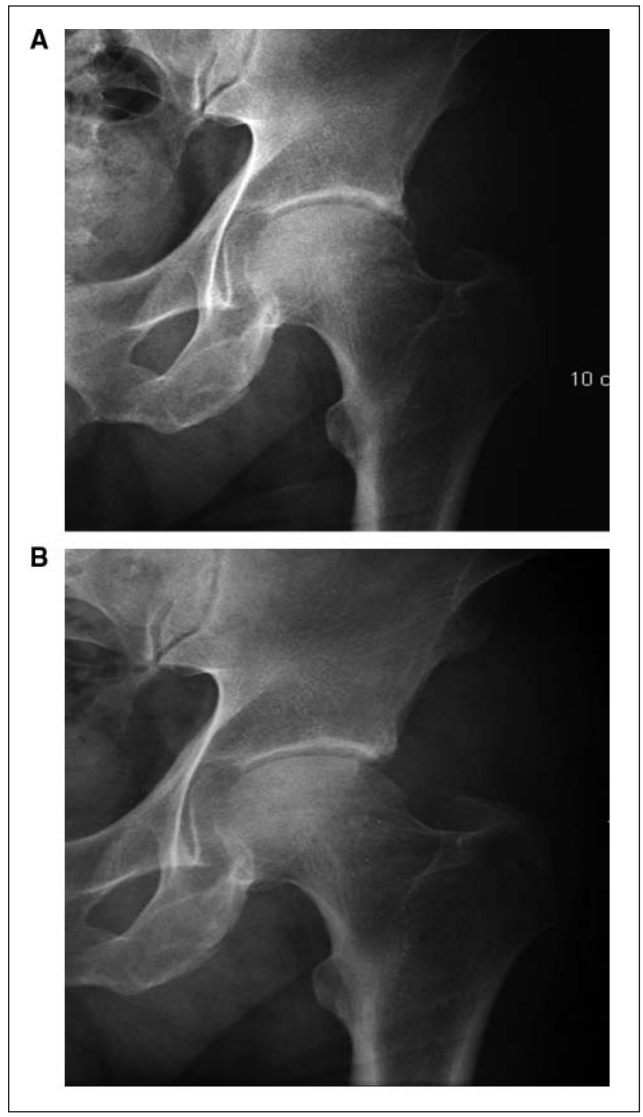

Figure 2. (**A**) Preoperative anterior-posterior (AP) view of the left hip of a 69-year-old male. Pincer-type impingement as a result of a coxa profunda. The preoperative Harris Hip Score was 65. (**B**) Two-year postoperative AP view. There is normal coverage and preservation of the joint space. The postoperative Harris Hip Score was 86.

Kim et al.[25] reported the results of hip arthroscopy in patients with early osteoarthritis. They found that better outcomes were present in patients with isolated osteoarthritis and no signs of FAI. Results in the presence of FAI were considered inadequate by the authors; thus, they discouraged hip arthroscopy for the treatment of osteoarthritis if association with FAI is suspected. These findings are quite opposite to the ones presented in our work. A possible explanation for such differences may include the fact that in the study by Kim et al., the treatment for the FAI only involved labrum debridement, synovectomy, and removal of loose bodies and acetabular bone spurs.

A study by Jerosch et al.[26] showed a significant improvement in terms of function in 18 of 22 patients with early and midstage osteoarthritis undergoing hip arthroscopy. In these patients, capsular release, synovectomy, and drilling of areas with bone edema were performed.

Emphasis must be put on the importance of a careful selection of patients over 60 years old undergoing a hip scope. Excluding patients with Tonnis grade III osteoarthritis, we have estimated that no more than 10% of the patients seen in our center with hip pain and some grade of hip

osteoarthritis over 60 years old may be candidates for hip arthroscopy for the treatment of their underlying FAI. Preoperative study must be more thorough because these individuals may have a more diffuse degenerative disease than younger patients. Clinical examination is very important in these patients and must be compatible with FAI rather than an osteoarthritic condition. Typically, patients with FAI have mechanical symptoms, such as catching, buckling, or locking, and a positive impingement test finding (inguinal pain with flexion, adduction and internal rotation of the hip).[27] Understanding of intra-articular pathologies is extremely important because identifying extra-articular sources of pain may be sometimes challenging.

Preoperative planning must rule out significant chondral and subchondral damage with imaging studies. An MRI arthrogram allows good visualization of the cartilage, subchondral bone, and the acetabular labrum. Subchondral cysts are frequent and must be considered a potential contraindication for this procedure. Based on our observations in more than 450 hip arthroscopies for FAI, patients with subchondral cysts, especially when they are multiple or larger than 5 mm, tend to do poorly. The acetabular labrum in these kinds of patients usually presents diffuse degenerative changes such as calcification, thinning, and complex tears, which makes them less than prime candidates for preservation.

Finally, despite strict criteria for the selection of this group of patients, there is a considerable risk of early failure (20% in our series), considering the indication for a total hip replacement as the end point. Patients with poor results in our study had chondral damage not seen or underestimated in preoperative imaging studies, especially in the acetabular side.

As previously mentioned, patients with Tonnis grade II osteoarthritis had a 4-fold risk of progression of the degenerative disease in our series. In such cases, the decision of performing a hip arthroscopy must be carefully discussed with the patients. In Tonnis grade I patients, the outcome seems to be more predictable, as only 1 in 10 patients did poorly. From our perspective, the most important prognostic factor in these patients was the overall cartilage status evaluated under direct visualization during the arthroscopy, as imaging studies may underestimate chondral lesions in some cases.

Although the procedures performed varied in terms of magnitude, all of the patients involved in this study underwent the same procedures (acetabuloplasty, femoral head-neck junction osteoplasty, labrum debridement, and a standard capsular release). No additional procedures (i.e., microfractures, tendon release, etc.) were performed. We believe the above-mentioned facts make this group of patients even more comparable.

Nevertheless, our study has major limitations regarding the limited number of patients, the short follow-up, and the lack of a control group. More studies addressing such limitations are necessary to elucidate the real significance of the arthroscopic treatment of FAI in the presence of osteoarthritis. Newer bearing surfaces and techniques regarding total hip replacement are promising. A well-designed study comparing their results with those obtained after hip arthroscopy in this group of patients would be desirable.

Arthroscopic treatment of FAI in patients over 60 years old, with no signs of advanced osteoarthritis, showed a significant Harris Hip Score increase as a result of excellent and good short-term clinical results in most of the cases. Nevertheless, despite strict selection criteria, we observed an early failure rate of up to 20%.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the authorship and/or publication of this article.

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