Arthroscopic Treatment of Labral Tears in Patients Aged 60 Years or Older

John M. Redmond, M.D., Asheesh Gupta, M.D., M.P.H., William M. Cregar, B.S., Jon E. Hammarstedt, B.S., Chengcheng Gui, B.S.E., and Benjamin G. Domb, M.D.

Purpose: The purpose of this study was to (1) evaluate the clinical outcomes of a series of patients aged 60 years or older who underwent hip arthroscopy for labral tears with minimum 2-year follow-up and (2) identify risk factors for conversion to total hip arthroplasty (THA). **Methods:** Outcome data were prospectively collected and retrospectively reviewed in patients aged 60 years or older who underwent hip arthroscopy between April 2008 and May 2012. Four patient-reported outcome (PRO) scores, pain scores, and satisfaction ratings were collected. Conversion to THA and revision surgery rates were recorded. A subgroup analysis compared survivors with patients requiring THA. **Results:** Minimum 2-year follow-up was available for 30 patients with a mean age of 63.9 years. The 2-year survivorship rate was 70%, with 9 patients undergoing conversion to THA at a mean of 1.1 years after hip arthroscopy. Two patients required additional surgery during the study period, for a reoperation rate of 37% (11 of 30 patients). The remaining cohort showed mean improvements in all PRO scores. All scores, except the sports-related PRO ($P = .12$), improved significantly from the preoperative baseline scores. Visual analog scale scores for pain decreased from a mean of 5.0 preoperatively to 2.7 postoperatively ($P = .003$). Patients who required conversion to THA had lower preoperative modified Harris Hip Scores ($P = .015$), lower preoperative Hip Outcome Score—Activity of Daily Living values ($P = .01$), higher pain scores ($P = .05$), greater acetabular inclination ($P = .023$), and more severe chondral damage ($P = .033$). **Conclusions:** Arthroscopic treatment of labral tears in patients aged 60 years or older should be approached with caution. Patients in this age group had an overall 2-year survivorship rate of 70% and should be counseled before surgery on the possibility of subsequent conversion to THA. Patients aged 60 years or older with poor preoperative PRO scores, high pain scores, radiographic evidence of borderline dysplasia, and severe chondral damage may be poor candidates for hip arthroscopy. **Level of Evidence:** Level IV, therapeutic case series.

The use of hip arthroscopy for the management of labral tears has been increasing over the past decade, and indications for surgery have been evolving as our understanding of hip pathology has increased.[1] Chondrolabral damage in the hip can be painful and functionally limiting. Traditionally, arthroscopic hip surgery has been reserved for younger patients. Numerous publications have documented the outcomes of hip arthroscopy in patient cohorts aged younger than 50 years, with positive patient-reported outcomes (PROs) at 2 and 10 years; however, limited research exists regarding the outcomes of hip arthroscopy in elderly patients.[2-8]

A literature search yielded 2 publications that specifically focused on PROs after hip arthroscopy in patients older than 50 years.[9,10] Philippon et al.[10] evaluated a cohort of patients aged 50 years or older undergoing arthroscopic surgery for femoroacetabular impingement and found that patients with less than 2 mm of joint space had a high risk of early conversion to total hip arthroplasty (THA). Patients with an intact joint space had satisfactory outcomes and a much lower risk of conversion to THA. Ben Tov et al.[9] evaluated the outcomes of 20 patients older than 50 years undergoing labral repair and noted a significant improvement in PROs with short-term follow-up.

From Mayo Clinic Florida (J.M.R.), Jacksonville, Florida; American Hip Institute (A.G., W.M.C., J.E.H., C.G., B.G.D.), Westmont, Illinois; Hinsdale Orthopaedics (B.G.D.), Westmont, Illinois; and Loyola University Chicago Stritch School of Medicine (B.G.D.), Chicago, Illinois, U.S.A.

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Address correspondence to Benjamin G. Domb, M.D., Hinsdale Orthopaedics, 1010 Executive Ct, Ste 250, Westmont, IL 60559, U.S.A. E-mail: DrDomb@americanhipinstitute.org

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Current studies suggest that advanced age has been a negative predictor of patient outcomes after hip arthroscopy and might be a cause for early failure, marked by a conversion to THA.[11-13] We have noted a number of active elderly patients presenting to the clinic with intra-articular hip pain without significant degenerative changes, and counseling these patients may be difficult because of the paucity of literature that pertains to this age group. The purpose of this study was to (1) evaluate the clinical outcomes of a series of patients aged 60 years or older who underwent hip arthroscopy for labral tears with minimum 2-year follow-up and (2) identify risk factors for conversion to THA. Our hypothesis was that this group of patients would show improved PRO scores, decreased visual analog scale (VAS) scores, and high patient satisfaction ratings.

Methods

Between April 2008 and May 2012, data were prospectively collected and retrospectively reviewed for 1,140 patients who underwent arthroscopic surgery of the hip for treatment of a labral tear. Patients aged 60 years or older at the time of surgery were included. Patients were excluded if they had undergone gluteus medius repairs, had Workers' Compensation claims, or had previous hip conditions including Legg-Calvé-Perthes disease or avascular necrosis. All patients underwent hip arthroscopy by the senior author (B.G.D.). Patient demographic characteristics such as sex, age, height, weight, and body mass index were recorded. Postoperative revision surgery and conversion to THA were recorded. This study received institutional review board approval.

Indications for Surgery

The diagnostic criteria for confirming a labral tear included patient history, physical examination findings, radiographic analysis, and magnetic resonance imaging (MRI). Physical examination findings consistent with a labral tear, such as a positive anterior impingement sign, were positive in all patients. Radiographs were used to evaluate bony morphology and degenerative changes. MRI of the hip was obtained in all patients and documented a labral tear. The indications for surgery were pain interfering with the activities of daily living and failure to improve with nonoperative treatment, including physical therapy and anti-inflammatory medications, for 3 months.

Surgical Technique

All surgical procedures were performed by the senior author (B.G.D.) with patients in the supine position. A diagnostic arthroscopy was performed to assess the labrum, chondral damage, and additional intra-articular pathologies. Intraoperative data were recorded for all patients. Acetabular labrum articular disruption (ALAD) grade, acetabular Outerbridge grade, and femoral Outerbridge grade were recorded.[14,15] Labral tears were repaired when possible. Otherwise, they were selectively debrided until stable. The senior author's preference during the study period was to perform labral repair when possible. Severe intrasubstance labral damage was an indication for labral debridement. Unstable chondral damage was treated with debridement to a stable border, and in cases with exposed bone, abrasion and microfracture were performed. During the study period, patients with the potential for hip instability underwent capsular closure or capsular plication. Patients with hip instability are defined as patients with borderline hip dysplasia, a lateral center-edge angle (LCEA) less than 25°, or ligamentous laxity on clinical examination.

Rehabilitation

Patients were placed in a hip brace (DJO Global, Vista, CA) for a minimum of 2 weeks after surgery. They were restricted to 20 lb of foot-flat weight-bearing activity for 2 weeks if no microfracture was performed. Patients undergoing microfracture were restricted to 20 lb of partial weight bearing for 6 weeks. A slow progression to full strength and activity occurred over a 3- to 4-month period. No differences in postoperative protocol were based on labral repair versus debridement or capsular management.

Radiographs

The anteroposterior pelvis radiograph was used to measure the LCEA, acetabular inclination, joint space, and acetabular crossover.[16] The joint space was measured from the medial, central, and lateral aspects of the sourcil perpendicular to the femoral head. When a crossover sign was present, we estimated the percent of crossover by dividing the distance from the superior acetabulum to the point of intersection of the anterior and posterior wall by the entire length of the posterior wall. This was performed to gauge the amount of acetabular retroversion. A 45° Dunn view was used to measure the alpha angle, and a false-profile view was used to measure the anterior center-edge angle.[16] Radiographic data were measured by hip-preservation fellows (J.M.R., A.G., and others) and recorded in a database.

PRO Scores

All patients were prospectively assessed preoperatively and postoperatively using 4 PRO scores: modified Harris Hip Score (mHHS), Non-Arthritic Hip Score, Hip Outcome Score—Activities of Daily Living (HOS-ADL), and Hip Outcome Score—Sport-Specific Subscale (HOS-SSS).[17,18] Pain was documented on the VAS (1, no pain at all; 10, worst pain imaginable), and patient satisfaction with surgery was assessed by asking the question "How satisfied are you with your surgery results?

(10 being the best it could be)." Patient conversion to THA was also recorded. If patients underwent conversion to THA, they did not have final PRO or VAS scores available and they were not included in the PRO analysis. The final mHHS was analyzed for all patients. An mHHS less than 70 was considered a poor result.

Subgroup Analysis

A record of patients who underwent conversion to THA was kept during the study period. Two subgroups were created to compare differences between patients who underwent conversion to THA and patients who did not. Preoperative factors used for comparison were Tönnis grade, LCEA, joint space, and 4 PROs.[19] Intraoperative findings used for comparison included ALAD classification, acetabular Outerbridge grade, and femoral Outerbridge grade. Patients with less than 2 mm of joint space were compared with patients with greater than 2 mm of joint space for conversion to THA. Patients with an LCEA less than 25° were compared with patients with an LCEA greater than 25° for conversion to THA.

Statistical Methods

Descriptive statistics were used to report frequencies and means for the cohort and subgroups. A 2-tailed *t* test was performed to compare preoperative and postoperative PRO data within the cohort and joint space measurements between the subgroups. A χ^2 test was used to compare categorical data such as ALAD classification, acetabular Outerbridge grade, femoral Outerbridge grade, and Tönnis grade. All statistics were performed using Microsoft Excel (Microsoft, Redmond, WA). $P < .05$ was considered statistically significant.

Results

During the study period, 1,140 patients underwent arthroscopic hip surgery. We identified 49 patients aged 60 years or older from this group. After application of the exclusion criteria, a total of 32 patients were available for review. The primary reason for exclusion was gluteus medius repair performed at the time of hip arthroscopy. Two patients were unavailable for follow-up, leaving a 94% follow-up rate (30 patients). Demographic information is presented in Table 1. The mean age was 63.8 years, with the oldest patient being aged 74.8 years and the youngest being aged 60.1 years. The minimum length of follow-up was 2 years, with a mean length of follow-up of 2.5 years (range, 2.0 to 5.5 years). Preoperative radiographs were available for 28 of 30 patients in this study. A false-profile view was available in 19 of 30 patients. The specific surgical procedures performed are shown in Table 2.

Conversion to THA was required in 9 patients (30%) at a mean of 1.1 years after hip arthroscopy (Fig 1). In 1 patient (3%) revision surgery was required for the removal of heterotopic ossification, and 1 patient (3%) required open irrigation and debridement for a deep infection.

PRO scores were analyzed at a mean of 2.5 years for the 21 patients who did not undergo conversion to THA. The mean PRO scores improved from preoperatively to postoperatively as follows: mHHS, from 63.0 to 80.1; HOS-ADL, from 64.1 to 80.4; HOS-SSS, from 48.2 to 63.4; and Non-Arthritic Hip Score, from 57.9 to 79.5. All scores except the HOS-SSS ($P = .12$) showed significant improvements from the preoperative baseline values (Fig 2). The VAS score decreased from a mean of 5.0 preoperatively to 2.7 postoperatively ($P = .003$) (Fig 3). The mean patient satisfaction rating at latest follow-up was 8.1, with 16 patients (76%) reporting a score of 8 or higher.

Table 1. Demographic Information for Cohort of Patients Aged 60 Years or Older Who Underwent Hip Arthroscopy

	Data
No. of patients	30
Sex, n	
Male	12
Female	18
Size	
Mean height, in	67.0
Mean weight, kg	81.4
Mean BMI, kg/m^2	28.2
Laterality, n	
Right	18
Left	12
Age, yr	
Mean	63.8
Maximum	74.8
Minimum	60.1
Mean traction time, min	54.9
Mean follow-up time, yr	2.5
Conversion, n	
THA	9
Revision	1

BMI, body mass index; THA, total hip arthroplasty.

Table 2. Surgical Procedures Including Labral and Capsular Treatment for Entire Cohort of Patients Aged 60 Years or Older

	n	%
Acetabuloplasty	10	33
Femoroplasty	14	47
Trochanteric bursectomy	6	20
Loose body removal	6	20
Microfracture	3	10
Labral		
Repair	6	20
Debridement	23	77
Reconstruction	1	3
Capsule		
Release	26	87
Repair	4	13

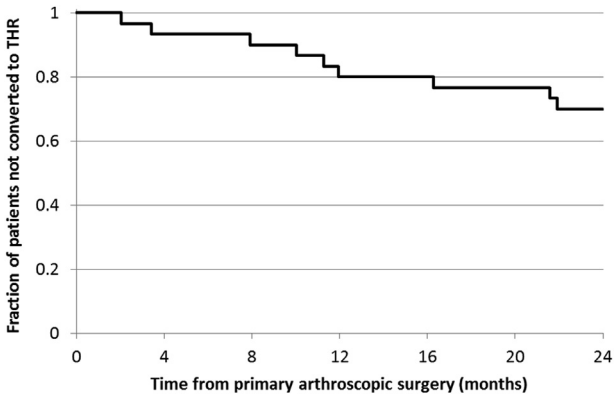

Fig 1. Kaplan-Meier survivorship curve for conversion to total hip arthroplasty. (THR, total hip replacement.)

In 5 of 21 patients (24%), the final mHHS was less than 70. The mHHS was between 70 and 80 in 4 patients (19%) and was greater than 80 in 12 patients (57%).

Subgroup Analysis

Preoperatively, the THA group reported lower mean PRO scores for the mHHS ($P = .02$) and HOS-ADL ($P = .01$), as well as higher VAS scores ($P = .05$), compared with patients who did not undergo conversion to THA. The THA conversion group also reported lower preoperative HOS-SSS values ($P = .29$), although the difference was not statistically different. Patients with a preoperative mHHS less than 50 were 2.6 times more likely to undergo conversion to THA than patients with an mHHS greater than 50. Patients with a VAS score greater than 7 were 2.3 times more likely to undergo conversion to THA than patients with a VAS score less than 7.

Comparing Tönnis grades yielded no difference between subgroups. However, there was only 1 patient with a Tönnis classification of 2, and this patient underwent conversion to THA. Mean joint space between subgroups was lower for the THA group, but the difference was not statistically significant: 3.0 mm compared with 3.3 mm (medial) and 3.5 mm compared with 3.9 mm (lateral). There were 5 patients with joint space measurements below 2.0 mm, and 3 of these patients underwent conversion to THA ($P = .11$). The THA conversion group showed increased acetabular inclination ($P = .02$). No statistically significant differences were noted for crossover percentage, LCEA, anterior center-edge angle, and alpha angle. There were 6 patients who were considered to have dysplasia or borderline dysplasia with an LCEA less than 25°, and 4 of these patients underwent conversion to THA ($P = .03$) (Table 3).

Intraoperatively, the THA subgroup had a statistically higher grade of cartilage damage according to the ALAD classification at the time of hip arthroscopy. The THA group had a higher femoral Outerbridge grade and higher acetabular Outerbridge grade measured at the time of hip arthroscopy; however, the differences were not significant (Table 4). There were a total of 5 patients with a grade 4 ALAD classification, and 4 of these patients underwent conversion to THA ($P = .03$).

Discussion

In this study the overall rate of 2-year survivorship free of conversion to THA was 70%. Patients who did not undergo conversion to THA showed satisfactory improvement in PRO scores and pain scores. Risk factors identified for conversion to THA in this age group were lower preoperative mHHS, lower preoperative HOS-ADL, higher VAS score, evidence of dysplasia, and severe acetabular chondral damage. Patients with a preoperative mHHS less than 50 and VAS score greater than 7 have a greater than 2-fold risk of early conversion to THA.

Philippon et al.[10] evaluated 153 patients aged 50 years or older undergoing hip arthroscopy for

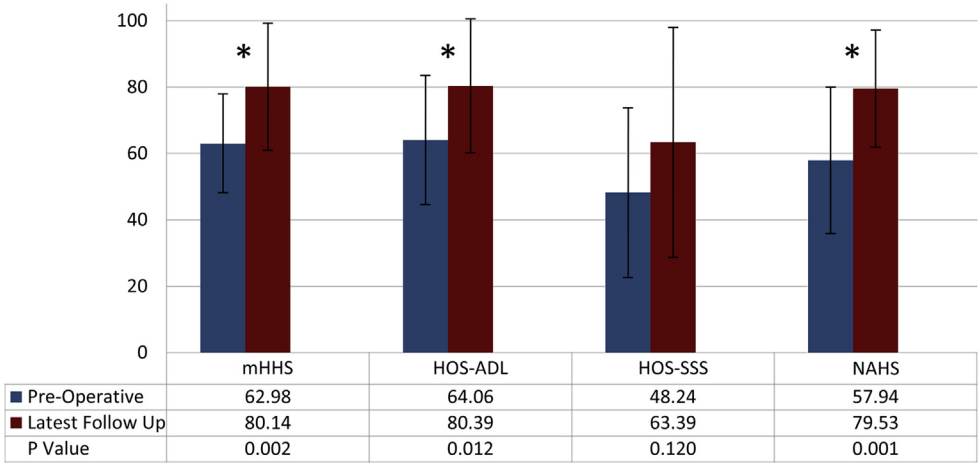

Fig 2. Preoperative and postoperative patient-reported outcome scores for the 21 patients who did not undergo conversion to total hip arthroplasty. Significant differences in scores from preoperatively to postoperatively are indicated by asterisks. (HOS-ADL, Hip Outcome Score—Activities of Daily Living; HOS-SSS, Hip Outcome Score—Sport-Specific Subscale; mHHS, modified Harris Hip Score; NAHS, Non-Arthritic Hip Score.)

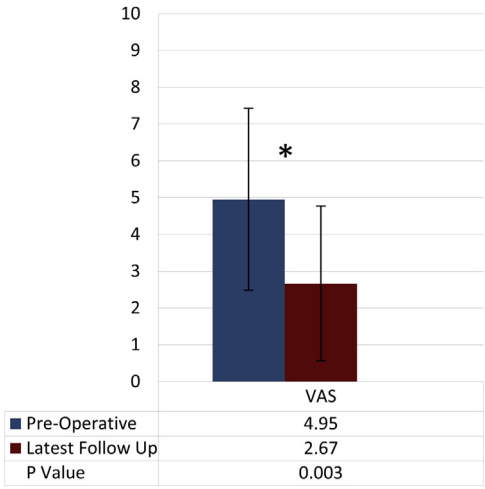

Fig 3. Preoperative and postoperative visual analog scale (VAS) scores for the 21 patients who did not undergo conversion to total hip arthroplasty. The differences in scores from preoperatively to postoperatively were significant (asterisk).

femoroacetabular impingement. The findings from their study included a marked effect of joint space narrowing on conversion to THA, with a 43% rate of conversion to THA at 3 years in patients with less than 2 mm of joint space. In contrast, patients with greater than 2 mm of joint space had a 10% rate of conversion to THA at 3 years. Patients who did not undergo conversion to THA showed significant improvements in mHHS from 58 to 84, HOS-ADL from 66 to 87, HOS-SSS from 42 to 72, and Short Form 12 physical component score from 38 to 49. The patients in our study are, on average, a decade older than the aforementioned group, and we also included patients with borderline dysplasia. We noted similar outcomes to the study of Philippon et al. In our study there were 4 patients with joint space measurements less than 2 mm, and 3 of the 4 patients (75%) underwent conversion to THA. However, it should be noted that 6 of the 9 patients who underwent conversion to THA initially had joint space measurements greater than 2 mm. Overall, the improvements in PRO scores in our study were similar to those in the cohort evaluated by Philippon et al. Using a cutoff of 2 mm of joint space, we did not find a statistically significant difference between patients who underwent conversion to THA and those who did not; however, this study likely lacks the sample size sufficient to make such a conclusion. In addition, in the study by Philippon et al., 80% of patients underwent labral repair, and in our study, 77% of patients underwent labral debridement. This may limit the comparison between these studies. The preference of the senior author is to repair the labrum when possible, and the differences in repair rate may be due to the additional decade of aging. We typically perform labral debridement when there is significant intrasubstance damage to the labrum, which precludes labral repair.

Ben Tov et al.[9] evaluated 22 patients older than 50 years who underwent labral repair. At a mean of 22 months' follow-up, the group showed improvements in mHHS and Hip Outcome Score values similar to previously published studies in younger cohorts. Patients were excluded from this study if they had preoperative evidence of arthritis, and only 1 patient underwent conversion to THA in this cohort. In our study 7

Table 3. Radiographic Measurements of Crossover, Lateral CEA, Acetabular Inclination, Anterior CEA, and Alpha Angle by Subgroup

	THA Subgroup	Non-THA Subgroup	*P* Value
Crossover, %	5.00	5.53	.91
Lateral CEA, °	25.88	31.63	.07
Acetabular inclination, °	10.125	4.263	.023
Anterior CEA, °	32.25	31.67	.83
Alpha angle, °	64.000	61.333	.520

NOTE. Data are presented as mean values within each subgroup.
CEA, center-edge angle; THA, total hip arthroplasty.

Table 4. Intraoperative Findings: Cartilage Measurements (ALAD Grade, Acetabular Outerbridge Grade, Femoral Outerbridge Grade, Mean Joint Space, and Tönnis Grade) by Subgroup

	THA Subgroup	Non-THA Subgroup	*P* Value
ALAD grade, n (%)			.033
0	0 (0)	3 (13)	
1	1 (11)	2 (9)	
2	1 (11)	11 (48)	
3	3 (33)	4 (17)	
4	4 (44)	1 (4)	
Acetabular Outerbridge grade, n (%)			.174
0	0 (0)	1 (4)	
1	1 (11)	3 (13)	
2	2 (22)	12 (52)	
3	2 (22)	1 (4)	
4	4 (44)	3 (13)	
Femoral Outerbridge grade, n (%)			.062
0	2 (22)	14 (61)	
1	0 (0)	1 (4)	
2	3 (33)	1 (4)	
3	3 (33)	4 (17)	
4	0 (0)	0 (0)	
Mean Joint space, cm			
Medial	0.22	0.33	.510
Central	0.34	0.39	.964
Lateral	0.32	0.39	.391
Tönnis grade, n (%)			.335
0	5 (56)	12 (52)	
1	3 (33)	7 (30)	
2	1 (11)	0 (0)	
3	0 (0)	0 (0)	

ALAD, acetabular labrum articular disruption; THA, total hip arthroplasty.

patients underwent labral repair, 1 patient underwent labral reconstruction, and 24 patients underwent labral debridement. The improvements in mHHS, HOS-ADL, and HOS-SSS were similar in our patients who did not undergo conversion to THA. There was no difference between labral repair and debridement patients in the conversion rate to THA. Only 4 patients who underwent labral repair were available for 2-year follow-up in our study, which limits direct comparison between labral procedures.

The indications for treating borderline hip dysplasia are currently controversial. Parvizi et al.[20] evaluated 34 patients with hip dysplasia and other morphologic abnormalities of the hip and noted persistent pain in most patients. The mean age in this group was 34 years (range, 19 to 51 years), and 16 patients underwent further surgical intervention. Parvizi et al. concluded that performing hip arthroscopy without addressing the underlying bony morphologic abnormalities may not be beneficial. Byrd and Jones[21] reported on 16 patients with dysplasia (LCEA $<20°$) and 32 patients with borderline dysplasia (LCEA of $20°$ to $25°$) and noted satisfactory improvement in both groups at a mean of 27 months' follow-up. The mHHS values in these groups were similar to other patients undergoing hip arthroscopy without dysplasia. Byrd and Jones also noted better outcomes in younger patients when stratified by age. Similarly, Domb et al.[22] have recently reported favorable results with capsular plication in the setting of borderline dysplasia. In our study there were 6 patients with an LCEA less than $25°$, and 4 of these 6 (66%) underwent conversion to THA. Only 1 of these patients had a joint space measurement less than 2 mm. Although these numbers are limited, it appears that hip arthroscopy for borderline dysplasia should be approached with caution in this age group.

A number of authors have cited older age as a risk factor for poor results after hip preservation.[2,7,11,12,23,24] It stands to reason that in patients with morphologic abnormalities of the hip, increasing degenerative changes develop with age, and the chondral damage that is present does not respond well to arthroscopic intervention. Although it is clear that degenerative changes on radiographs portend a poor prognosis, many elderly patients present with hip pain in the setting of a normal joint space. Although MRI may be helpful in evaluating chondral damage, many lesions go undetected.[25] In our study only 4 patients had joint space narrowing greater than 2 mm. Although this study lacks a younger control group, it is apparent that patients aged 60 years or older undergoing hip arthroscopy have worse outcomes compared with previously published literature on younger cohorts.[7,24,26] Of the 21 patients who did not undergo conversion to THA, 12 had an mHHS greater than 80 and 16 had an mHHS greater than 70. We observed a relatively linear decline in the Kaplan-Meier survivorship curve (Fig 1). This may have implications for future follow-up because patients without substantial improvement from hip arthroscopy undergo conversion to THA. Further follow-up of this patient group will be necessary to follow this trend.

As the population ages and remains active, we may encounter more patients aged 60 years or older who present with nonarthritic hip pain, and this study should aid in counseling this demographic. Preoperative evidence that should caution the patient about proceeding with arthroscopy includes poor preoperative PRO scores, joint space narrowing, and evidence of dysplasia. Intraoperatively, grade 4 ALAD was associated with an 80% risk of conversion to THA. It may be reasonable to convert to THA intraoperatively if severe acetabular chondral damage is identified arthroscopically. This, of course, requires a thorough discussion with the patient preoperatively.

Limitations

This study has several limitations. There was no control group used for analysis. There are a limited number of patients available for follow-up in this age group because this patient demographic is only a small percentage of our patient population. The follow-up is short-term and midterm, and long-term survivorship is difficult to gather from these data. The study also included 6 patients who underwent trochanteric bursectomy at the time of hip arthroscopy. Although none of these patients had a gluteus medius tear, they clearly had a component of lateral-sided hip pain that may have affected their outcomes.

Conclusions

Arthroscopic treatment of labral tears in patients aged 60 years or older should be approached with caution. Patients in this age group had an overall 2-year survivorship rate of 70% and should be counseled before surgery on the possibility of conversion to THA. Patients aged 60 years or older with poor preoperative PRO scores, high pain scores, radiographic evidence of borderline dysplasia, and severe chondral damage may be poor candidates for hip arthroscopy.

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