ORIGINAL ARTICLE

Rare and uncommon diseases of the hip: arthroscopic treatment

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ABSTRACT

Aim Uncommon and rare hip diseases are sources of pain and functional limitation particularly in young patients. Some of these conditions may be nowadays treated by arthroscopy due to the expertise and technical tips that high-volume hip arthroscopies have achieved during the last decades ensuring a wider range of indications for such a procedure. The aim of this study was to evaluate clinical results of arthroscopy in treating uncommon or rare diseases of the hip at a single Institution.

Methods Thirteen patients affected by several types of diseases were treated by a hip arthroscopy and retrospectively evaluated. All patients were operated by the same surgeon, instrumentation and technique, but postoperative rehabilitative protocol was tailored on each patient and his disease. Each patient underwent a specific imaging, consisting of dedicated x-rays and arthro-MRI. Modified Harris Hip score (mHHS) and Non-Arthritic Hip score (NAHS) were used before and after surgery to clinically assess the outcome.

Results All patients reported satisfaction, pain relief, and a good functional recovery at the latest follow-up visit. Only one patient affected by chondromatosis reported a recurrence of synovitis and needed a further arthroscopy 25 months after the index operation. No complications were reported at the latest follow-up. The NAHS and mHHS showed good improvements and all patients referred high satisfaction.

Conclusion Hip arthroscopy performed by expert and high-volume surgeons may ensure good results in patients affected by uncommon and rare hip diseases.

Key words: arthroscopy, hip, hip joint/pathology, hip joint/surgery

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INTRODUCTION

Hip arthroscopy is nowadays more diffused than a decade ago, even if it cannot be still considered a standard procedure: few surgeons in a limited number of centres per country reach a high volume of procedures every year (1,2). Arthroscopy represents the gold standard procedure for the treatment of femoro-acetabular impingement (FAI), labral tears, and conditions as early arthritis and snapping hip. During the last years several other diseases have been successfully treated by this technique (1).

Growing the confidence on this procedure, hip surgeons have proposed hip arthroscopy also for other uncommon or rare diseases, as a unique technique or support to mini-open approaches and with encouraging outcomes (3–22).

Chondromatosis is a proliferative benign disease of synovium characterized by formation of osteochondral loose bodies, with an unknown pathogenesis: classically treated by open surgery, it has been recently treated by arthroscopy and associated to good results (3, 4, 17, 18). Moreover, rheumatic diseases, pigmented villo-nodular synovitis of the hip and Ehlers-Danlos syndrome and hyperlaxity have been recently introduced as potential indications for hip arthroscopy with acceptable results and early recovery after surgery (19–21). The confidence of surgeons with such a technique leads also to the proposal of arthroscopy for traumatic and post-traumatic conditions such as Pipkin fractures, loose intra-articular fragments after acetabular rim fractures, ligamentum teres tears, and even slipped capital femoral head (5–10, 22) we conducted the present prospective study to determine the value of hip arthroscopy in the diagnosis and management of various causes of hip pain after traumatic conditions. The present study included a prospective cohort of 17 patients with symptomatic post-traumatic hip pain. It was conducted between July 2013 and May 2018. The mean age was 22 (19–29.) Additionally, an endoscopic approach for several conditions as iliopsoas tendonitis, bursitis and internal snapping hip has been proposed as a surgical option (12–14, 23) operative reports and operative procedures. All patients received either labral debridement, labral repair, osteoplasty or a combination of those procedures. A standardized rehabilitation protocol was used. Of 252 patients, 60 (24%).

The aim of this study was to evaluate clinical results of arthroscopy performed for uncommon or rare diseases of the hip at a single Institution.

PATIENTS AND METHODS

Patients and study design

Medical records of all patients undergoing a hip arthroscopy over a 7-year period (September 2012 to October 2019) were retrospectively evaluated. Among these, 13 patients (7.3% of the total hip scopes in the overall period) were considered for the study because fulfilling the following inclusion criteria: patients of all ages undergoing a hip arthroscopy for an uncommon or rare disease, different from primary FAI, labral tears, early arthritis, and snapping hip. Exclusion criteria were: patients affected by FAI, labral tears, hip arthritis, snapping hip, and joint infection.

The Institutional Review Board accepted the proposal of the study, and all patients were properly informed before surgery about the treatment and follow-up visits after discharge.

The mean age of the selected patients at the time of surgery was 32.2 (range 14-54) years. Ten patients were males and three were females (Table 1). Four patients were represented by traumatic

Table 1. Demographic data, diagnosis and surgical procedures during hip arthroscopy

Patients' No	Age (years)	Diagnosis	Procedure
1	21	Rheumatoid arthritis and symptomatic synovitis	Arthroscopic debridement and synovectomy
2	22	Hip sprain with partial tear of lig. teres and FAI	Shrinkage by radiofrequencies and osteoplasty
3	38	Femoral fracture and dislocation	Osteochondral fragments removal and microfractures
4	26	Acetabular fracture and dislocation	Loose bodies removal and synovectomy
5	28	Rheumatoid arthritis and symptomatic synovitis	Arthroscopic debridement and synovectomy
6	23	Isolated chondromatosis*	Loose bodies removal and synovectomy (synovectomy*)
7	17	Isolated chondromatosis	Loose bodies removal and synovectomy
8	18	Rheumatoid arthritis and symptomatic synovitis	Arthroscopic debridement and synovectomy
9	18	Acetabular fracture and dislocation	Bony fragments removal and debridement & microfractures
10	52	Pigmented villo-nodular synovitis	Loose bodies removal and synovectomy
11	54	Symptomatic chronic ileopsoas bursitis	Partial bursectomy and synovectomy
12	28	Atypical rheumatic disease and symptomatic synovitis	Arthroscopic debridement and synovectomy
13	25	FAI secondary to slipped capital femoral epiphysis	Osteoplasty and screw removal

* This female patient underwent a revision arthroscopy two years after the first hip scope due to synovitis recurrence without formation of chondromas; FAI, femoro-acetabular impingement;

or post-traumatic lesions (fracture-dislocation, hip sprain with partial rupture of ligamentum teres) (Figure 1) and four patients by rheumatologic diseases (rheumatoid arthritis, a specific synovitis); two patients were with isolated hip chondromatosis (Figure 2), one patient with pigmented villo-nodular synovitis (PVNS), one patient with symptomatic chronic ileopsoas bursitis, and one patient with complications after an epiphysiodesis by screw performed for slipped capital femoral epiphysis (SCFE).

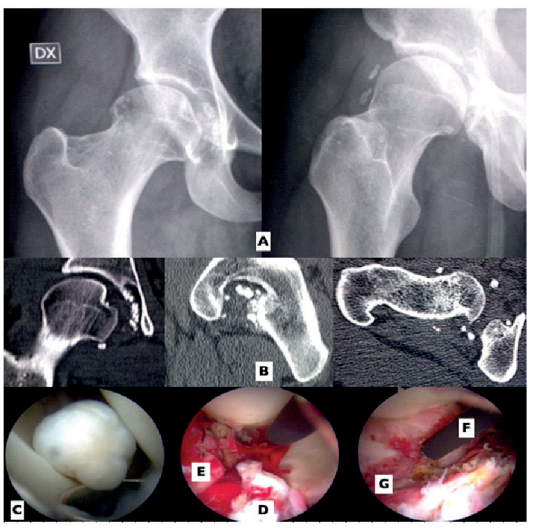

Figure 1. Symptomatic isolated chondromatosis of a right hip of a 17-year-old female patient (professional dancer). A, B) Radiologic and MRI patterns and C) intraoperative aspect of several chondromas in the joint space; D, E) within the hyperplastic synovitis in the acetabulum; F, G) treatment consisted in loose bodies removal and synovectomy by radiofrequencies (Azienda Ospedaliero Universitaria Careggi, 2018)

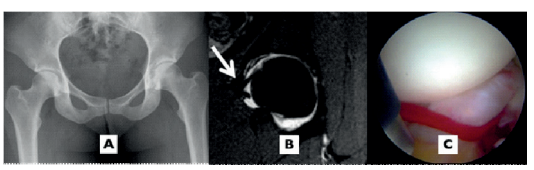

Figure 2. Left hip of a 22-year-old female athlete (professional volley) undergoing a hip sprain. A) On the basis of a mild femoro-acetabular impingement (FAI), B) a partial rupture of the ligamentum teres was found at arthro-magnetic resonance imaging (white arrow); C) during surgery, the ligament tear was evident and associated to acute hemarthrosis: the treatment consisted in joint debridement, osteoplasty, and shrinkage of the residual safe part ligament (Azienda Ospedaliero Universitaria Careggi, 2016)

Methods

All patients were evaluated clinically by modified Harris Hip Score (mHHS) (24) and Non Arthritic Hip Score (NAHS) (25), before and after surgery at specific intervals. All patients underwent a preoperative instrumental examination by x-rays (standing true pelvis view, Dunn views at 45° and 90°, false profile views) and arthro-magnetic resonance imaging (arthro-MRI) (15, 26).

All procedures were performed by a single surgeon, in lateral position, with a dedicated leg traction, a short-term antibiotic regimen (with a preoperative first dose), and in general or locoregional anaesthesia depending on patient's characteristics.

All patients underwent a tailored postoperative rehabilitation protocol. Follow-up visits were planned at 1, 3, 6, and 12 months, then yearly; when indicated, a further imaging was requested during the follow-up period.

Statistical analysis

Statistical analysis was performed by a sample size calculation based on a priori assumption of p=0.05 with a 95% confidence interval. The Student t-test was used to perform the scores' analysis, testing each disease separately.

RESULTS

All patients completed the minimum follow-up of 12 months. The mean follow-up was 52.4 (range 12-98) months. No intraoperative complications were recorded. A single case of early postoperative complication was recorded; it consisted in a superficial infection of one of the arthroscopic portals, requiring a prolonged oral antibiotic therapy lasting for two weeks.

Several associated lesions were found during arthroscopy: FAI in nine (all managed by femoral osteoplasty), chondral lesions in 11 (eight on the acetabular side, managed by shaving and/or radiofrequencies), and loose bodies in six patients (two in the chondromatosis patients, four in post-traumatic conditions).

The mean preoperative values of mHHS and NAHS were 42.6 (range 31-66) and 50.2 (range 41-68), respectively. The mean time of return to a full physical activity was 4.8 months (range 3-7). At follow-up, one single case of chondromatosis required a revision arthroscopy about two years after the first operation, due to the recurrence of synovitis without loose bodies or chondromas.

Two years after surgery, mHHS and NAHS values significantly improved with a mean score of 84.5

(range 79-90) and 72.4 (range 69-80), respectively ($p<0.05$); at the time of the mean follow-up, all scores remained substantially good (Table 2). At the latest follow-up, all patients referred satisfaction and a good health status, with no recurrence of their diseases and with an acceptable standard of life.

Table 2. Pre- and post-operative score evaluation of thirteen patients

Patient No	Diagnosis	mHHS*		NAHS*	
		Pre-op	Post-op	Pre-op	Post-op
1	Rheumatoid arthritis and symptomatic synovitis	37	79	49	69
2	Hip sprain with partial tear of lig. teres and FAI	42	84	51	78
3	Femoral fracture and dislocation	35	81	47	70
4	Acetabular fracture and dislocation	33	84	45	76
5	Rheumatoid arthritis and symptomatic synovitis	48	88	51	72
6	Isolated chondromatosis	66	90†	68	80*
7	Isolated chondromatosis	40	84	53	78
8	Rheumatoid Arthritis and symptomatic synovitis	45	88	61	79
9	Acetabular fracture and dislocation	56	90	67	80
10	Pigmented villo-nodular synovitis	56	88	57	78
11	Symptomatic chronic ileopsoas bursitis	51	82	41	72
12	Atypical rheumatic disease and symptomatic synovitis	31	79	49	69
13	FAI secondary to slipped capital femoral epiphysis	37	81	51	70

*p< 0.05; †This female patient underwent a revision arthroscopy two years after the first hip scope due to synovitis recurrence without formation of chondromas; mHHS, Modified Harris Hip score; NAHS, Non-Arthritic Hip score; pre-op, pre-operative; post-op, post-operative; FAI, femoro-acetabular impingement;

DISCUSSION

Chondromatosis was for first time arthroscopically treated by Boyer with a study population of 111 cases: at a mean follow-up of 78 months, 57% of patients referred no recurrence and satisfaction, while almost 20% needed conversion to hip arthroplasty (17) 120 patients underwent arthroscopic management for primary synovial chondromatosis of the hip. We report the outcome of 111 patients with a mean follow-up of 78.6 months (12 to 196). Also Zini et al. (18) and Lee et coll. (4) reported their series with 11 cases at almost two years follow-up (1 failure, early converted in arthroplasty) and 10 patients at 4-year follow-up respectively, associated to acceptable outcomes. In our series, two patients with chondromatosis were treated with good outcome; even tough if in one case a recurrence of synovitis, detected two years after the first operation, needed a further arthroscopy for synovectomy.

Rheumatic diseases have been recently managed by hip arthroscopy in the series of Zhou et al.: 27 patients (40 hips; 36 patients) affected by inflammatory arthritis (17 ankylosing spondylitis, 11 rheumatoid arthritis, and eight of psoriatic arthritis) undergoing arthroscopic debridement and synovectomy (mean follow-up of 67 months), referred satisfaction regaining normal daily activities (19). In our series, the four patients treated reported a significant improvement among all the clinical scores with no complications or further surgeries at the final follow-up.

Evaluation of arthroscopic treatment for PVNS of the hip of 13 patients (followed-up for a minimum period of 2 years) showed good outcome and minimal morbidity (20). Our findings are in line with this study.

Larson et al. presented the outcome in a series of 12 patients (16 hips) affected by Ehlers-Danlos syndrome and hyperlaxity: FAI was mostly associated to severe capsular laxity, thus, osteoplasty for FAI and careful capsular plication were performed with satisfactory results and no cases of postoperative dislocations were recorded (21). In our series of patients with FAI associated with severe capsular laxity all were treated with complete capsular closure reporting satisfactory results and no conversion to hip arthroplasty.

Traumatic and post-traumatic conditions treated by arthroscopy were reported recently by the analysis of 17 patients with symptomatic hip pain caused by different conditions (traumatic labral tear, Pipkin fractures, and loose intra-articular fragments) with a mean follow-up of 24 months, showing significant improvements of mHHS (22). In our study performing loose body removal and synovectomy combined or not with microfractures was associated with good postoperative clinical outcome. Despite the presence of initial early osteoarthritis in all patients, we reported no subsequent surgical procedures at a minimum of 24-month follow-up.

Hip arthroscopy finds application also in ligamentum teres reconstruction caused by traumatic tears as reported by O'Donnell et al. in a series of nine patients using autologous semitendinosus tendons (five cases) and tibialis posterior allografts (four cases) with a minimum follow-up

of 12 months; all patients appeared satisfied with mHHS and during the follow-up a single patient underwent capsular tightening due to instability, and another underwent debridement due to a partial tear (5). We reported a single case of hip sprain associated with partial tear of ligamentum teres and FAI in which we performed the osteoplasty and a simple shrinkage by radiofrequencies without augmentation; nevertheless, this single patient referred significant improvement in all clinical scores at the final follow-up.

Arthroscopy may be an option also for the treatment of slipped capital femoral head (SCFE), in conjunction with acute treatment or as delayed surgery. In the latter cases, delaying the surgery resulted in the worsening of the outcome (6–11) EMBASE, and PubMed were searched and screened in duplicate. Data such as patient demographics, surgical technique, surgical outcomes and complications were retrieved from eligible studies. Results: Fifteen eligible level IV studies were included in this review comprising 261 patients (266 hips). Chen et al. reported complete pain relief in 88%, mild residual pain in two patients (out of 34 patients with a mean follow-up of 22 months); two patients underwent subsequent open osteotomy due to residual extra rotation in flexion (7) 10 to 19 years. Among 19 patients with SCFE (a mean follow-up of 40 months), Wilye et al. found 14 with mild and five with moderate slips, and obtained an alpha angle improvement in all patients, as well as all patients had pain relief and improvement at the clinical scores (10). Basheer et al. observed statistically significant improvement of mHHS and NAHS postoperatively in a group of 18 patients with a mean follow-up of 29 months (8)including osteochondroplasty, for the sequelae of SCFE. Data were prospectively collected on patients undergoing arthroscopy of the hip for the sequelae of SCFE between March 2007 and February 2013, including demographic data, radiological assessment of the deformity and other factors that may influence outcome, such as the presence of established avascular necrosis. Patients completed the modified Harris hip score (mHHS. Our experience is limited to a single case presenting with a FAI secondary to SCFE. After performing osteoplasty and screw removal the patient reported good post-operative clinical outcome.

Iliopsoas tendonitis, bursitis and internal hip snapping may also cause hip pain especially among athletes (12–14, 23) operative reports and operative procedures. All patients received either labral debridement, labral repair, osteoplasty or a combination of those procedures. A standardized rehabilitation protocol was used. Of 252 patients, 60 (24%). Perets et al. found statistically significant improvement with mHHS and NAHS comparing two patient groups (underwent/or not) iliopsoas fractional lengthening treated for FAI (60 patients with a mean follow-up of 49.1 months post-operatively) and/or chondrolabral lesions (23). Satisfactory subjective outcome and mHHS were reported by Maldonado et al. in patients with painful snapping hip: revision arthroscopies were performed in 5.6% and conversion to THA in 1.3% (14). Complete resolution of symptoms was also reported in our case of symptomatic chronic ileopsoas bursitis treated by partial bursectomy and synovectomy.

Independently from the type of uncommon disease, it is clear from the literature that hip arthroscopy has shown encouraging outcomes, minimal invasiveness, and very low rates of complications with respect to standard open surgery.

This study has several limitations. First of all, it is a retrospective study, with a small patient sample, and represented by a heterogeneous group of diseases. Moreover, an adequate statistical analysis was not feasible given the scarce numbers and parameters to evaluate. However, it is hard to reach gross numbers of patients at a single institution due to rarity of these clinical issues, and the literature witnesses such difficulty.

Hip arthroscopy may be indicated for uncommon and rare clinical conditions, ensuring good results and few complications, when performed by expert high-volume surgeons. Future experiences of other study groups will be useful to assess if outcomes and complications' rate may be considered actually acceptable.

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TRANSPARENCY DECLARATION

Conflicts of interest: None to declare.

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