



Ten years of Minimum Follow-Up After Hip Arthroscopy. Personal Series and Results

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Abstract

Introduction: Arthroscopic Hip Surgery (AHS) has shown exponential growth in the treatment of injuries that affect the coxofemoral joint.

Materials and Methods: Observational, descriptive and retrospective study. The medical records of patients who underwent AHS during the period January 2008 to May 2013 were reviewed. The surgical technique, intraoperative findings, surgical time, complications, and surgical reinterventions were recorded. An assessment of pre and post operative scales was carried out.

Results: Fifty-eight patients met all the requirements, with a mean age of 39.3 years and a BMI of 24.33 kg/m², 56.9% being men (33 patients) and 43.10% women (25 patients). The right hip was operated on in 34 cases (58.62%). 84.5% of diagnoses were FAI (femoroacetabular impingement). In 89.65% of cases the minimum duration of symptoms was present for at least 6 months and in 48.27%, for at least 1 year. Regarding the satisfaction of our patients after follow-up of at least 10 years, 51.73% were highly satisfied, 6.9% very satisfied, 37.92% satisfied and 3.45% dissatisfied. The survival of AHS in the FAI subgroup at 10 years was 93.88% (95% CI: 82.21-97.98), establishing conversion to THR (total hip replacement) as the end point.

Conclusion: AHS is an effective and safe therapeutic tool for our patients.

Keywords: Hip Arthroscopy; Surgical Indications; Femoroacetabular Impingement; Survival

Introduction

Arthroscopic Hip Surgery (AHS) is a surgical technique described by Burman at the beginning of the 20th century, but it has not been until the last few decades that there has been a great interest in its learning and use [1].

Arthroscopic hip procedures have allowed the possibility of treating diseases that were previously only accessible by open technique (mini-open or safe dislocation) in a less invasive way [2].

This is how AHS has experienced exponential growth in the last decade as a sparing surgery technique. At the Spanish level, Nova-

Parra, *et al.* conducted a retrospective review of the registry of hospital discharges from the National Health System, observing an increase in the number of AHS from 42 to 1,447 (between 1998 and 2018), representing an increase of 34.45 times. Compared to 2018, they calculate a projection of an increase of 156% by 2030 [3].

The main indication for the use of AHS is Femoroacetabular Impingement (FAI), both for the treatment of lesions of the central and peripheral compartments, and the use of this endoscopic technique has been extended to the lateral compartment (external springs, gluteal lesions) and for diseases of the Deep Gluteal Compartment [2].

FAI is a bony deformity of the hip joint at either the head-neck junction (cam), the acetabulum (pincer), or both (mixed impingement), which can result in abnormal contact and obstruction of fluid movement of the femoral head within the acetabulum, which can result in subsequent damage to the labrum and acetabular cartilage. It is a disease that is increasingly recognized as a cause of groin pain and progression to osteoarthritis in the hips of young, non-dysplastic patients [4].

Although AHS is considered a safe procedure, it is not exempt from complications, the most frequent being those associated with traction and positioning of the patient, which vary between 1 and 15% of pudendal nerve neuropraxias, almost always transient, depending on the series. Skin lesions in the genitoperineal area have also been described. Other less frequent complications are extravasation of fluid into the retroperitoneal or abdominal cavity, iatrogenic damage at the chondrolabral level, and hip instability secondary to overcorrection, especially in a dysplastic hip [2,5].

The aim of this study was to review our results of the use of AHS in patients with a minimum follow-up of 10 years.

Material and Methods

This is an observational, descriptive and retrospective study in which patients who underwent AHS during the period January 2008 to May 2013 were reviewed, achieving a registry with a minimum follow-up of 10 years. All procedures were performed by a single surgeon (J.R.Z). Demographic data were collected, such as age at the time of the intervention, gender, Body Mass Index (BMI), laterality, time of evolution of symptoms, exploratory maneuvers that trigger pain (FADIR, FABER, etc.), diagnosis, time to return to work, and functional outcomes.

Patients under 18 years of age, those who suffered loss of follow-up, as well as those who had undergone previous surgery on the same hip were excluded from the study. In this way, it was possible to obtain records of 58 patients operated on with AHS for different diseases. The study was approved by the Hospital's Ethics Committee and was therefore developed in accordance with the ethical standards set out in the 1975 Declaration of Helsinki and revised in 1983.

The diagnosis of FAI was based on the anamnesis, physical examination and the radiological tests requested, with the conventional radiological study being an anteroposterior x-ray of the pelvis in standing position and Dunn's axial projection at 45°. Pincer-like morphology was determined by the presence of crossover sign and/or ischial spine (partial or total retroversion) and Cam-like morphology by an alpha angle greater than 60° [6,7].

20.68% (12 patients) of the series were studied preoperatively with arthro-resonance and the rest with conventional resonance. 34.5% (20 patients) had a CT scan with 3D reconstruction in which they were measured Wiberg angles, Alpha angles and articular spaces in millimeters in zones 1 to 5 of Ilizaliturri [8].

The basic elements of the surgical technique for the FAI group were epidural anesthesia plus general anesthesia, performing all cases in the supine position on a classic traction table, with a 2-portal technique (Anterolateral and Anterior) until 2009 and a posteriori, with 3 portals (Anterolateral, Medio-anterior and Dala). Interportal capsulotomy was performed for the central compartment (except in dysplasias) and for the peripheral compartment, a 2-point traction technique was developed and the vertical T was systematically developed since 2014. The length of hospital stay ranged from 24 to 48 hours, and the use of orthopedic discharge material depended on the disease treated.

The surgical technique, together with the intraoperative findings and the complications produced, were recorded in each medical record, as well as a record of the pre- and post-intervention scales: modified Harris (mHHS), [9] the Hip Outcome Score (HOS) questionnaire with the subscales for activities of daily living (HOS-ADL) and sports activities (HOS-SSS) [10], in addition to the Hip Outcome Tool (iHOT-12) [11]. The level of pre and postoperative sports activity was determined according to the Tegner scale [12]. Patients were contacted in May 2023, by telephone, to

answer a single question: How do you assess the outcome of their arthroscopic hip surgery today?, being able to answer: highly satisfied, very satisfied, satisfied, dissatisfied, very dissatisfied.

Surgical time, traction time, as well as the evolutionary need for a surgical reoperation either as revision arthroscopy (re-AHS), or as conversion to Total Hip replacement (THR), or both.

Survival of the surgical technique was established as the need for conversion to THR as an endpoint and was calculated using the Kaplan-Meier scale. Statistical analysis was performed with Stata Software (Data Analysis and Statistical Software, Texas, USA) version 12.0 for Mackintosh.

Results

Of the total number of patients registered, 58 met all the inclusion criteria, 49 patients being diagnosed with FAI (84.5% of the series), 3 patients with isolated labral ruptures, one patient who underwent labral repair in the context of hip dysplasia, one patient who associated labral lesion with ischemic necrosis of the femoral head treated with forage, a patient who, in addition to labral repair, required a reduction and percutaneous osteosynthesis due to fracture of an Os acetabuli, a patient who required revision of AHS after being operated on in another center where it was not possible to operate due to bleeding that prevented the technique, a patient who underwent an arthroscopic trochanteric bursectomy and finally, one patient who required a tenotomy of the psoas after THR.

The mean age of the series was 39.3 years and the mean BMI was 24.33 kg/m². 56.9% were men (33 patients) and 43.1% were women. The right hip was operated on in 34 of the cases (58.62%). In 89.6% of the cases, symptoms were present for at least 6 months and in 48.27%, for at least 1 year prior to the intervention. A total of 8.6% (5 patients) had a history of a previous contralateral AHS. A total of 51.7% of patients performed at least one sport, with a mean preoperative Tegner score of 2.69 (1 to 7). A total of 96.55% of patients underwent AHS for intra-articular injury (56 patients). The mean follow-up of patients was 130.08 months with a maximum of 176 months (14.6 years).

At the intraoperative level, excluding the 2 patients without intra-articular lesions, a labrum of normal structure was recorded in 83.92% of the series (47 patients), calcified or absent in

12.58% and hyperplastic in the remaining 3.5%. Labral lesion was evidenced in 100% of patients with intra-articular lesions, showing a majority (83.9%), lesions in zone 2 and 3 of Ilizaliturri, 8.93% in isolated zone 2 and 7.14% lesions that involved from zone 2 to zone 4, being able to perform a labral repair in 73.2% of the cases, using 2 harpoons in 57.5% of the patients. 1 harpoon in 35% and 3 harpoons in the remaining 7.5%. Labral debridement was performed in case of non-reinsertion.

A total of 11 psoas tenotomies were performed (19.29% of cases). Only 1 patient had a round ligament injury, which was treated by vaporizer remodeling.

Tegner's physical scale went from 2.69 to 3.45 on average 10 years after the intervention. The preoperative modified Harris Hip Score (mHHS) was 72.99, rising to 92.33 at one year of the intervention, 95.88 at 5 years, and 96.7 at 10 years.

The average time to return to work was 4.87 months (range 2-10 months).

During the follow-up period, 11 patients (19.64%) required new interventions. Eight (14.28%) were rearthroscopied (re-AHS) with a mean time to this new procedure of 26.25 months and a mean age of 38.12 years at the first intervention, with the remaining 3 patients converted to THR in a mean time of 56.6 months, with the Conversion Rate to THR of this series being 5.35% (3 of 56 cases).

Regarding the level of satisfaction reflected by the patients (except for the 3 converts to THR), 51.73% were highly satisfied, 6.9% were very satisfied, 37.92% were satisfied, and 3.45% were dissatisfied.

A homogeneous group of patients (the 49 specifically diagnosed with FAI) was evaluated in isolation, of which 14.28% (7 patients) presented an isolated CAM pattern, 48.97% a mixed pattern (24 patients) and an isolated Pincer pattern (36.73% (18 patients)). The mean age in this group was 38.9 years and the BMI was 24.1 kg/m², with 63.27% men (31 patients) and 36.73% women (18 patients) (Table 1). The mean surgical time in this subgroup was 122.4 minutes and the mean traction time was 69.6 minutes, with the mean time in the mixed FAI being 124.2 minutes and the traction time being 67.8 minutes, slightly longer than for the isolated Cam or Pincer patterns.

Age	38.9 ± 8.1
Gender	
Men (%)	31 (63.27)
Women (%)	18 (36.73)
Weight (Kg)	71.7 ± 15.3
Size (m)	1.7 ± 0.1
BMI (kg/m ²)	24.1 ± 3.7
Occupation	
Unknown (%)	15 (30.6)
Administrative (%)	29 (59.2)
Construction (%)	2 (4.1)
Elite sport (%)	3 (6.1)
Time with symptoms	
<6 months (%)	3 (6.1)
6-12 months (%)	24 (48.9)
> 12 months (%)	22 (44.9)
Full tracking (years)	10.4 ± 2.1

Table 1

Regarding the functional results of the FAI subgroup, we found improvement with respect to preoperative values both at one year of follow-up, and at 5 and 10 years, respectively, in the scales used. The greatest degree of improvement occurred after one year of intervention, achieving statistical significance compared to the preoperative values: Tegner (+0.61) (2.81 to 3.42), mHHS (+17.67), HOS-ADL (+19.38), HOS-SSS (+19.86) and iHOT-12 (+18.97) ($p < 0.05$). After 5 years of follow-up and compared to the functional results of the first year, the HOS-ADL (+2.6), HOS-SSS (+2.82) and the iHOT-12 (+2.44) continue to improve and achieve statistically significant differences ($p < 0.05$). Between 5 and 10 years of follow-up, no statistically significant improvements were observed, however, when comparing pre AHS results with functional outcomes after 10 years of follow-up, we did find statistically significant differences for both mHHS (+20.61), HOS-ADL (+22.37), HOS-SSS (+22.57) and iHOT12 (+21.63) ($p < 0.05$) (Table 2).

The average number of months in which patients in this subgroup were able to return to work was 4.32 months (range: 2 - 9 months).

	Pre surgery	1 year	5 years	10 years
Tegner	2.81	3.42	3.55	3.61
Harris (mHHS)	72.71	90.39	92.35	93.32
HOS - ADL	70.17	89.55	92.16	92.55
HOS - SSS	67.92	87.79	90.61	90.49
i-HOT 12	70.23	89.21	91.65	91.87

Table 2

The rate of re AHS in this subgroup was 8.16% (4 cases), they had a mean age of 34 years (24-45) and the new AHS was performed on average at 30.5 months of follow-up (23-45). In the FAI subgroup, 3 patients were reconverted to THR a mean of 48.3 months (24-96 months) after primary AHS, with a mean age at conversion of 40 years (range: 36-48 years).

The 10-year survival of AHS for the FAI subgroup was 93.88% (95% CI: 82.21-97.98), establishing conversion to THR as the end point, with a rate of 0.58 people per year (6.12% of the 49 cases) (Figure 1).

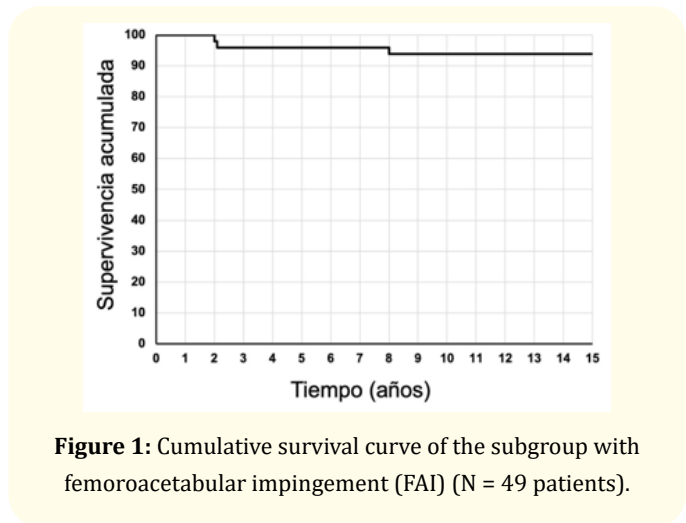


Figure 1: Cumulative survival curve of the subgroup with femoroacetabular impingement (FAI) (N = 49 patients).

No major complications were recorded in the entire series (deep infection, fracture or necrosis of the proximal femur, deep vein thrombosis, pulmonary thromboembolism, or intra-abdominal fluid extravasation). There were 4 hematomas in the portal area that did not require intervention.

Of the total series, 12 patients (20.68%) presented paresthesias that affected the Pudendo nerve in 10 cases and the femorocutaneous nerve in 2, resolving in 10 cases in the first 24-48 hours, one in the first week and the rest after 21 days of evolution. There were no cases of sciatica paralysis.

Discussion

AHS is increasingly being used for the treatment of both intra- and extra-articular hip diseases. This is due in part to the success of arthroscopic techniques for the treatment of FAI and labral lesions, with results similar to those achieved by open surgery, but with less invasiveness, a low rate of reoperations-complications and high rates of return to sports and work activity with an adequate level of satisfaction reported by patients [13].

An increasing number of arthroscopic hip procedures are performed around the world every year. In the US, depending on the registry studied, there was a growth of 265% between 2004 and 2009, and 250% between 2007 and 2011. In the UK, the increase reached 483% between 2012 and 2018. In Spain, between 1998 and 2008 the growth was 485.7%, and between 2008 and 2018, 709.3%. This upward trend is expected to continue until 2030 (growth of up to 210.7%) [3].

In addition, the AHS has the support of world-renowned health institutions such as the National Institute for Health and Care Excellence (NICE) of the United Kingdom, which already in 2011 determined that there was adequate evidence to indicate this technique in FAI.¹⁴ In the same vein, Griffin and his collaborators published in 2018 the UK FASHiON study, which established with a level of evidence I that AHS achieves better results in the treatment of FAI, with clinically significant differences, when compared to the best possible conservative treatment [15].

Although AHS has increasing scientific support when the indication is appropriate, we know that it has a long learning curve and that the surgeon must learn to recognize, manage and prevent complications of the procedure.¹³ Studies show that after the first 75 cases, the surgeon begins to stabilize surgical times [16] and that after 388 AHS, the reoperation rate drops below 10% and that above 500 cases, a significantly lower risk of reoperation is achieved [17].

Either way, AHS is a safe surgical procedure for experienced surgeons. Although minor complications (neuropraxia, chondral or labrum trauma) are very frequent, they are generally not of major clinical relevance. Major complications are very rare but can have a catastrophic outcome for the operated hip (fractures, avascular necrosis, dislocations, etc.) [5,13,18,19].

Our 10-year results show functional and satisfaction levels similar to the few series published in the literature and in the specific subgroup of the FAI, with a 10-year survival of 93.88%, a conversion rate to THR of 6.12%, and a reoperation rate of 8.16% [20-22]. It allows us to compare our results to those published with a minimum follow-up of 10 years.

In the search for other national series with significant follow-up, Torres-Perez., *et al.* [20]. stands out with 40 cases, a mean follow-up of 6 years (43-130 months) and a mean survival of 81% of patients evaluated at 10 years. However, as they describe, there is a significant decrease in patient follow-up (original series of 102 patients).

Recently, Dr Más's group published a national series of 71 patients who underwent AHS in the context of FAI with a mean follow-up of 132 months, determining a survival rate of 85.2% in Tönnis 0-1 patients and 45.4% in Tönnis 2-3 patients, considering reoperation as the endpoint. They conclude that age, cartilaginous injury and joint degeneration would increase the risk of reoperation [23].

The limitations of our study include its retrospective nature and the lack of a comprehensive record of mainly postoperative radiological measurements in patients.

Conclusion

Arthroscopic Hip Surgery is undoubtedly an important advance in the treatment of diseases that affect the hip, especially in the field of Femoroacetabular Impingement.

According to our results and after 10 years of follow-up, AHS is a safe therapeutic tool for our patients, as long as the choice and indication is correct, in addition to the surgeon's experience using this technique.

Conflicts of Interest

The authors declare that there is no conflict of interest directly or indirectly related to the content of the article.

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