



Original

Hip arthroscopy provides medical personnel with an early and complete return to work. A multicentre study

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Received 2 November 2023

Accepted 8 August 2024

Available online: September 2024

ABSTRACT

Objectives: To describe the functional outcomes and occupational data in a group of medical personnel undergoing arthroscopic hip surgery (AHS) for the treatment of femoroacetabular impingement (FAI) by high-volume surgeons.

Methods: A multicentre retrospective review was made of AHS performed in medical personnel as treatment of FAI by high-volume surgeons. Demographic data, functional parameters, need for revision AHS or conversion to total hip replacement (THR), the level and time of return to work, and the degree of satisfaction with the outcome of surgery were recorded.

Results: A total of 40 hips were operated upon in 40 patients: 22 women (55%) and 18 men (45%). The mean duration of follow-up was 7.1 ± 3.8 years (range 1-12). At the end of follow-up, statistically significant improvement was recorded in the Hip Outcome Score-Activities of Daily Living (HOS-ADL) and International Hip Outcome Tool 12 (i-HOT12) scales (from 60.1 ± 14.2 and 40.4 ± 16.2 preoperatively to 86.8 ± 8.9 and 77 ± 11.6 postoperatively, respectively; $p < 0.001$). Five patients (12.5%) required reoperation during follow-up: 2 revision AHS (5%), 1 case of adductor tenotomy (2.5%), and 2 conversions to THR (5%), due to poor outcomes at 32 and 104 months after initial AHS. All patients returned to work after surgery, with a mean time off work of 3.8 ± 1.8 months (range 1-8). The degree of satisfaction with the outcome of sur-

RESUMEN

La artroscopia de cadera proporciona en el personal médico una reincorporación laboral temprana y completa. Estudio multicéntrico

Objetivos: describir los resultados funcionales y datos laborales en un grupo de pacientes médicos intervenidos de cirugía artroscópica de cadera (CAC) para el tratamiento del choque femoroacetabular (CFA) por cirujanos de alto volumen.

Material y método: se llevó a cabo una revisión retrospectiva con carácter multicéntrico de las CAC llevadas a cabo en personal médico como tratamiento del CFA por cirujanos de alto volumen. Se recogieron datos demográficos, parámetros funcionales, necesidad de CAC de revisión o conversión a prótesis total de cadera (PTC), nivel y tiempo de reincorporación a la actividad laboral y grado de satisfacción con el resultado de la cirugía.

Resultados: se intervinieron 40 caderas en 40 pacientes, 22 mujeres (55%) y 18 hombres (45%). El tiempo medio de seguimiento fue de $7,1 \pm 3,8$ años (1-12). Al final del seguimiento se obtuvo una mejoría estadísticamente significativa en las escalas Hip Outcome Score-Activities of Daily Living (HOS-ADL) e International Hip Outcome Tool 12 (i-HOT12) (de $60,1 \pm 14,2$ y $40,4 \pm 16,2$ preoperatorio a $86,8 \pm 8,9$ y $77 \pm 11,6$ postoperatorio, respectivamente; $p < 0,001$). Requirieron reintervención 5 pacientes (12,5%) duran-



<https://doi.org/10.24129/j.reacae.31181.fs2311029>

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gery was high or very high in 90% of the patients (very high 55%, high 35%, medium 7.5% and low 2.5%).

Conclusions: Arthroscopic hip surgery as a treatment for FAI in medical personnel results in improved functional parameters and allows an early return to work with the same level of activity as before the injury, with a low reintervention and conversion to THR rate after a mean follow-up over 7 years.

Level of evidence: Level IV study, retrospective case series.

Clinical relevance: The present study is the first to describe the demographics, occupational data, functional outcomes and need for revision AHS or conversion to THR in medical personnel undergoing AHS due to FAI.

Key words: Hip arthroscopy. Femoroacetabular impingement. Hip surgery. Return to work. Medical personnel.

Introduction

In view of its good results, arthroscopic hip surgery (AHS) has been gaining popularity as the treatment of choice for frequent hip joint injuries such as femoroacetabular impingement (FAI) and labral disorders⁽¹⁾. Most of the studies published to date have reported excellent results with this technique in the treatment of FAI, with significant improvement in pain and functional parameters, provided that the indication is made correctly and surgery is accompanied by adequate rehabilitation therapy⁽²⁾.

A number of publications have analysed the outcomes of AHS in the treatment of FAI in different population groups, most of them involving professional athletes and military personnel, given their high functional demand. In professional athletes, the percentage return to sports activity is over 80%, and most athletes are able to return to their pre-injury level of activity⁽³⁾. In the case of military personnel, around 75% remain in service for the first two years after surgery, although this percentage drops to 50% over medium term follow-up⁽⁴⁾.

Although the level of physical activity in the medical profession is lower than that of professional athletes and military personnel, most physicians dedicate many hours to their work, with variable physical exertion. To date, no studies have examined the clinical and functional outcomes of AHS in the treatment of FAI among medical personnel. Our working hypothesis is that AHS offers this population group improved functional parameters with

te el seguimiento, 2 CAC de revisión (5%), 1 caso de tenotomía de aductores (2,5%) y 2 conversiones a PTC (5%) por mala evolución a los 32 y 104 meses desde la CAC inicial. Todos los pacientes se reincorporaron a su puesto de trabajo tras la intervención con un tiempo medio de baja de $3,8 \pm 1,8$ meses (1-8). El grado de satisfacción con el resultado de la cirugía fue alto o muy alto en el 90% de los pacientes (muy alto 55%, alto 35%, medio 7,5% y bajo 2,5%).

Conclusiones: la CAC como tratamiento del CFA en el personal médico proporciona una mejoría de los parámetros funcionales y permite una reincorporación laboral temprana y al mismo nivel de actividad que antes de la lesión con una baja tasa de reintervenciones y conversión a PTC tras un seguimiento medio superior a 7 años.

Nivel de evidencia: estudio nivel IV, serie de casos retrospectiva.

Relevancia clínica: el presente estudio es el primero que describe los datos demográficos, laborales, resultados funcionales y necesidad de CAC de revisión o conversión a PTC en personal médico sometido a CAC por CFA.

Palabras clave: Artroscopia de cadera. Choque femoroacetabular. Cirugía de cadera. Retorno al trabajo. Personal médico.

complications similar to those seen in the general population. The present study was carried out to evaluate the demographic characteristics, functional outcomes, satisfaction and return to work in a group of medical patients subjected to arthroscopic surgery for FAI by high-volume surgeons.

Material and methods

Patient selection

A retrospective review was made, using a multicentre database of patients with FAI subjected to AHS. The multicentre operating group consisted of 7 surgeons from 7 different hospital centres, with a minimum experience in this technique of 10 years and a minimum of 40 cases per year, all belonging to the Iberian Group of Hip Preservation Surgery (Grupo Ibérico de Cirugía de Preservación de Cadera [GIPCA]). All patients were evaluated by the surgeon in charge at each hospital centre. A joint encrypted database (Microsoft Excel, Microsoft Corporation, Redmond, WA, USA) was used for all centres for data collection and extraction, which was carried out by an independent analyst. The inclusion criteria were patients belonging to the medical profession undergoing AHS due to FAI. The exclusion criteria were revision surgery or AHS as treatment for other disorders (isolated tendon injuries, tumours or trauma).

Surgical technique

All surgeries were performed in the supine position and on a traction table with perineal post. The anterolateral, mid-anterior and distal anterolateral portals were used. In order to be able to perform the necessary procedures in each patient, an interportal capsulotomy was used in all cases in the central compartment (bony treatment of the acetabular rim, debridement of chondral lesions to secure stable edges, microfractures, labral debridement or repair), except in young women with signs of joint hyperlaxity, in which case independent capsulotomies were used (Figure 1). In patients with cam-type deformities (alpha angle $>55^\circ$), a T-capsulotomy (with different edge traction systems, and only in those patients with difficult access to the femoral bump) was performed to gain access to the peripheral compartment and resect the femoral deformity until an adequate head-neck transition was achieved to prevent conflicts of space, tested by intraoperative dynamic examination to confirm adequate correction (Figure 2). The intraoperative procedures made are described in Table 1.

Clinical outcomes

Demographic data, functional scores preoperatively and one year after surgery, the need for reoperation or prosthetic surgery throughout follow-up, time and level of return to work, and satisfaction with the outcome of surgery at the end of follow-up were collected. The functional scales included the Hip Outcome Score-Activities of Daily Living (HOS-ADL) and the International Hip Outcome Tool 12 (i-HOT-12)^(5,6). Calculation was made of the percentage of patients achieving a *minimum clinically important difference* (MCID), the *patient acceptable symptom state* (PASS), and the *substantial clinical benefit* (SCB) scores for both functional scales at one year after surgery. The MCID was defined as a postoperative increase of over 8.8 and 15.1 points, PASS as a postoperative score of over 89.7 and 69.1 points, and SCB as a postoperative score of over 89.7 and 72.6 points for the HOS-ADL and i-HOT12 scales, respectively⁽⁷⁾.

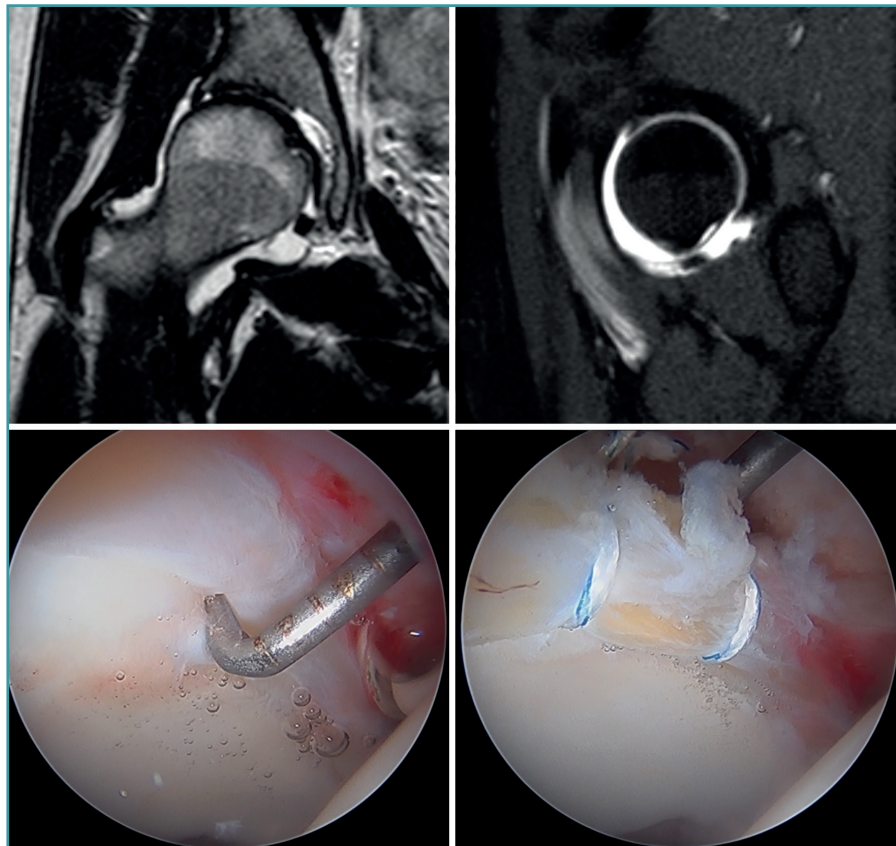


Figure 1. Chondrolabral injury in a young female patient. At top, coronal and sagittal views of the preoperative MRI study, showing the chondrolabral junction lesion in the anterosuperior region. At bottom, intraoperative details of the chondrolabral lesion (left) and after stabilisation (right).

Statistical analysis

Continuous variables were reported as the mean and standard deviation. Categorical variables were presented as percentages. In the case of the continuous variables, the Shapiro-Wilk test was used to assess normal distribution of the data. For continuous variables, the Student t-test or the Mann-Whitney U-test was used, as applicable. Statistical significance was considered for $p < 0.5$. The statistical analysis was performed using the SPSS version 26 statistical package (IBM Corporation, Armonk, NY, USA).

Results

Demographic data

Out of a total of 43 patients, 40 (representing 40 hips) met the study inclusion criteria (93%). The mean age, weight, height and body mass index (BMI) were 38.1 ± 7.5 years, 67.4 ± 16.4 kg, 1.69 ± 0.1 m and 23.8 ± 2.7 kg/m², respectively. There were 22 women (55%) and 18 men (45%). The demo-

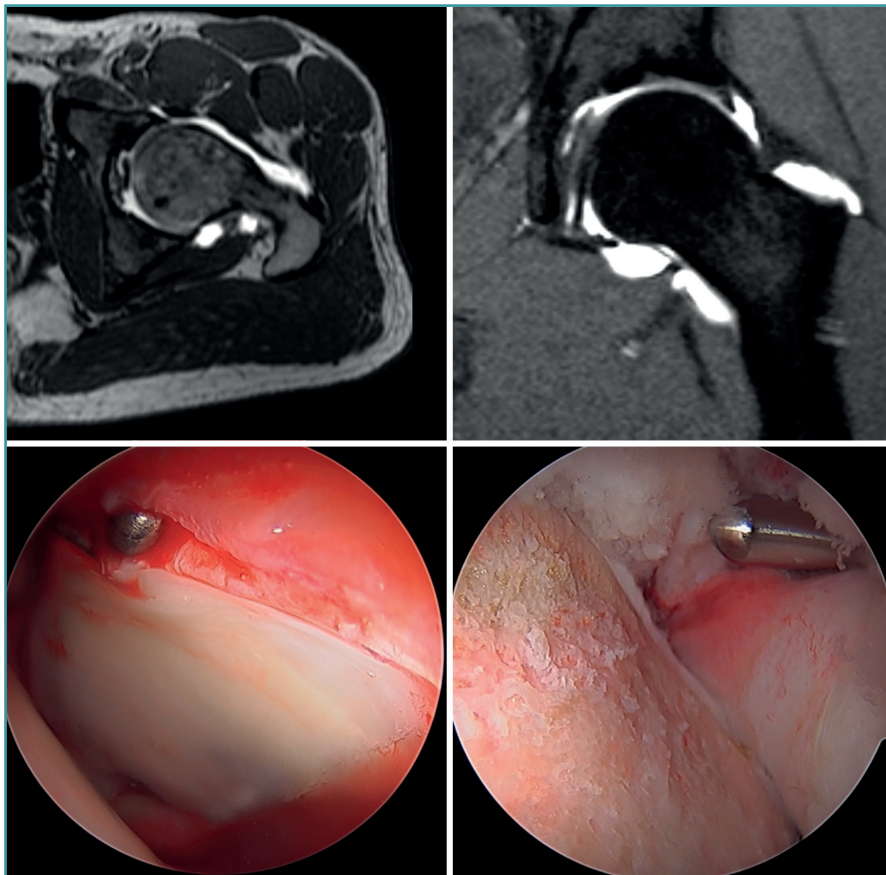


Figure 2. Combined femoroacetabular impingement in a middle-aged male patient. At top, axial and sagittal views of the preoperative MRI study, showing a deformity at the head-neck transition (left) and a chondrolabral junction lesion with excess coverage in the upper area (right). At bottom, intraoperative details of the chondrolabral junction lesion (left) and correction of the femoral deformity (right).

graphic data, diagnoses and degree of preoperative joint degeneration are detailed in **Tables 2 and 3**.

Clinical outcomes and complications

The mean duration of follow-up was 7.1 ± 3.8 years (range 1-12). Statistically significant improvement of the HOS-ADL and i-HOT12 scores was recorded at one year after surgery (from 60.1 ± 14.1 and 40.4 ± 16.2 preoperatively to 87 ± 8.9 and 77 ± 11.6 postoperatively, respectively; $p < 0.001$). The percentage of patients achieving MCID, PASS and SCB at one year after surgery was 87.5%, 41.7% and 41.7% for the HOS-ADL scale, and 77.2%, 85.7% and 87.5% for the i-HOT12 scale, respectively. Five patients (12.5%) required reoperation during follow-up: two revision AHS (5%) due to labral suture failure; one adductor tenotomy (2.5%) due to inguinal pain and inability to perform full abduction; and two conversions to total hip replacement (THR) (5%) due

to poor outcomes at 32 and 104 months after initial AHS. Both of these patients presented moderate chondral lesions (Tönnis classification grade 2) prior to first surgery.

Occupational outcomes

All patients returned to work after surgery, with a mean time off work of 3.8 ± 1.8 months (range 1-8). The percentage of patients on call or with shifts of more than 12 hours was the same before the injury and at the end of follow-up (4 out of 40; 10%). There were no statistically significant differences between the weekly working hours before the injury (45.4 ± 9.5) and at the end of follow-up (47.6 ± 10.9). Satisfaction with the outcome of surgery at the end of follow-up was high or very high in 90% of the patients (very high 55%, high 35%, average 7.5% and low 2.5%).

Discussion

The most relevant finding of the present multicentre study was that AHS as treatment for FAI

allowed the medical personnel to fully return to work at a level similar to that before the injury, and with a high degree of satisfaction with the treatment received. In addition to the above, significant improvement of the functional parameters was achieved one year after the operation compared to the pre-treatment values.

There are data on the return to work after AHS in the general population, though most studies focus on elite athletes and military personnel^(3,4,8-11). Although to varying degrees, the reported return to work rates are lower than those obtained in the present study. In the general population, the average percentage of patients returning to work at any level is 71.4%, with a range of 55-100%. The reported full return to work rate is 50.9%, while 15.5% (range 5-46) of the patients return to a lower or modified work intensity level⁽⁴⁾. The average return to work time in the general population is 115 days, with a range from 17-219 days⁽⁸⁾.

In athletes, the return to sports activity rate in general is 85%, with an average follow-up of around two years. The

Table 1. Intraoperative procedures performed

	Number of hips (n = 40)
Cam treatment	25 (62.5%)
Pincertreatment	23 (57.5%)
Cam + pincertreatment	16 (40%)
Psoas tenotomy	4 (10%)
Chondral cup lesions	26 (65%)
Debridement	23 (57.5%)
Microfractures	3 (7.5%)
Chondral femoral head lesions	18 (45%)
Debridement	17 (42.5%)
Microfractures	1 (2.5%)
Chondral femoral head + cup lesions	6 (15%)
Debridement	5 (12.5%)
Microfractures	1 (2.5%)
Labrum treatment	
Repair	30 (75%)
Debridement	4 (10%)
None	5 (12.5%)
Resection	1 (2.5%)

proportion of professional athletes who are able to return to elite sports ranges from 82-93.3%. This proportion decreases in the case of recreational sports, where the return rates vary between 66.7-84%⁽¹¹⁾. Approximately 70% of the athletes return to sports activity at a level similar to or higher than before the injury. The mean time to return to sports is 7.4 months⁽³⁾.

In the case of military personnel, the return to service rate is around 75%. However, on analysing the proportion of military personnel that return to service without limitations (i.e., similar to the return to sports activity at pre-injury level in athletes), the figure is much lower (around 47%). The average time to return to service is highly variable, ranging from 1-2 years in some studies, and up to 6 years in others^(4,9). Postoperative improvement of the pain and functional parameters is significantly higher in special forces and infantry personnel, with their return to service ratio being comparable to that of the return to sports activity in elite athletes⁽¹⁰⁾. Although the medical profession is characterised by a lower level of activity than professional athletes or military personnel, in the present study 100% of the patients returned to their previous work activity, and both the percentage of patients working on call or

Table 2. Demographic data

Age (years) mean ± standard deviation (SD)	38.1 ± 7.5
Gender	
Male	18 (55)
Female	22 (45)
Weight (kg), mean ± SD	67.43 ± 16.4
Height (m), mean ± SD	1.69 ± 0.1
Body mass index (kg/m ²), mean ± SD	23.79 ± 2.7
Reoperation	
No (%)	37 (92.5)
Yes (%)	3 (7.5)
Conversion to total hip replacement	
No (%)	38 (95)
Yes (%)	2 (5)
Return to work (%)	100
Time to return to work (months), mean ± SD (range)	3.8 ± 1.8 (1-8)
Total follow-up (years), mean ± SD (range)	7.1 ± 3.8 (1-12)

Table 3. Preoperative diagnosis and degree of joint degeneration

Preoperative diagnosis	Number of hips (n = 40)
Combined femoroacetabular impingement (FAI)	16 (40%)
Cam predominance FAI	9 (22.5%)
Pincer predominance FAI	7 (17.5%)
Chondrolabral instability	6 (15%)
Psoas impingement	2 (5%)
Preoperative Tönnis classification	
Grade 0	27 (67.5%)
Grade 1	11 (27.5%)
Grade 2	2 (5%)
Grade 3	0 (0%)

in shifts of more than 12 hours and the number of weekly working hours did not differ between pre-injury and the end of follow-up. The mean time to return to work was under 120 days.

Although the return to work, sports or service has been used as a measure of success after AHS, functional

parameters also contribute information on the outcomes achieved. All studies describe clinically and statistically significant improvement of functional parameters in athletes and military personnel when compared to the pre-surgery condition^(10,12-20). In the present study, significant improvements were obtained in the postoperative values one year after the operation on the HOS-ADL and iHOT-12 scales compared to the presurgical values. In this same line, 87.5%, 41.7% and 41.7% of the patients achieved MCID, PASS and SCB with the HOS-ADL scale, versus 77.3%, 85.7% and 87.5% with the i-HOT12 scale, respectively. The difference in the percentage of patients achieving PASS and SCB between the two scales can be explained by the fact that the i-HOT12 questionnaire, unlike the HOS-ADL, assesses emotional, social, occupational and lifestyle aspects. Furthermore, while MCID assesses the proportion of patients achieving minimal clinical benefit, PASS and SCB assess the proportion of patients achieving complete and sufficient satisfaction, respectively.

Regarding the need for further surgery or conversion to THR, athletes are undoubtedly the most studied population group. The reoperation rate in this group ranges from 8.6-40% depending on the series⁽²¹⁻²⁹⁾. On strictly considering new hip preservation surgeries, the reoperation rate ranges from 3.6-15.2%. The frequency of conversion to THR ranges from 0-33.3%. In the present study the reoperation rate was low (12.5%), with a mean follow-up of 7 years; two were revision AHS due to failure of the previous labral suture, and one adductor tenotomy was performed due to inability for full abduction. The frequency of conversion to THR was also lower than in most published studies (2 cases; 5%), and conversion took place an average of 6 months after initial AHS. Both cases involved patients with moderate presurgical arthritic signs, Tönnis classification grade 2, where the indication of AHS is controversial.

The present study has a number of limitations. Firstly, the retrospective design of the study leads to selection bias. Secondly, the study does not take into account several factors that may have influenced the return to work, such as economic needs, social factors and disability insurance coverage issues. Thirdly, as this was a multicentre study, not all patients followed the same rehabilitation and recovery protocol. It is important to note that the present series represents the results of an experienced group of hip preserving surgeons in a specific population cohort; the results obtained therefore should be extrapolated with caution.

Conclusions

The results obtained indicate that AHS in medical personnel results in improved functional parameters and allows an early return to work with the same level of activity as before the injury, with a low reintervention and conver-

sion to prosthetic surgery rate after a mean follow-up over 7 years.

Ethical responsibilities

Conflicts of interest. The authors state that they have no conflicts of interest.

Financial support. This study has received no financial support.

Protection of people and animals. The authors declare that this research has not involved human or animal experimentation.

Data confidentiality. The authors declare that the protocols of their work centre referred to the publication of patient information have been followed.

Right to privacy and informed consent. The authors have obtained informed consent from the patients and/or subjects cited in the article. The mentioned document is filed by the corresponding author.

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