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Results of arthroscopic treatment of femoroacetabular impingement (FAI)

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ABSTRACT

Introduction: Femoroacetabular impingement (FAI) has been suggested as an important etiology of pain in the groin region in young adults especially athletes and there are theories connecting it to early onset osteoarthritis.

Aim: To assess the results of arthroscopic treatment of FAI.

Patients: Forty patients had been managed arthroscopically for their FAI in both El-Hadra university hospital and William Harvey Hospital.

Methods: Results of arthroscopic treatment of FAI in 40 consecutive patients had been evaluated using patients reported outcomes (modified Harris Hip Score and international Hip Outcome Tool-12) and clinical measures of improvement of range of motion in both flexion and internal rotation in 90° of hip flexion.

Results: The average of the outcome scores showed statistically significant improvement following the arthroscopic intervention.

Conclusion: Femoroacetabular impingement is an important etiology of groin pain in young adults, nevertheless the athletes. Diagnosis of this condition is primarily a clinical one to be supported with relevant imaging. Hip arthroscopy is an effective approach to treat and correct the underlying bony abnormalities of FAI. Younger age of patients predicts better improvement in i-HOT-12 score.

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1. Introduction

Femoroacetabular impingement (FAI) has been suggested as an important etiology of groin pain in young adults especially in athletes,¹ and theories connecting it to early onset osteoarthritis have been put.² Two polar groups of FAI have been identified: cam and pincer. Practically, FAI is a wide spectrum of abnormal morphology, with most patients lying in between these 2 polar groups.³

Surgical intervention aims to address the damaged internal structures and to correct the underlying abnormal morphology. The possible arthroscopic procedures include selective labral debridement with excision of acetabular rim osteophyte (pincer type), labral repair using anchors, cam osteoplasty and debridement of cartilaginous lesions to a stable rim with or without microfracture.⁴

1.1. Aim

The assessment of results of arthroscopic treatment of FAI.

1.2. Patients

This study was carried out on 40 patients whose demographics are shown in Table 1. The duration of symptoms before surgery ranged from 9.0 to 48.0 months with a mean of 19.08 ± 8.20 months. Thirty-two (80.0%) patients had a labral tear detected by MRA, 11(27.5%) patients had acetabular cartilage damage detected by MRA.

2. Methods

Forty patients treated in both El-Hadra university hospital and William Harvey hospital. Informed consent was taken from every patient involved in the study. The assessment included detailed history taking, clinical examination and imaging investigations. Inclusion criteria included cam type FAI and pincer type with

Abbreviations: FAI, femoroacetabular impingement; MRA, magnetic resonance arthrography; RSA, radiostereometric analysis.

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Table 1
Distribution of the studied group regarding demographic data.

	Frequency	
	No.	%
Age		
19–40	20	50%
71–80	20	50%
Mean	38.63	
Median	40.5	
S.D.	11.12	
Min	19	
Max	56	
Range	37	
Sex		
Male	20	50%
Female	20	50%
Side		
Right	23	57.5%
Left	17	42.5%

localized anterior over-coverage. Patients with acetabular retroversion were excluded from the study.

Moderate traction was used to achieve adequate distraction of the hip joint. The anterolateral portal was established blindly, and it was followed by the mid-anterior portal under direct vision from the other portal. If labral tear was identified, either selective labral debridement to a stable rim with removal of the pincer lesion from underneath the labrum or labral repair with anchors was done. If there was any cartilage lesion, debridement of the degenerated and unstable cartilage was done. Next, the traction was released, and the hip was flexed. The head-neck junction was examined for reduced offset. If a cam lesion was identified, a burr was used to resect the lesion guided by fluoroscopy. The portals were closed, and a sterile dressing was applied.

The results are assessed by a self-administered international hip outcome tool-12 and modified Harris Hip scores preoperatively and at least 6 months postoperatively.⁴ As well as the range of movement of the hip in terms of flexion and internal rotation at 90° of hip flexion. The duration of follow up ranged between 6–24 months with the mean of 12.45 ± 4.7 months. Data was entered to the computer followed by tabulation and analysis. Analysis was done using SPSS-15 (Statistical package for Social Sciences version 15).

3. Results

In the studied patients 35 patients (87.5%) were found having labral tear at the time of arthroscopy. Fifteen patients (37.5%) were found having acetabular cartilage damage. Thirty-seven patients (92.5%) were found having cam lesion. Four patients (10.0%) were found having impingement cyst. In the studied patients, there was no statically significant difference between male and female patients regarding the arthroscopic findings as well as no association between the age of the patients and any of the arthroscopic findings was found.

In the studied patients, magnetic resonance arthrography showed sensitivity of 85.71%, specificity of 60.0%, positive predictive value of 93.75%, negative predictive value of 37.5%, and accuracy of 82.5% in detecting labral tears. Magnetic resonance arthrography showed sensitivity of 46.67%, specificity of 84.0%, positive predictive value of 63.64%, negative predictive value of 72.41%, and accuracy of 70.0% in detecting acetabular cartilage damage.

Out of 40 patients, 24 patients (60.0%) had labral repair, while 16 patients (40.0%) had labral debridement. In this study, the international hip outcome tool-12, modified Harris hip score, range of

hip flexion and range of internal rotation of the hip at 90° of flexion showed statistically significant improvement following hip arthroscopy. The score of (i-HOT-12) improved from 49.87 ± 16.46 preoperatively to 66.65 ± 23.63 postoperatively (P value < 0.001). Modified Harris hip score improved from 57.10 ± 13.26 preoperatively to 68.18 ± 18.87 postoperatively (P value < 0.001). Range of flexion of the hip improved from 92.88 ± 4.79^0 preoperatively to 105.63 ± 8.26^0 postoperatively (P value < 0.001). Range of hip internal rotation at 90° improved from 8.25 ± 7.30^0 to 14.75 ± 6.40^0 postoperatively (P value < 0.001).

In this study, there was statistically significant correlation between percent of improvement of (i-HOT-12) score and Harris hip score postoperatively. Also there was statistically significant correlation between percent of improvement of flexion and internal rotation postoperatively. The outcome scores didn't show statistically significant difference between labral repair and labral debridement Fig. 1.

There was no statistically significant correlation between the improvements in the outcome measures with the duration of the symptoms before having the surgical intervention. Six patients (15.0%) developed lateral cutaneous nerve of the thigh paresthesia, which improved in 5 of them over an average period of 6.9 months (range 4–13 months). Fourteen patients (35.0%) developed postoperative synovitis evident by lack of progression through their postoperative rehabilitation. These patients were managed with intra-articular steroid injections, which were given at an average duration 9.45 month (range 5–19 months). Three patients (7.50%) had their arthritis progressed during the follow up with development of radiographic evidence of hip osteoarthritis and failure of non-operative management. These patients were managed with total hip replacements at an average duration 18.4 month (range 8–25 months).

4. Discussion

In this study, the age of the patients ranged from 19–56 years with a mean of 38.63 ± 11.12 years and median of 40.5 years. There was statistically significant correlation between the improvements in (i-HOT-12) score with the younger age of the patient. There was no statistically significant correlation between the improvements in the other outcome measures with the age of the patient which can be explained by the fact that score is specially designed to young adult patients with non-arthritic hip problems. In this study, the duration of symptoms before surgery ranged from 9–48 months with a mean of 19.08 ± 8.20 months with a median 18.0 months. Length of duration of symptoms before having the arthroscopic intervention did not affect the outcome. Menge et al. in his study about the predictors of length of sport career following arthroscopic treatment of FAI found that athletes who continued their career longer than 5 years were having shorter duration of symptoms (20.2 vs 9.3 months; $P = .049$). These professional athletes should be treated early.⁵

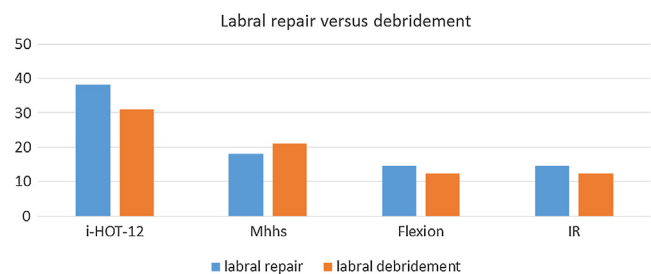


Fig. 1. Labral repair versus labral debridement.

In the studied patients, sensitivity of MRA was 85.71%, its specificity was 60.0%, its positive predictive value was 93.75%, its negative predictive value was 37.5%, and its accuracy was 82.5% in detecting labral tears. The sensitivity of MRA was 46.67%, its specificity was 84.0%, its positive predictive value was 63.64%, its negative predictive value was 72.41%, and its accuracy was 70.0% in detecting cartilage injury. Saied et al.⁶ in their meta-analysis of magnetic resonance studies in detecting intra-articular pathology in cases of FAI reported that arthrography improves the accuracy of detection of both labral tears and chondral damage. The accuracy was superior for detection of labral tears than for chondral lesions.

There was no statically significant difference between male and female patients regarding the arthroscopic findings as well as no association between the age of the patients and any of the arthroscopic findings was found. Bhatia et al.⁷ in their study about the risk factors of FAI related cartilage lesions reported that full thickness chondral defects were present in 308 of 1097 hips (28%). In this study, the international hip outcome tool-12, modified Harris hip score, range of hip flexion and range of internal rotation of the hip at 90° of flexion showed statistically significant improvement following hip arthroscopy. Nwachukwu et al.⁸ in their study on the outcome of arthroscopically treated FAI reported that adolescents readily achieve MCID (minimal clinically important difference) on hip-specific patient-reported outcome tools.

In the studied patients, there was no statistically significant difference in any of the outcome measures between labral repair and labral debridement. Cetinkaya et al.⁹ in his comparative study between the outcomes of labral repair versus labral debridement as part of arthroscopic management of FAI with minimum of 2.5 years follow up they didn't find any difference in hip functional outcomes between labral debridement and labral repair in arthroscopic treatment of femoroacetabular impingement.

There was no statistically significant correlation between the improvements in any outcome measures with cam osteoplasty. Hansen et al.¹⁰ in their study about the dynamic RSA for evaluation of hip joint found that there is little increase in the different aspects of the range of motion after cheilectomy alone.

In current study it was found that there is no statistically significant difference in the outcomes within the follow up period of the study between patients who needed debridement of intra-articular cartilage lesions at the time of the arthroscopy and those who didn't have cartilage lesions at the time of the arthroscopy. Menge et al.¹¹ in their study about the return to play in professional footballers following arthroscopic treatment of FAI reported that there is no significant difference in return to play rate between athletes who underwent microfracture and those who did not (25% vs 38%, $P = .698$). In current study it was found that 3 patients (7.50%) had their arthritis progressed during the follow up with development of radiographic evidence of hip osteoarthritis and failure of

non-operative management. Nwachukwu et al.⁸ in his systematic review reported that With THA as an outcome endpoint, there was an overall survival rate of 93% for open and 90.5% for arthroscopic procedures ($P = .06$). The risk factors included increased age and previous cartilage damage.

5. Conclusion

Femoroacetabular impingement is an important cause of pain and disability in young adult population, nevertheless the athletes. Diagnosis of this condition is primarily a clinical one to be supported with relevant imaging. Hip arthroscopy is an effective approach to treat and correct the underlying bony abnormalities of FAI. Younger age of patients predicts better improvement in i-HOT-12 score.

Conflict of interest

The authors declared that there is no conflict of interest.

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