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Research article

Hip arthroscopy results in improved patient reported outcomes compared to non-operative management of waitlisted patients

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ABSTRACT

Hip arthroscopy (HA) is an established treatment option to address intra-articular pathology of the hip. However, some clinicians encourage non-operative management (NOM). Non-operative management may include active measures such as physiotherapy and intra-articular steroid injections, or NOM may involve so called watchful waiting with no active intervention. These approaches, along with surgery have been detailed recently in the Warwick Agreement, a Consensus Statement regarding diagnosis and treatment of Femoroacetabular Impingement Syndrome The aim of this study is to compare the change in clinical outcome scores of waitlisted patients with intra-articular hip pathology who receive no active treatment with matched controls that have undergone HA. Patients less than 60 years of age were identified from a HA waiting list in a single hospital in the Australian public hospital system. Patient reported outcomes (PRO) were collected whilst patients waited for surgery. During this waiting period no specific treatment was offered. A separate group of patients who had previously undergone HA were matched based on age, sex, body mass index and baseline non-arthritic hip scores (NAHS). The groups were compared using the NAHS as the primary outcome measures. Modified Harris Hip Scores were also collected and compared. Thirty-six patients were included in each group, with a mean follow up of 19 months (12–36). There were no significant differences in age, sex, BMI and NAHS between groups at baseline. At final follow up, mean NAHS scores after HA were significantly higher than scores after NOM, 82.1 (36.4–100.0) versus 48.9 (11.3–78.8), respectively ($P < 0.001$) with a large effect size for mean change in scores between groups ($d = 1.77$, 95% CI 1.21–2.30). Mean mHHS after HA were significantly higher than scores after NOM, 84.3 (15.4–100.0) versus 48.1 (21.0–66.0) respectively ($P < 0.001$), with a large effect size for mean change in scores between groups ($d = 1.92$, 95% CI 1.34–2.46). HA may lead to significant improvements in PRO when compared to non-operative management of waitlisted patients with intra-articular pathology of the hip at 18 months follow-up.

INTRODUCTION

The optimal management of hip pain in the young adult population, particularly pain due to damage secondary to femoroacetabular impingement (FAI), prior to the onset of osteoarthritis, is a current topic of debate [2]. Those opposed to surgical intervention cite the lack of high level evidence supporting FAI surgery, and the lack of a group of non-operatively treated control patients in the case series reported [2]. Having two groups of patients allows an effect size to be calculated, and better measure the

difference between the two groups, rather than rely on measures of statistical significance alone. Proponents of surgical intervention cite the benefits of pain relief and improved function which have been reported in numerous case series [3–5]. The possible delay in, or avoidance of, the development of osteoarthritis is a potential added benefit of surgery [6–8]. Hip arthroscopy has emerged as the surgical intervention that allows for adequate correction of the abnormal morphology in a cost-effective, minimally invasive manner, with fewer complications when compared to open approaches [9–11]. Reports of the utilization of hip arthroscopy to treat a variety of pre-arthritic conditions have supported its continued use thus far [12, 13]. Proponents of non-operative management (NOM) for pre-arthritic disease note the lack of long term evidence that surgical intervention alters the natural course of disease progression [14]. Additionally, the presence of asymptomatic cam lesions and labral tears leads some to further question the need for surgery in these settings [15–21]. The goal of NOM for pre-arthritic hip disorders is to reduce hip pain and avoid further damage by modifying activities of daily living [22]. A typical treatment protocol consists of patient education, avoidance of provocative maneuvers in the acute phase, the use of anti-inflammatory medications, activity modification and physiotherapy [22, 23]. However, NOM may also include no active treatment at all, but rather 'watchful waiting' These various approaches, along with surgery have been detailed recently in the Warwick Agreement, a Consensus Statement regarding diagnosis and treatment of Femoroacetabular Impingement Syndrome [1].

Much of the evidence in the literature supporting either approach has lacked a suitable control group. Therefore, the aim of this study is to compare the clinical outcomes of waitlisted patients with pre-arthritic hip pathology, and who received no structured treatment, with matched controls that undergo HA.

METHODS

This study, a retrospective matched pair analysis, compared two cohorts of 36 patients each. The first cohort (Group 1) contained all patients who had been placed on a single Public Hospital waiting list for HA surgery between June 2013 and June 2015 who fulfilled the study inclusion criteria. This allowed a minimum follow-up time of 12 months. Inclusion criteria were age less than 60 years old, and a diagnosis of intra-articular hip pathology amenable to arthroscopic surgical treatment, as determined by a single Fellowship trained, and experienced HA surgeon (PJS). Whilst on the waiting list, patients were counseled regarding activity modification, but received no active, or structured treatment.

Table I. Demographic and clinical data

Variable	*Non-operative*	*Operative*	P *values*
N	36	36	
Age	40.0 (18–58)	40.0 (18–58)	0.86
Sex			
M	15 (42%)	15 (42%)	1.00
F	21 (58%)	21 (58%)	1.00
BMI	27.9 (20.0–40.4)	27.1 (20.3–37.0)	0.52
Baseline NAHS	51.8 (17.5–85.0)	50.1 (10–76.3)	0.69
Baseline HHS	48.5 (18.0–79.0)	57.8 (25.3–82.5)	0.008*
Follow up	20 (12–30)	18 (12–36)	0.23

Values reported as mean or mean (range) and count (percentage).

The second cohort of patients (Group2) contained a closely matched group of patients treated by HA during the same time period. Matching was performed for age (within 5 years), gender, BMI (within 5 kg/sq. m, and preoperative Non Arthritic Hip Score (NAHS, within 10 points), and follow-up time (Table I), to produce a comparison group with very similar demographics, and also similar disability at the time of presentation, as measured by NAHS.

All patients in both groups had undertaken at least 3 months conservative treatment, including community physiotherapy, before being considered for surgery, and had failed to improve with that treatment.

HA procedures were performed by a single surgeon (JOD), in the lateral position utilizing lateral and modified mid-anterior portals. An inter-portal capsulotomy was performed, unless micro-instability was the primary diagnosis. After a diagnostic arthroscopy was completed, intra-articular pathology was documented and treated as indicated. Labral tears were repaired utilizing the labral base technique unless tissue quality dictated a looped suture construct be used [24]. More minor, superficial tears, with no associated labral instability were treated by debridement. Femoral osteochondroplasty was performed through a modified inter-portal capsulotomy with the aid of capsular retraction sutures. Capsular repair was not routinely performed. Ligamentum teres tears were debrided with a radiofrequency (RF) probe (EFLEX, Smith and Nephew). In cases of suspected microinstability capsular plication was completed with RF or absorbable suture. When

indicated, microfracture of acetabular chondral defects was completed for full thickness lesions measuring up to 4 cm^2.

The primary outcome measure was the NAHS, and the modified Harris Hip Score (mHHS) was also collected. Scores were recorded either prior to surgery, or when the patients name was placed on the waiting list, and then again at 6 months, and 12 months later and annually thereafter. Clinical improvement within each group was assessed using paired t-tests. Final outcomes between groups were assessed with student's *t* test or the Mann–Whitney test when applicable. The standardized mean difference (SMD) was calculated to estimate effect size (d) for the mean change in PRO scores between groups. The SMD was calculated by dividing the difference between the mean change in PRO scores for the non-operative and operative groups, by the pooled standard deviation of the baseline mean mHHS and NAHS, respectively. A large effect size was interpreted as a SMD > 0.8, moderate effect size between 0.5 and 0.79, and a weak effect size between 0.2 and 0.49.

The study was approved by the Office of Research and Ethics, Eastern Health, Reference Number QA11-2016.

RESULTS

During the study period, 41 patients were placed on the HA waiting list and had a minimum of 12 months of follow up. There were five patients excluded for age greater than 60 years. This left 36 patients in the non-operative group and 36 matched patients who had HA, for a total of 72 patients. The mean age was 40 years, and the mean follow up across groups was 19 months. There were no significant differences in age, sex, BMI and NAHS between groups at baseline (Table I). Data on diagnosis and treatment are reported in Table II.

Mean NAHS showed little change (from 51.7 to 51.6) in the non-operative group and improved from 50.1 to 82.1 in the HA group ($P < 0.001$). Mean mHHS scores similarly showed little change from 48.5 to 48.1 in the non-operative group ($P = 0.91$), and improved from 57.8 to 84.3 in the HA group ($P < 0.001$). At final follow up, mean NAHS scores after HA were significantly higher than scores for waitlist patients, 82.1 versus 48.9, respectively ($P < 0.001$) with a large effect size for mean change in scores between groups ($d = 1.77$, 95% CI 1.21–2.30). Mean mHHS after HA were significantly higher than scores after NOM, 84.3 versus 48.1, respectively ($P < 0.001$) with a large effect size for mean change in scores between groups ($d = 1.92$, 95% CI 1.34–2.46) (Table III).

Table II. Diagnosis of hip pathology effecting non-operative and operative groups

Intra-articular pathology	*Non-operative*+	*Operative**
Labral tear	27	16
Labral repair	n/a	5
Cam deformity	19	15
Femoral Osteochondroplasty	n/a	15
Chondral lesion	7	15
Microfracture	n/a	3
Ligamentum teres tear	6	19
Ligamentum teres debridement	n/a	19
Capsular plication	n/a	11

+Non-operative diagnoses based on MRI.
*Operative diagnoses based on assessment at the time of arthroscopy.

Table III. Results: patient reported outcomes

Paired T-test

	Baseline	*Final follow up*	P *values*
Non-operative			
NAHS	51.7 (17.5–85.0)	51.6 (11.3–78.8)	0.48
HHS	48.5 (18–79)	48.1 (21–66)	0.91
Operative			
NAHS	50.1 (10–76.3)	82.1 (26.3–100.0)	<0.001*
HHS	57.8 (25.3–82.5)	84.3 (15.4–100.0)	<0.001*

Independent T-test

	Non-operative	Operative	*P* values
NAHS	48.9 (11.3–78.8)	82.1 (26.3–100.0)	<0.001*
HHS	48.1 (21.0–66.0)	84.3 (15.4–100.0)	<0.001*

DISCUSSION

The key finding of this study is the marked improvement in PRO in the HA treatment group when compared to patients having no treatment while waiting for surgery. The findings add to the current body of evidence for surgical intervention in the setting of FAI syndrome, which up until this point, has consisted largely of case series without a suitable control group [25]. Similarly, there is a paucity of high-level evidence supporting non-operative treatment for FAI syndrome [26].

Although the findings support surgical treatment over no treatment, the results should be carefully interpreted. The non-operative arm consisted of a group of patients on a surgical waiting list, with no structured non-operative treatment protocol. In this setting, the PRO either failed to significantly improve or worsened. Some evidence exists that supervised physiotherapy may lead to improved outcomes when compared to no treatment. Smeatham et al. prospectively examined the role of supervised physiotherapy versus no supervised treatment for FAI in a pilot study including 30 patients. Twenty-three patients completed the study, and after 3 months, a modest improvement in clinical scores was noted in the treatment group [27]. Similar findings were reported by Wright et al. [28]. Both studies found that sufficient evidence existed to support further study of the role of physiotherapy in the treatment of FAI with full-scale randomized controlled trials. While understanding the shortcomings in the current body of evidence for the treatment of FAI syndrome, most clinicians would likely agree that a trial of non-operative measures for at least 3 months should be undertaken before surgery is considered.

There are several studies supporting surgical treatment for FAI syndrome and the concomitant pathology including labral tears and chondral injuries. In a recent review, hip arthroscopy for FAI and labral tears resulted in a mean post-operative mHHS of 80.5 and 86.9 respectively [12]. The final mHHS of 84.3 reported after surgery in this study is comparable to the improvements in PRO from other surgical series at similar follow up. The large effect sizes for the mean change in PRO scores between groups reported in this study are comparable to the effect size noted for hip outcomes scores after surgical treatment in other studies across a wide variety of patient populations and hip pathology [29, 30].

The strength of this study is the inclusion of a well matched control group comparing non-operatively managed patients with who had arthroscopic surgery for pre-arthritic intra-articular hip pathology. Previously, data was largely limited to case series or case reports supporting either conservative or surgical treatment.

There are important limitations of this study. As with any retrospective study design, systematic errors including selection bias must be considered. To minimize the risk of selection bias during the matching process, final scores of the operative group were not considered to ensure an unbiased comparative group was selected. The groups were well matched at baseline with the exception of the mHHS. MHHS has been shown to be a less reliable measure in this patient population than NAHS [31], and so NAHS was the preferred measure of these two PROs which were available in all the Public Hospital patients. The study size was also necessarily limited by the number of available patients on the Public Hospital waiting list, potentially increasing the risk of random error due to the small sample sizes in each group. All surgery was performed by one very experienced surgeon. It is possible that these results would not be generalizable to all surgeons.

The relatively short time to follow up is another important limitation. However, the study was necessarily limited by the time that the Public Hospital patients spent on the waiting list before coming to surgery. It would not have been ethically acceptable to make them wait longer than was required by their place in the waiting list.

As a significant proportion of the population has been reported to have asymptomatic cam lesions and labral tears, some question the utility of, and need for, surgery in the management of FAI [15, 18]. This debate has created a drive for a higher level of evidence to support the treatment of FAI. There are currently several randomized controlled trials (RCT) underway which will examine the effectiveness of non-operative management and surgery in the treatment of FAI [32–35]. Results from these studies will provide further evidence to guide clinicians who manage young adults with hip pain. However these RCTs are not due to report for at least 18 months, and in the meantime, this study provides further, improved evidence of the utility of HA treatment as against no treatment. Follow up studies of these same patients will examine the result of operative treatment in the waitlisted group to determine whether delayed treatment impacts the final outcome.

CONCLUSION

HA may lead to significant improvements in PRO when compared to recommended activity modification for waitlisted patients with intra-articular pathology of the hip at 18 months follow up.

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CONFLICT OF INTEREST STATEMENT

None declared.

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