Five-Year Outcomes in Patients with Global Acetabular Retroversion following Hip Arthroscopy for Femoroacetabular Impingement Syndrome: A Matched Cohort Study

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INTRODUCTION:

Traditionally, global acetabular retroversion was treated with a reverse periacetabular osteotomy. More recently, hip arthroscopy has demonstrated low complication rates and excellent outcomes for patients with global retroversion in multiple retrospective studies limited to short or medium-term follow up. The purpose of our study was to determine if patients with radiographic signs of global acetabular retroversion performed worse than a matched cohort of patients with femoroacetabular impingement syndrome (FAIS) treated with hip arthroscopy and labral repair/osteoplasty.

METHODS:

A retrospective matched-cohort analysis of a prospectively-collected database was performed. We included patients who underwent primary hip arthroscopy for treatment of FAIS with or without labral tearing, had preoperative radiograph imaging of the hip including anteroposterior (AP), 45°, and 90° Dunn views, and had completed PROMs in the form of the modified Harris Hip Score (mHHS) and Non-Arthritic Hip Score (NAHS) both preoperatively and at 5-year follow up. Global retroversion was as the presence of three radiographic signs: the ischial spine sign (ischial spine projecting medial to the pelvic brim), posterior wall sign (posterior wall line medial to femoral head center), and crossover sign (anterior acetabular wall “crosses over” posterior acetabular wall). Subjects with global retroversion were matched 1:1 to controls without features of retroversion on age, sex, and body mass index. Multivariable linear and logistic regression was used to evaluate the relationship between acetabular retroversion signs and postoperative outcomes, as well as the achievement of the Minimal Clinically Important Difference (MCID), Patient Acceptable Symptom State (PASS), and Substantial Clinical Benefit (SCB). A subgroup analysis was performed to assess the combined effect of global retroversion and sex on outcomes.

RESULTS:

Of 124 eligible patients, 38 patients with global retroversion were matched to 38 controls (mean age: 40.8 ± 11.6; 60.5% female). Patients overall reported significant 5-year improvement in mHHS (mean 50.4 to 82.7, p<.001) and NAHS (49.4 to 85.5, p<.001), and there were no significant differences between groups with respect to change in mHHS (p=0.86) or NAHS (p=0.90). There were no significant differences between groups with respect to achievement rates of the MCID (p=0.69), SCB (p=0.76), or PASS (p=1.00). PASS achievement rates were higher among males compared to females in both control (93.3% vs. 73.9%) and global retroversion groups (93.3% vs. 73.9), p=0.04. One patient in each group had converted to total hip arthroplasty by 5-year follow up.

DISCUSSION AND CONCLUSION:

Patients with global acetabular retroversion had similar outcomes to matched controls at 5-year minimum follow up. These results demonstrate that hip arthroscopy appears to be a valid treatment option for patients with FAIS and global retroversion at mid-term follow up.

Figure 1. Preoperative anteroposterior pelvic radiograph demonstrating ischial spine (*arrow*), posterior wall (*circle*), and crossover signs (*red and blue dotted-lines*) in a 29-year-old female with femoroacetabular impingement syndrome.

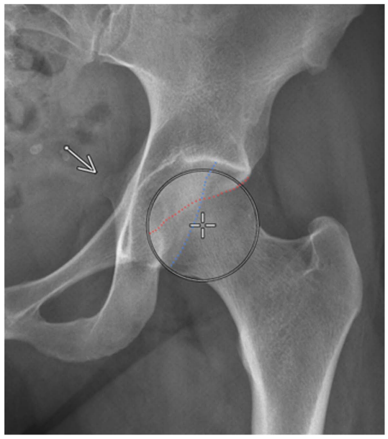

Table 1. Demographics, preoperative radiograph measurements, and intraoperative findings.

Variable	Global retroversion (n = 38)	Controls (n = 38)	P-value
Demographics			
Age (years)	40.6 ± 10.8	41.3 ± 13.6	0.80
Sex	M: 15 (39.5%) F: 23 (60.5%)	M: 15 (39.5%) F: 23 (60.5%)	1.00
BMI (kg/m²)	24.6 ± 4.3	24.9 ± 4.2	0.14
Laterality	L: 22 (57.9%) R: 16 (42.1%)	L: 21 (55.3%) R: 17 (44.7%)	0.82
Preoperative symptom length	≥1 year: 19 (50.0%) <1 year: 16 (42.1%)	≥1 year: 19 (50.0%) <1 year: 18 (47.4%)	0.70
Radiograph Measurements			
Ischial spine sign	38 (100%)	13 (34.2%)	<0.001*
Posterior wall sign	38 (100%)	10 (26.3%)	<0.001*
Crossover sign	38 (100%)	13 (34.2%)	<0.001*
Alpha angle on AP view (°)	61.9 ± 21.7	63.6 ± 18.0	0.72
Alpha angle on 45° Dunn (°)	58.2 ± 12.8	56.4 ± 10.7	0.48
Alpha angle on 90° Dunn (°)	53.0 ± 13.1	50.8 ± 10.6	0.37
LCEA (°)	37.6 ± 5.8	38.9 ± 7.7	0.46
Tönnis grade	Grade 0: 20 (52.6%) Grade 1: 18 (47.4%)	Grade 0: 22 (57.9%) Grade 1: 16 (42.1%)	0.65
Intraoperative Findings			
Acetabular Outerbridge grade	Grade I-II: 34 (89.5%) Grade III-IV: 4 (10.5%)	Grade I-II: 33 (86.8%) Grade III-IV: 5 (13.2%)	0.72
Labral tear	38 (100%)	38 (100%)	1.00
Chondral delamination	38 (100%)	38 (100%)	1.00
Subspine impingement	8 (21.1%)	8 (21.1%)	1.00
Cam lesion	35 (92.1%)	21 (81.6%)	0.18
Pincer lesion	37 (97.4%)	38 (100.0%)	0.32
Mixed FAIS	34 (89.5%)	31 (81.6%)	0.33

Abbreviations: BMI - body mass index, AP - anterior-posterior, LCEA - lateral center edge angle, FAIS - femoroacetabular impingement syndrome

Table 2. Survivorship and patient-reported outcomes at 5-year follow-up.

Variable	Global retroversion (n = 38)	Controls (n = 38)	P-value
Hip Survivorship			
Arthroscopic reoperation	1 (2.6%)	1 (2.6%)	1.00
Conversion to THA	1 (2.6%)	1 (2.6%)	1.00
Any secondary surgery	2 (5.3%)	2 (5.3%)	1.00
Patient-Reported Outcomes			
mHHS at baseline	51.6 ± 12.9	52.0 ± 16.4	0.92
mHHS at 5-year follow-up	84.7 ± 15.3	85.3 ± 13.1	0.86
Change in mHHS	32.6 ± 17.9	33.3 ± 16.3	0.86
NAHS at baseline	52.2 ± 15.6	49.0 ± 14.3	0.44
NAHS at 5-year follow-up	88.9 ± 16.3	88.9 ± 15.2	0.90
Change in NAHS	36.7 ± 19.4	39.6 ± 16.6	0.90
Achieved MCID on mHHS	34 (89.5%)	25 (92.1%)	0.69
Achieved SCB on mHHS	31 (81.6%)	32 (84.2%)	0.76
Achieved PASS on mHHS	31 (81.6%)	31 (81.6%)	1.00

Abbreviations: THA – total hip arthroplasty, mHHS – modified Harris Hip Score, NAHS – Non-Arthritic Hip Score, MCID – minimum clinically-important difference, SCB – substantial clinical benefit, PASS – patient acceptable symptom state