Outcomes of Hip Arthroscopy for Patients with Symptomatic Borderline Dysplasia: A Comparison to a Matched Cohort of Patients with FAI

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Disclosures

• The following relationships exist:
  – Anil S. Ranawat has financial relationships with Stryker, Mako Surgical, Conformis, NOVA Surgical, Cynthes, ConMed Linvatec and DePuy Mitek.
  – Asheesh Bedi is a Consultant for Smith and Nephew and is an A3 Surgical stockholder
  – Bryan T. Kelly is a Consultant for A3 Surgical and Smith and Nephew

• None of these financial relationships relate to this presentation
Introduction

- The outcomes of hip arthroscopy in the treatment of dysplasia are variable.

- Arthroscopic resection of the labrum, capsule, and rim in severe dysplasia (lateral center-edge angle [LCEA] < 18°) results in poor outcomes and iatrogenic instability\(^1,2\).

- However, in milder forms of dysplasia with associated hip instability, favorable outcomes have been demonstrated at short-term follow-up, with an arthroscopic approach that included labral repair and capsular plication\(^3\).

- The outcomes of hip arthroscopy specifically for a cohort of patients with femoroacetabular impingement (FAI) in the setting of borderline dysplasia have not been reported.
Purpose

To compare the outcomes of hip arthroscopy in borderline dysplastic patients to a control group of non-dysplastic patients undergoing hip arthroscopy for femorocetabular impingement (FAI)
Materials and Methods

• Between March 2009 and May 2012, 1381 patients (1593 hips) undergoing hip arthroscopy by the senior author for symptomatic FAI were enrolled into a hip preservation registry. From this cohort we identified our 2 study groups with a minimum follow-up period of 2 years.

<table>
<thead>
<tr>
<th></th>
<th>Borderline Dysplastics</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients (hips)</td>
<td>44 (46)</td>
<td>100 (123)</td>
</tr>
<tr>
<td>Age (years)</td>
<td>29.3 ± 9.2</td>
<td>29.1 ± 10.1</td>
</tr>
<tr>
<td>M:F</td>
<td>20:24</td>
<td>47:53</td>
</tr>
<tr>
<td>LCEA range</td>
<td>≥ 18° and ≤ 25°</td>
<td>≥ 26° and ≤ 40°</td>
</tr>
</tbody>
</table>
Materials and Methods

• Morphologic characteristics and intra-operative interventions were obtained from the registry.

• Patient reported outcomes obtained pre-operatively and at 6 months, 1, 2, and 3 years post-operatively:
  – Modified Harris Hip Score (mHHS)
  – Hip Outcome Score-Activity of Daily Living (HOS-ADL)
  – Hip Outcome Score-Sport-Specific Subscale (HOS-SSS)
  – International Hip Outcome Tool (iHOT-33)

• Continuous and categorical variables compared with independent sample t-tests and chi-square or Fisher’s exact tests as appropriate.

• Changes in outcome scores within groups were assessed via paired t-tests.
## Results: Morphological Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Borderline Dysplastics</th>
<th>Controls</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCEA – Mean (range)</td>
<td>21.8° (18 to 25°)</td>
<td>31.7° (26 to 40°)</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Pre-operative Alpha Angle</td>
<td>63.7 ± 10.3°</td>
<td>58.6 ± 13.9°</td>
<td>0.017*</td>
</tr>
<tr>
<td>Pre-operative Alpha Angle by Sex</td>
<td>Females: 59.2 ± 9.0° Males: 69.1 ± 9.3°</td>
<td>Females: 51.5 ± 13.0° Males: 66.6 ± 9.9°</td>
<td>0.001*</td>
</tr>
<tr>
<td>Femoral Version</td>
<td>16.0 ± 9.0°</td>
<td>14.3 ± 10.0°</td>
<td>0.35</td>
</tr>
<tr>
<td>Acetabular Version</td>
<td>1 o’clock: 4.2 ± 8.5°</td>
<td>1 o’clock: 0.6 ± 8.9°</td>
<td>0.03*</td>
</tr>
<tr>
<td></td>
<td>2 o’clock: 11.7 ± 9.7°</td>
<td>2 o’clock: 9.2 ± 10.0°</td>
<td>0.17</td>
</tr>
<tr>
<td></td>
<td>3 o’clock: 16.6 ± 7.8°</td>
<td>3 o’clock: 15.1 ± 6.9°</td>
<td>0.23</td>
</tr>
<tr>
<td>Tonnis Angle – Mean (range)</td>
<td>6.2° (1 to 12°)</td>
<td>2.6° (-10 to 12°)</td>
<td>&lt;0.001*</td>
</tr>
</tbody>
</table>
## Results: Intra-operative Interventions

<table>
<thead>
<tr>
<th>Procedures</th>
<th>Borderline Dysplastic Patients</th>
<th>Control Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cam Decompression Only</td>
<td>8 (18.2%)</td>
<td>14 (14.0%)</td>
</tr>
<tr>
<td>Rim Decompression Only</td>
<td>1 (2.3%)</td>
<td>2 (2.0%)</td>
</tr>
<tr>
<td>Cam + Rim Decompression</td>
<td>10 (22.7%)</td>
<td>12 (13.0%)</td>
</tr>
<tr>
<td>Cam + AIIS Decompression</td>
<td>18 (40.9%)</td>
<td>46 (46.0%)</td>
</tr>
<tr>
<td>Cam + Rim + AIIS Decompression</td>
<td>6 (13.6%)</td>
<td>25 (25.0%)</td>
</tr>
<tr>
<td>Capsular Closure</td>
<td>40 (90.9%)</td>
<td>90 (90.0%)</td>
</tr>
<tr>
<td>Capsular Plication</td>
<td>1 (2.3%)</td>
<td>1 (1.00%)</td>
</tr>
<tr>
<td>Labral Debridement</td>
<td>13 (29.5%)</td>
<td>17 (17.0%)</td>
</tr>
<tr>
<td>Labral Refixation</td>
<td>31 (70.5%)</td>
<td>82 (82.0%)</td>
</tr>
</tbody>
</table>
Results: Clinical Outcomes

• At a mean follow-up of 33.2 months (range, 24-58), statistically significant improvements \((p<0.001)\) in all outcomes scores were observed in both groups.

• The borderline dysplastic group had smaller mean improvements for all scores but this was only large for the HOS-SSS.

• After adjustment for age, sex, alpha angle and pre-op score via multiple regression there was no significant difference in clinical improvement between the two groups.

• Importantly, female sex did not appear to be a predictor of inferior outcome.
Results: Clinical Outcomes

Modified Harris Hip Score

- Pre Post: 62.4 ± 18.7
- Pre Post: 64.1 ± 20.9
- Change: 37.7 ± 13.8

International Hip Outcome Tool

- Pre Post: 37.7 ± 20.9
- Pre Post: 40.4 ± 16.4
- Change: 33.4 ± 18.6

Hip Outcome Score: Activities of Daily Living Subscale

- Pre Post: 72.9 ± 13.8
- Pre Post: 74.4 ± 16.4
- Change: 57.0 ± 18.6

Hip Outcome Score: Sports Subscale

- Pre Post: 87.4 ± 8.4
- Pre Post: 90.8 ± 16.4
- Change: 76.6 ± 27.4
Case Example: 18yo Female

- Pre-op mHHS = 64.1
- Pre-op HOS-ADL = 69.4
- Pre-op HOS-SSS = 55.7
- LCEA = 23.7
- Alpha Angle = 58.5

- Treated with hip arthroscopy, AIIS decompression, labral refixation, cam decompression and complete capsular closure.

- All scores significantly improved at 3 years follow-up with joint preservation.
Discussion & Conclusion

• Our results indicate that when treating a patient arthroscopically for FAI with borderline dysplasia, favorable outcomes can be expected when a careful approach of labral refixation and complete capsular closure is employed.

• These outcomes are similar to non-dysplastic patients undergoing hip arthroscopy for FAI at a mean of 33 months follow-up.

• The outcomes between males and females appear to be similar.

• Despite these favorable results we recommend caution in treating symptomatic dysplasia with hip arthroscopy - Our results indicate favorable results in very mild dysplasia with symptomatic FAI, and NOT instability as the chief presenting complaint.

• Further follow-up in larger cohorts is necessary to prove the durability and safety of hip arthroscopy in this challenging group.
References

