Conflicts of Interest statement

J. Deranlot: Non-financial support
  - DePuy Synthes

B. Marion: Non-financial support
  - SANOFI

S. Klouche: none

G. Nourissat: none

Ph. Hardy: Personal Fees as consultant
  - Arthrex
  - Zimmer
Latarjet Procedure : Comparative Short Term Study of Arthroscopic vs Mini-Open Approach

J. Deranlot, P. Marion, S. Klouche, G. Nourissat, Ph. Hardy
Background

Recurrent anterior instability = surgical challenge


Mini-open approach

New arthroscopic set

Benefits versus mini-open approach?

Comparative studies are needed
Objectives - Hypothesis

Main objective: to assess post-operative pain

Secondary objective

- Time of surgery
- Peri-operative complications
- Analgesic consumption
- Positioning of coracoid bone block at the anterior aspect of the glenoid

Hypothesis: arthroscopic Latarjet procedure is less painful than mini-open procedure
Study design

- Prospective comparative non-randomized study
- 2 centers (one by procedure)
  - Mini-invasive procedure: Ancillaire Arthrex®, Naples, FL
  - Arthroscopic procedure: Depuy-Mitek®, Raynham, MA
- From January 2012 to December 2012
- Institutional Review Board (CPP IDF VI – Hôpital La Pitié-Salpêtrière)
Selection criteria

Consecutive patients

Inclusion criteria:

- Chronic anterior shoulder instability
- ISIS (Instability Severity Index) score > 3
  (Balg F., Boileau P.; The instability severity index score. A simple pre-operative score to select patients for arthroscopic or open shoulder stabilization. JBJS 2007 Nov;89(11):1470-7.)
- Written consent

Exclusion criteria

- ISIS score < 3
Preoperative and postoperative protocols

Standardized

Preoperative workup
- Clinical examination
- AP radiographs in 3 rotations
- Arthro-CT

Analgesic postoperative protocol (paracetamol, non-steroidal anti-inflammatory, tramadol)

Follow-up assessment at 1, 3, 6 and 12 months
- AP and lateral radiographs at 1, 3, 6 and 12 months,
- CT at 3 months.
Evaluation criteria

Primary criterion: mean post-operative pain during the first week using Visual Analogic Scale (VAS 0 to 10)

Secondary criteria

- Graft placement
  - On lateral X-ray
  - On CT-Scan
- Postoperative complications
- Analgesic consumption and side effects of drugs
Secondary criterion: Radiographs Assessment

According to Young et al. *(Coracoid graft dimensions after harvesting for the open Latarjet procedure*, AA. Young, M. Baba, L. Neyton, A. Godeneche, G. Walch; *JSES 2012)*
Secondary criterion: CT-scan Assessment

According to Kraus et al. (Coracoid graft positioning in the Latarjet procedure Validation of a standardized CT-scan analysis; TM. Kraus, N. Graveleau, Y. Bohu, E. Pansard, S. Klouche, P. Hardy; KSSTA. 2013)
Statistical Analysis

- **STATA.10 software**

- **Sample size calculation**
  - alpha = 0.0500 (two-sided); power = 0.8000
  - m1 = 3 ± 1; m2 = 2 ± 1; n2/n1 = 1.00
  - Estimated required sample sizes: n1 = 16, n2 = 16

- **Nonparametric tests**
  - Mann-Whitney
  - Fischer exact
  - p<0.05
CONSORT Flow-chart

Assessed for eligibility (n=58)

Excluded (n=0)

Center 1 (n=22)

Mini-open surgery (n=22)
  • Received allocated technique (n=22)
  • Did not receive allocated technique (n=0)

Lost to follow-up (n=0)
Discontinued (n=0)

Analyzed (n=22)
  • No patient excluded from analysis

Center 2 (n=36)

Arthroscopical technique (n=36)
  • Received allocated technique (n=36)
  • Did not receive allocated technique (n=0)

Lost to follow-up (n=0)
Discontinued (n=0)

Analyzed (n=36)
  • No patient excluded from analysis
Patients

<table>
<thead>
<tr>
<th></th>
<th>Complete group (n=58)</th>
<th>Mini-Open (n=22)</th>
<th>Arthroscopic (n=36)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at Surgery</td>
<td>26.9 ± 7.7</td>
<td>27.3 ± 7.5</td>
<td>26.7 ± 7.8</td>
<td>0.70</td>
</tr>
<tr>
<td>Gender</td>
<td>13 F / 45 M</td>
<td>6 F / 16 M</td>
<td>7 F / 29 M</td>
<td>0.53</td>
</tr>
<tr>
<td>BMI</td>
<td>23.8 ± 3.2</td>
<td>23 ± 3</td>
<td>23.3 ± 2.7</td>
<td>0.08</td>
</tr>
<tr>
<td>ISIS</td>
<td>4.4 ± 1.4</td>
<td>4.6 ± 1.8</td>
<td>4.3 ± 1.2</td>
<td>0.82</td>
</tr>
<tr>
<td>Sports</td>
<td>84.5%</td>
<td>92.7%</td>
<td>77.8%</td>
<td>0.13</td>
</tr>
<tr>
<td>Recreational</td>
<td>67.2%</td>
<td>81.8%</td>
<td>58.3%</td>
<td>0.21</td>
</tr>
<tr>
<td>Competition</td>
<td>32.8%</td>
<td>13.7%</td>
<td>16.7%</td>
<td></td>
</tr>
</tbody>
</table>

2 Groups were comparable at inclusion
Operative Time

<table>
<thead>
<tr>
<th></th>
<th>Mini-open group</th>
<th>Arthroscopic group</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Operative Time</td>
<td>61.6±13.2 mn</td>
<td>76.8±14 mn</td>
<td>0.00001</td>
</tr>
</tbody>
</table>

- The mean operative time was significantly higher in the arthroscopic group
- No peri-operative complications
# Pain Evaluation

<table>
<thead>
<tr>
<th></th>
<th>Complete Group</th>
<th>Mini-Open</th>
<th>Arthroscopic</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean Pain level during 1st week</strong></td>
<td>1.7 ± 1.5</td>
<td>2.5 ± 1.4</td>
<td>1.2 ± 1.2</td>
<td>0.0026</td>
</tr>
<tr>
<td><strong>Mean Pain level D1</strong></td>
<td>2.9 ± 1.8</td>
<td>3.3 ± 1.7</td>
<td>2.1 ± 1.3</td>
<td>0.0001</td>
</tr>
<tr>
<td><strong>Mean Pain level D2</strong></td>
<td>2.6 ± 1.8</td>
<td>3.8 ± 1.9</td>
<td>1.8 ± 1.4</td>
<td>0.0018</td>
</tr>
<tr>
<td><strong>Mean Pain level D3</strong></td>
<td>2.1 ± 1.9</td>
<td>3.2 ± 1.6</td>
<td>1.3 ± 1.8</td>
<td>0.0006</td>
</tr>
<tr>
<td><strong>Mean Pain level D4</strong></td>
<td>1.5 ± 1.8</td>
<td>2.3 ± 1.8</td>
<td>1 ± 1.6</td>
<td>0.001</td>
</tr>
<tr>
<td><strong>Mean Pain level D5</strong></td>
<td>1.2 ± 1.8</td>
<td>1.7 ± 2</td>
<td>0.9 ± 1.6</td>
<td>0.11</td>
</tr>
<tr>
<td><strong>Mean Pain level D6</strong></td>
<td>1 ± 1.6</td>
<td>1.3 ± 1.9</td>
<td>0.8 ± 1.4</td>
<td>0.39</td>
</tr>
<tr>
<td><strong>Mean Pain level D7</strong></td>
<td>0.8 ± 1.4</td>
<td>1.2 ± 1.8</td>
<td>0.5 ± 0.9</td>
<td>0.31</td>
</tr>
</tbody>
</table>
## Analgesic consumption - Side effects

<table>
<thead>
<tr>
<th></th>
<th>Mini-Open</th>
<th>Arthroscopic</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetaminophen 500mg</td>
<td>2.5 ± 1.8</td>
<td>1.8 ± 1.4</td>
<td>0.13</td>
</tr>
<tr>
<td>Tramadol 100mg</td>
<td>0.2 ± 0.4</td>
<td>0.7 ± 1.2</td>
<td>0.07</td>
</tr>
<tr>
<td>Naproxen 75mg</td>
<td>0.9 ± 0.6</td>
<td>0.8 ± 0.5</td>
<td>0.20</td>
</tr>
</tbody>
</table>

No Difference

<table>
<thead>
<tr>
<th></th>
<th>Mini-Open</th>
<th>Arthroscopic</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nausea</td>
<td>3 (17.6%)</td>
<td>2 (7.7%)</td>
<td>0.36</td>
</tr>
<tr>
<td>Vomiting</td>
<td>2 (11.8%)</td>
<td>3 (11.5%)</td>
<td>1</td>
</tr>
<tr>
<td>Anxiety</td>
<td>3 (17.6%)</td>
<td>4 (15.4%)</td>
<td>1</td>
</tr>
<tr>
<td>Vertigo</td>
<td>4 (23.5%)</td>
<td>4 (15.4%)</td>
<td>0.69</td>
</tr>
</tbody>
</table>

No Difference
## Medio-lateral Bone Block Positioning

<table>
<thead>
<tr>
<th></th>
<th>Mini-Open group</th>
<th>Arthroscopy group</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6.6 ± 5.5 mm</td>
<td>3.7 ± 3.3 mm</td>
<td>0.036</td>
</tr>
</tbody>
</table>

**Significant**
### Equatorial Bone Block Positioning

<table>
<thead>
<tr>
<th>Mini-Open group</th>
<th>Arthroscopy group</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>44.4%</td>
<td>94.1%</td>
<td>0.002</td>
</tr>
</tbody>
</table>

**Significant**
CT-scan Assessment

<table>
<thead>
<tr>
<th></th>
<th>Mini-open</th>
<th>Arthroscopic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equatorial positionning</td>
<td>4h : 50%</td>
<td>4h : 9 (40.9%)</td>
</tr>
<tr>
<td></td>
<td>5h : 50%</td>
<td>5h : 13 (59.1%)</td>
</tr>
<tr>
<td>Bone Block Length</td>
<td>21.4 ± 2.1mm</td>
<td>20.6 ± 2.8mm</td>
</tr>
<tr>
<td>Healing</td>
<td>5 (62.5%)</td>
<td>6 (27.3%)</td>
</tr>
<tr>
<td>Tangential Line 25%</td>
<td>1.2 ± 2.8mm</td>
<td>1 ± 2.1mm</td>
</tr>
<tr>
<td>Tangential Line 50%</td>
<td>1.7 ± 3.7mm</td>
<td>2 ± 3.0mm</td>
</tr>
<tr>
<td>Circle 25%</td>
<td>Contact 1 (12%)</td>
<td>Médial 7 (87.1%)</td>
</tr>
<tr>
<td></td>
<td>Médial 20 (90.9%)</td>
<td>Médial 20 (90.9%)</td>
</tr>
<tr>
<td>Circle 50%</td>
<td>Contact 1 (12.5%)</td>
<td>Contact 2 (9.1%)</td>
</tr>
<tr>
<td></td>
<td>Médial 7 (87.5%)</td>
<td>Médial 20 (90.9%)</td>
</tr>
<tr>
<td>Distance Circle 25%</td>
<td>4.9 ± 2.6</td>
<td>5.1 ± 3.5mm</td>
</tr>
<tr>
<td>Distance Circle 50%</td>
<td>5.2 ± 3</td>
<td>4 ± 2.9mm</td>
</tr>
</tbody>
</table>

No Difference
Conclusion

- Less postoperative pain during the first week with arthroscopic procedure
- With no difference regarding analgesic consumption
- No difference regarding postoperative complications
Conclusion

X-Ray Positioning with arthroscopic procedure

- More Lateral
- Significantly more sub-equatorial

But no significant difference on CT-scan assessment
Summary

- Arthroscopic procedure: reliable and reproducible
- No difference compared to mini-open procedure regarding the post-operative complications
- Good bone block positioning
Merci... 
dr.deranlot@gmail.com