Clinical Outcomes and Survival rate of Autologous Chondrocyte Implantation With and Without Concomitant Meniscus Allograft Transplantation: 10 to 15-year follow-up study

Kyoung Ho Yoon, MD; Sang-Gyun Kim, MD; Sang Jun Kim, MD; Eung Ju Kim, MD; Yoo Beom Kwon, MD; Jae-Young Park, MD

Department of Orthopaedic Surgery
Kyung Hee University Hospital
Seoul, Korea
Disclosure

No conflicts of interest
Autologous chondrocyte implantation (ACI) with meniscus allograft transplantation (MAT) had been considered as one of the treatment option for relatively young patients who had a focal chondral defect of meniscus deficient knee.

However, the effect of concomitant MAT on clinical outcomes and survivorship after ACI had not been investigated.

**Background**

- **Purpose**: To investigate the clinical outcomes and survival rate of ACI with MAT compared to the isolated ACI
- **Hypothesis**: ACI with concomitant MAT would not restore clinical outcomes as much as isolated ACI
Methods

April 2002 to June 2008
Autologous chondrocyte implantation
(n=55)

Patients excluded:
- Revision surgery (2)
- Osteotomy (3)
- PF chondral defect (5)
- Different compartment ACI & MAT (1)

Medical record review
(n=44)

Patients excluded:
- Follow-up less than 10 years (11)

33 patients enrolled

Isolated ACI (n=14)

ACI with MAT (n=19)
Methods: Surgical Techniques

Isolated ACI

ACI with MAT
## Methods: Demographics

<table>
<thead>
<tr>
<th></th>
<th>Isolated ACI (n=14)</th>
<th>ACI with MAT (n=19)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years) †</td>
<td>31.2 ± 9.9</td>
<td>34.8 ± 8.4</td>
<td>0.236</td>
</tr>
<tr>
<td>Male / female, (n)</td>
<td>11 / 3</td>
<td>16 / 3</td>
<td>0.678</td>
</tr>
<tr>
<td>Injury side, right / left, (n)</td>
<td>5 / 9</td>
<td>13 / 6</td>
<td>0.167</td>
</tr>
<tr>
<td>BMI (kg/m²) †</td>
<td>25.1 ± 3.3</td>
<td>25.2 ± 2.7</td>
<td>0.911</td>
</tr>
<tr>
<td>Location of chondral injury, medial / lateral (n)</td>
<td>7 / 7</td>
<td>8 / 11</td>
<td>0.653</td>
</tr>
<tr>
<td>Size of chondral injury, (cm²)</td>
<td>3.0 ± 1.5</td>
<td>4.2 ± 1.8</td>
<td>0.063</td>
</tr>
<tr>
<td>Associated meniscal injury, n (%)</td>
<td>7 (50.0%)</td>
<td>19 (100%)</td>
<td>0.006</td>
</tr>
<tr>
<td>Follow-up (years) †</td>
<td>13.1 ± 2.4</td>
<td>12.9 ± 2.1</td>
<td>0.875</td>
</tr>
</tbody>
</table>

†Values are presented as mean ± standard deviation with range in parentheses. SB, single bundle; DB, double bundle; BMI, body mass index; STSD, side-to-side difference.
Methods: Outcome Measurements

• Clinical evaluation
  : IKDC, Lysholm, Tegner activity score

• Survivorship assessment
  – Kaplan-Meier method
  – Definition of graft failure
    • Need for revision surgery
    • ICRS grade IV chondral defect on MRI
    • Poor result of Lysholm score (<65)
Results: Clinical Scores

* P value <0.05

- **IKDC**
  - Isolated ACI: 75.8
  - ACI+MAT: 61
  - P = 0.024

- **Lysholm**
  - Isolated ACI: 77.5
  - ACI+MAT: 61
  - P = 0.029

- **Tegner**
  - Isolated ACI: 5.3
  - ACI+MAT: 4.5
  - P = 0.072
Results: Survivorship

<table>
<thead>
<tr>
<th>Follow-up Period (Y)</th>
<th>Isolated ACI (n = 14)</th>
<th>ACI+MAT (n = 19)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td>3</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td>5</td>
<td>14</td>
<td>17</td>
</tr>
<tr>
<td>7</td>
<td>14</td>
<td>17</td>
</tr>
<tr>
<td>9</td>
<td>13</td>
<td>16</td>
</tr>
<tr>
<td>11</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>13</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>15</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

8-year survival rate (%): Isolated ACI 92.9, ACI+MAT 89.5
15-year survival rate (%): Isolated ACI 69.6, ACI+MAT 50.2
## Results: Failure

<table>
<thead>
<tr>
<th></th>
<th>Isolated ACI (n = 14)</th>
<th>ACI+MAT (n = 19)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>n(%)</td>
<td>4 (28.6%)</td>
<td>10 (52.6%)</td>
<td>0.167</td>
</tr>
<tr>
<td>Need for additional surgery</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Graft complete tear</td>
<td>0</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>STSD &gt; 10mm</td>
<td>4</td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>
Limitation

- Retrospective, nonrandomized study
- Clinical outcome of the first generation ACI
- Sample size of two groups were relatively small

Conclusion

- ACI with concomitant MAT did not restore clinical outcomes as much as isolated ACI.
- There was a trend for the long-term survival rate to be greater in isolated ACI than ACI with MAT.
References


References


