Septic Arthritis After Anterior Cruciate Ligament Reconstruction - How Important Is Graft Salvage?

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declare no conflict of interest.
Introduction

Background:
Septic arthritis (SA) after ACL reconstruction (ACLR) remains challenging to treat and today only about 4 out of 5 grafts can be salvaged during treatment.

Purpose:
Assessment of clinical, subjective and radiological outcomes following septic arthritis after ACLR of patients with graft retention and graft removal.

Hypothesis:
Graft retention yields better clinical and subjective results and leads to fewer radiological alterations.
Methods

- Level of evidence III, cohort study

- Patient selection

  - Group 1: graft retention
  - Group 2: graft removal
    - Group 2A with re-implantation until FU
    - Group 2B: without re-implantation until FU

  Inclusion:
  - Arthroscopic ACLR with consecutive SA
  - >12 months FU since last surgery

  Exclusion:
  - Concomitant surgery (e.g. Osteotomy, PCL)
  - Non residents

- Follow-Up:
  - Clinical evaluation: objective IKDC, KT-1000
  - Subjective evaluation: subjective IKDC, Lysholm- and WOMAC score
  - Radiological evaluation: pre injury and follow-up MRI
Results

52 patients treated for SA following ACLR between 2006-2015 at our institution

41 patients included in this study

Follow-up obtained from 33/41 patients (81%)

11 patients excluded:
- 5 non-residents
- 6 concomitant surgeries

8 patients lost to follow-up

patients for FU: n = 33

Group 1: n = 21

Group 2: n = 12

Group 2A (re-implantation): n = 4
Group 2B (no re-implantation): n = 8
### Results – baseline characteristics

*Baseline characteristics:*

No significant differences between groups

**TABLE 3**

<table>
<thead>
<tr>
<th></th>
<th>Group 1 (n = 21)</th>
<th>Group 2 (n = 12)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, y (mean ± SD)</td>
<td>29.7 ± 7.9</td>
<td>27.5 ± 12.7</td>
<td>.303</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>18 (85.7)</td>
<td>8 (66.7)</td>
<td>.377</td>
</tr>
<tr>
<td>Female</td>
<td>3 (14.3)</td>
<td>4 (33.3)</td>
<td></td>
</tr>
<tr>
<td>Follow-up, mo</td>
<td>54 (18-103)</td>
<td>41 (13-86)</td>
<td>.443</td>
</tr>
<tr>
<td>Index ACLR</td>
<td></td>
<td></td>
<td>.716</td>
</tr>
<tr>
<td>Primary</td>
<td>14 (66.7)</td>
<td>7 (58.3)</td>
<td></td>
</tr>
<tr>
<td>Revision</td>
<td>7 (33.3)</td>
<td>5 (41.7)</td>
<td></td>
</tr>
<tr>
<td>Index ACL graft</td>
<td>≥.999</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hamstring</td>
<td>20 (95.2)</td>
<td>12 (100)</td>
<td></td>
</tr>
<tr>
<td>Quadriceps</td>
<td>1 (4.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgical technique</td>
<td></td>
<td></td>
<td>.228</td>
</tr>
<tr>
<td>SB</td>
<td>11 (52.4)</td>
<td>9 (75)</td>
<td></td>
</tr>
<tr>
<td>DB</td>
<td>10 (47.6)</td>
<td>3 (25)</td>
<td></td>
</tr>
<tr>
<td>Days until infection</td>
<td></td>
<td></td>
<td>.275</td>
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<tr>
<td>Fever, &gt;38.5°C</td>
<td></td>
<td></td>
<td>.698</td>
</tr>
<tr>
<td>Yes</td>
<td>12 (57.1)</td>
<td>8 (66.7)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>9 (42.9)</td>
<td>4 (33.3)</td>
<td></td>
</tr>
<tr>
<td>CRP, mg/dL</td>
<td>11.5 (0-32)</td>
<td>12.5 (0-29)</td>
<td>.820</td>
</tr>
<tr>
<td>Gaechter stage</td>
<td>2 (1-2)</td>
<td>2 (1-3)</td>
<td>.423</td>
</tr>
<tr>
<td>Total IDs</td>
<td>3 (1-7)</td>
<td>4 (2-5)</td>
<td>.171</td>
</tr>
</tbody>
</table>

*Continuous data are presented as median (range) unless otherwise noted. Categorical data are presented as n (%). ACL, anterior cruciate ligament; ACLR, anterior cruciate ligament reconstruction; CRP, C-reactive protein; DB, double bundle; ID, irrigation and debridement; SB, single bundle.*
### Microorganisms:

No significant differences between groups.
Results - objective

Objective outcomes

IKDC: Group 1 >* Group 2

KT-1000: Group 1 <* Group 2

*clinically significant difference
Results - subjective

Subjective outcomes:

WOMAC: no significant differences

Lysholm: Group 1 >* Group 2

IKDC subj: Group 1 >* Group 2

*clinically significant difference
Results - radiology

Radiological outcomes:

28 patients (84.8%) available for MRI at final FU

(Group 1, n = 17; Group 2A, n = 7; group 2B, n = 4)

- ACL intact in all patients of Group 1 and 2A
- **Graft vs. no graft at FU:**
  - cartilage deterioration: 1.0 vs. 1.6 points (ICRS classification)
  - new meniscal tears: n (%): 2 (25%) vs. 3 (75%)
  - Arthrofibrosis: 74% vs. 0%
Conclusion

Main findings:

- Patients with graft salvage showed superior clinical, subjective and radiological results
- Patients with graft removal and reimplantation showed similar results as patients with initial graft retention
- Patients without a graft at final FU reported worst outcomes of all groups

Conclusions:

- Patient following SA after ACLR benefit from a graft
- Graft re-implantation may yield similar results as initial graft salvage


Thank you!