Gender Differences in End-Stage Ankle Arthritis

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  • Board Member/Editor: AOFAS, COFAS, CORR, Foot and Ankle Specialist, JBJS Am

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  • Consultant/financial support: Wright medical, Acumed, Cartiva, Zimmer, Bioventus, Amniox, Synths
  • Board Member/Editor: AOFAS, Foot and Ankle Int, COA

• TD:
  • Consultant/financial support: Wright medical, Carticept, Integra, Stryker
Background

• End-stage ankle arthritis (ESAA) is a debilitating disease, and its impact on quality of life is comparable to patients with end-stage hip arthritis

• Gender differences in pre- and postoperative pain and disability have been demonstrated in the hip and knee arthroplasty population

  • Females have more pain, disability

  • Few authors have investigated the clinical importance of these differences using the minimal clinically important difference (MCID) of the outcome tools used

• No previous studies on gender differences in ESAA

Research Question

• Does gender influence the pre- and postoperative pain and disability of patients with ESAA undergoing total ankle replacement (TAR) or ankle arthrodesis (AA)?
Methods

• Subjects identified from Canadian Orthopaedic Foot and Ankle Society (COFAS) prospective foot and ankle reconstruction database

• Inclusion:
  • All patients undergoing primary TAR or AA for ESAA of varying etiologies with minimum 2-year followup

• Exclusion:
  • <2 years followup, tibiotalocalcaneal (TTC) fusions, revision TAR or AA, conversion of TAR->AA or AA->TAR

• Outcomes:
  • Primary:
    • Ankle Osteoarthritis Scale (AOS)
      • measure of pain and disability (function) specific to ankle arthritis
    • Short Form-36 Health Survey
      • Generic health outcome tool with both physical (PCS) and mental (MCS) components
  • Secondary:
    • Patient satisfaction (Foot and Ankle Follow-up Questionnaire)
    • Revision rates
Results

930 Patients

- Revision case (6)
- TAR->AA (5)
- AA->TAR (6)
- TTC Fusion (41)

872 Patients Included

629 TAR
243 AA
## Demographics

<table>
<thead>
<tr>
<th></th>
<th>Total Ankle Replacement</th>
<th></th>
<th></th>
<th>Ankle Arthrodesis</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male (n=316)</td>
<td>Female (n=313)</td>
<td>P-Value</td>
<td>Male (n=154)</td>
<td>Female (n=89)</td>
<td>P-Value</td>
</tr>
<tr>
<td>Age</td>
<td>65.4±9.3</td>
<td>61.5±10.6</td>
<td>&lt;0.001</td>
<td>57.9±11.8</td>
<td>52.0±12.3</td>
<td>0.001</td>
</tr>
<tr>
<td>BMI (kg/m2)</td>
<td>27.8±3.4</td>
<td>28.5±5.7</td>
<td>0.24</td>
<td>29.0±4.1</td>
<td>28.6±6.0</td>
<td>0.73</td>
</tr>
<tr>
<td>Follow-up (years)</td>
<td>4.9±2.3</td>
<td>5.0±2.6</td>
<td>0.46</td>
<td>3.9±1.7</td>
<td>4.3±2.0</td>
<td>0.05</td>
</tr>
<tr>
<td>Diabetes (%)</td>
<td>21 (6.6%)</td>
<td>21 (6.7%)</td>
<td>0.97</td>
<td>23 (14.9%)</td>
<td>8 (9.0%)</td>
<td>0.18</td>
</tr>
<tr>
<td>Smoker (%)</td>
<td>17 (5.4%)</td>
<td>20 (6.4%)</td>
<td>0.59</td>
<td>15 (9.7%)</td>
<td>10 (11.2%)</td>
<td>0.71</td>
</tr>
<tr>
<td>Etiology (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-Traumatic</td>
<td>184 (60.1%)</td>
<td>171 (56.6%)</td>
<td>&lt;0.001</td>
<td>77 (52.7%)</td>
<td>51 (60.7%)</td>
<td>0.01</td>
</tr>
<tr>
<td>Primary</td>
<td>90 (29.4%)</td>
<td>61 (20.1%)</td>
<td></td>
<td>54 (37.0%)</td>
<td>17 (20.2%)</td>
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<tr>
<td>Rheumatoid</td>
<td>25 (8.2%)</td>
<td>65 (21.5%)</td>
<td></td>
<td>3 (1.9%)</td>
<td>7 (8.3%)</td>
<td></td>
</tr>
<tr>
<td>Other IA</td>
<td>5 (1.6%)</td>
<td>6 (2.0%)</td>
<td></td>
<td>4 (2.7%)</td>
<td>7 (8.3%)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>2 (0.7%)</td>
<td>0 (0.0%)</td>
<td></td>
<td>8 (5.5%)</td>
<td>2 (2.4%)</td>
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</tbody>
</table>
## Outcome Scores

<table>
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<tr>
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<tbody>
<tr>
<td></td>
<td>Male (n=316)</td>
<td>Female (n=313)</td>
<td>Sig. (2-tailed)</td>
<td>Male (n=154)</td>
</tr>
<tr>
<td>SF-36 PCS</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>33.6±10.6</td>
<td>30.9±10.2</td>
<td>p=0.001</td>
<td>35.7±11.3</td>
</tr>
<tr>
<td>Post</td>
<td>40.0±11.9</td>
<td>37.3±12.3</td>
<td>p=0.002</td>
<td>42.1±13.0</td>
</tr>
<tr>
<td>SF-36 MCS</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>51.6±14.1</td>
<td>49.1±14.8</td>
<td>p=0.09</td>
<td>45.8±14.9</td>
</tr>
<tr>
<td>Post</td>
<td>51.2±12.7</td>
<td>50.1±14.2</td>
<td>p=0.02</td>
<td>46.6±15.7</td>
</tr>
<tr>
<td>AOS Pain</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>49.9±18.6</td>
<td>54.5±17.2</td>
<td>p=0.01</td>
<td>50.7±19.2</td>
</tr>
<tr>
<td>Post</td>
<td>18.8±18.3</td>
<td>21.5±19.3</td>
<td>p=0.04</td>
<td>23.0±24.1</td>
</tr>
<tr>
<td>AOS Disability</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>60.6±18.2</td>
<td>66.1±15.8</td>
<td>p&lt;0.001</td>
<td>62.4±19.4</td>
</tr>
<tr>
<td>Post</td>
<td>27.5±22.4</td>
<td>32.8±22.7</td>
<td>p=0.003</td>
<td>32.1±26.6</td>
</tr>
</tbody>
</table>
• Females had worse pain and disability preoperatively for both TAR and AA
• Females had worse pain and disability postoperatively for TAR
• No differences seen postoperatively for AA
Satisfaction

- TAR patients had higher expectations preop, but equivalent satisfaction postop.
- Male TAR patients more satisfied postop than male AA patients.

Revisions

<table>
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<tr>
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</tr>
<tr>
<td>58</td>
<td>55</td>
</tr>
</tbody>
</table>

- Gender had no significant impact on revision rates.
Discussion

- Statistically significant differences in preoperative pain and disability, with females having worse outcome scores. Differences persisted postoperatively in the TAR group but not the AA group.

- Possible Explanations:
  - Arthritis etiology: larger number of inflammatory arthritis patients in female TAR group
    - Inflammatory arthritis affects outcomes
  - Females tend to delay arthroplasty surgery longer than males
  - Preoperative pain/function has large impact on postoperative pain/function
  - Gender differences in pain perception/behavior
Discussion

• Clinical Relevance?
  
  • In large studies, small differences between groups become statistically significant\textsuperscript{13,14}
  
  • The differences between groups in our study do not meet the minimal clinically important difference (MCID) of the outcome instruments used\textsuperscript{15-17}

• Patient Counselling
  
  • This information is valuable when discussing surgical options with patients preoperatively
  
  • Males and Females both improve substantially after TAR and AA
    
    • Females have worse outcome scores than males after TAR
    
    • Satisfaction rates are similar between the two procedures
      
      • TAR patients have higher expectations than AA patients
      
      • Males TAR patients are more satisfied postoperatively than Male AA patients


