Major Perioperative Complications Are Higher In Ankle Fusion Than Total Ankle Arthroplasty: Results of a Matched Cohort Study

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Introduction

• Ankle fusion is the traditional surgical treatment for end stage arthritis.
• Total ankle arthroplasty (TAA) utilization is increasing as technique and implants improve.
• Evidence suggests that clinical outcomes are superior with TAA.
• Little is known of the perioperative complication rate.
Purpose

To compare the national rates of perioperative (in-hospital) complications between patients undergoing ankle fusion and total ankle arthroplasty.
Methods

- The 2002-2013 releases of the Nationwide Inpatient Samples were analyzed.
- A total of 4,451 TAA patients and 16,277 ankle fusion patients were identified using ICD-9-CM procedure codes (81.11 and 81.56, respectively).
- Using a previously reported classification system, ICD-9-CM diagnosis codes were utilized to classify major or minor perioperative complications.
<table>
<thead>
<tr>
<th>Minor Complications</th>
<th>ICD-9 Codes</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circulatory</td>
<td>451.89, 453.40-453.42, 453.9</td>
<td>phlebitis, thrombophlebitis, venous embolism</td>
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<td></td>
<td></td>
<td>thrombosis</td>
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<tr>
<td>Respiratory</td>
<td>518.5</td>
<td>pulmonary insufficiency</td>
</tr>
<tr>
<td>Other systems, unclassified</td>
<td>997.1, 997.2, 997.39, 997.4, 997.5, 997.91, 997.99</td>
<td>cardiac, periphera; vascular, digestive, urinary, respiratory</td>
</tr>
<tr>
<td>Other medical care, unclassified</td>
<td>999.2, 999.39, 999.5, 999.6, 999.7, 999.88-999.9</td>
<td>vascular; serum, injection, infusion and transfusion reactions</td>
</tr>
<tr>
<td>Other procedure, unclassified</td>
<td>998.11-98.13, 998.59, 998.81, 998.83, 998.89</td>
<td>wound, hematoma, seroma, infection, emphysema</td>
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</table>

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<tr>
<td>Circulatory and Respiratory</td>
<td>427.5, 415.11, 415.12, 415.19</td>
<td>cardiac arrest, iatrogenic pulmonary embolism and infarction; septic pulmonary embolism</td>
</tr>
<tr>
<td>Specific Procedure</td>
<td>996.40-996.49, 996.66, 996.67, 996.77-996.79</td>
<td>internal orthopedic device, implant or graft; including infection</td>
</tr>
<tr>
<td>Other systems, unclassified</td>
<td>997.00-997.02, 997.09, 997.31, 997.79</td>
<td>nervous system, central nervous system, iatrogenic cerebrovascular infarction or hemorrhage, vascular, respiratory</td>
</tr>
<tr>
<td>Other medical care, unclassified</td>
<td>999.4</td>
<td>anaphylactic shock</td>
</tr>
<tr>
<td>Other procedure, unclassified</td>
<td>998.0, 998.30, 998.32, 998.4, 998.51, 998.7</td>
<td>postoperative shock, foreign body left, surgical wound disruption, infected seroma</td>
</tr>
</tbody>
</table>
Methods

• Ankle fusion and TAA patients cases were statistically matched on the following covariates: age, gender, race, hospital type, geographical region, # comorbidities, diabetes status

• Exact matches identified for 4,174 patients

• Bivariate (unadjusted) and multivariate logistic regression (adjusted) were used to compare the risk of perioperative minor complications, major complications and in-hospital mortality between TAA and ankle fusion.
Results

• The minor complication rate for ankle fusion was 3.9% (169 of 4,174) compared to 4.6% (167 of 4,174) for TAA (p=0.91).

• The major complication rate for ankle fusion patients was significantly (p<.01) higher at 14.7% (615 of 4,174) compared to 6.4% (269 of 4,174) for TAA patients.

• The mortality rate was less .02%. Fewer than 10 patients in either group died (p=0.59).
Results

After adjusted for case-mix in multivariate analysis

• No significant differences in minor complication risks between the groups [OR: 1.17 (95% CI 0.882-1.415)].

• Ankle fusion patients were 2.46x more likely to experience major complications (OR: 2.46, 95% CI 2.11-2.88) than TAA patients.
Discussion

• Study limitations
  – national claims dataset does not include relevant clinical data
  – no patient identifier to track post-discharge

• Study strengths
  – exact matched patient groups
  – large sample that is geographically representative
  – Includes patient demographics, health status, functional status, and hospital type
Conclusion

• Compared to a matched cohort of TAA patients, ankle fusion patients have significantly higher risk of a major perioperative complications.

• The risk of a minor perioperative complication and mortality are similar between the groups.

• These findings suggest that TAA may be a safer surgery than ankle fusion.
References


