A RETROSPECTIVE STUDY ON LOWER EXTREMITY AMPUTATION LEVELS FOLLOWING ENDOVASCULAR REPERFUSION: AN INSTITUTIONAL REVIEW OF PODIATRIC MANAGEMENT IN THE LIMB SALVAGE TEAM

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INTRODUCTION

• CLI patients are at risk for limb loss and potentially fatal complications from progression of gangrene and development of sepsis.¹

• Leg amputation due to PAD gives rise to 5-year survival rate of less than 30%.²

• Improvements in the process of early detection and appropriate treatment of patients with CLI are warranted.

2. Anahita D, Cheong IJ. Epidemiology of peripheral arterial disease and critical limb is ischemia. Tech Vasc Interventional Rad 2016; 19:91-98.
INTRODUCTION

• Multiple studies have demonstrated a reduction in both amputation and mortality among individuals diagnosed with CLI through instituting multidisciplinary limb-salvage teams.

• Better understand the importance of podiatry in the limb salvage team, and to identify a correlation of amputation levels status post endovascular treatment with and without podiatry involvement.
METHODS

• Following IRB approval, a multi-center retrospective chart review was conducted using CPT codes 39.50 and 39.90 defining non-coronary angioplasty/stenting.

• CLI risk factors (ICD-9 codes):
  • Diabetes (250 – 250.99)
  • Smoking (V15.82, 305.1)
  • History of renal disease (443.9)

• Other demographics and risk factors will be identified and assessed for multivariate analysis using linear-regression modeling:
  • Age, gender, renal-disease, obesity, atherosclerosis, gangrene, ulcerations.
752 patient charts were analyzed

2,297 charts met initial inclusion

- CPT codes 39.50 or 39.9 with no open bypass

1,545 charts excluded

- EVT unrelated to CLI
- Timing between diagnosis and treatment not quantified
- Mortality <1 year of EVT
- Less than 1 year follow up

N=180
Yes PS
Yes Amp

N=261
Yes PS
No Amp

N=244
No PS
No Amp

N=67
No PS
Yes Amp

752 patient charts were analyzed
2,297 charts met initial inclusion

- CPT codes 39.50 or 39.9 with no open bypass

1,645 charts excluded

- EVT unrelated to CLI
- Timing between diagnosis and treatment not quantified
- Mortality <1 year of EVT

782 patient charts were analyzed

- N=180 Yes PS Yes Amp
- N=261 Yes PS No Amp
- N=244 No PS No Amp
- N=67 No PS Yes Amp

### PAD Risk Factors & Associated Outcomes

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Associated Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Prior Hx of PAD</td>
</tr>
<tr>
<td>Gender</td>
<td>Length of hospital stay</td>
</tr>
<tr>
<td>Smoking Y/N</td>
<td>Amputation Y/N</td>
</tr>
<tr>
<td>Diabetes Y/N</td>
<td>Final Level of Amputation</td>
</tr>
<tr>
<td>Podiatry Y/N</td>
<td></td>
</tr>
</tbody>
</table>
RESULTS

Male vs Female Patients

- Male: 56%
- Female: 44%

PS vs NPS

- Yes: 41.3%
- No: 58.7%
RESULTS

PS vs NPS with Amputation

<table>
<thead>
<tr>
<th>Condition</th>
<th>PS-A</th>
<th>NPS-A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes</td>
<td>73.90%</td>
<td>56.70%</td>
</tr>
<tr>
<td>Smoking History</td>
<td>43.40%</td>
<td>50.70%</td>
</tr>
</tbody>
</table>
RESULTS

PS vs NPS Amputation-Free Patients

<table>
<thead>
<tr>
<th>Comorbidities</th>
<th>Percentage of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes</td>
<td>61.30%</td>
</tr>
<tr>
<td>Smoking</td>
<td>52.90%</td>
</tr>
</tbody>
</table>

- **Diabetes**
  - PS-NA: 61.30%
  - NPS-NA: 36.50%

- **Smoking**
  - PS-NA: 52.90%
  - NPS-NA: 40.20%
RESULTS

Final Amputation Level Following Endovascular Treatment Between All Groups

- No: 505
- Yes: 247
- Major: 46
- Minor: 201
RESULTS

FINAL AMPUTATION LEVEL FOLLOWING EVT BETWEEN PS VS NPS GROUPS

<table>
<thead>
<tr>
<th>Final Amputation Level</th>
<th>Toe</th>
<th>Midfoot</th>
<th>BKA</th>
<th>AKA</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS</td>
<td>135</td>
<td>42</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>NPS</td>
<td>15</td>
<td>9</td>
<td>21</td>
<td>22</td>
</tr>
</tbody>
</table>
## RESULTS

<table>
<thead>
<tr>
<th>Amputation + EVT Comorbidity</th>
<th>Chi-Square Test (Two-sided; $\alpha=0.05$)</th>
<th>Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes</td>
<td>p&lt;0.0001 (n=752)</td>
<td>OR=2.313 (1.677, 3.191)</td>
</tr>
<tr>
<td>Smoking history</td>
<td>Not Significant</td>
<td>Not Significant</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amputation + EVT Podiatry</th>
<th>Chi-Square Test (Two-sided; $\alpha=0.05$)</th>
<th>Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Podiatry Consult</td>
<td>p&lt;0.0001*</td>
<td>2.5 (1.805, 3.495)</td>
</tr>
<tr>
<td>Podiatry Consult+Minor FAL</td>
<td>p&lt;0.0001*</td>
<td>105x (30.419, 367.348)</td>
</tr>
</tbody>
</table>
RECOMMENDATIONS

- ABI at age 50 in Diabetics
- Revasc.
- Annual Exam with PAD Hx

CONCLUSION

- A minor final amputation level correlated to PS consultation in patients status post EVT compared to patients without PS consultation.
- The incidence of amputation was increased with PS consultation, but patients were significantly more likely to have a minor final amputation level with PS involved.
- Smoking history (V15.82, 305.1) did not correlate to increased incidence of amputation following EVT.
- PS inclusion in the limb salvage team offered CLI patients greater EVT success with respect to improved preservation of limb length.
REFERENCES