Continued Tobacco Use Is Bad For PAD Patients But Does Not Negatively Affect Outcomes Of Endo Treatments For Intermittent Claudication

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• I have no disclosures related to this presentation

Introduction
• PAD ~ 5 million adults in US
• US population is aging
  • 70yo: 15-20% claudication
    • Minority progress to CLI
    • Impact on lifestyle is often minimized
    • Decreased QoL


Tobacco Use
PAD
Active Tobacco Use:
• Accelerates progression towards claudication
• Higher rates of amputation
  • 2x in patients with PAD
  • MI
  • Death

Claudication
SVS Guidelines for treatment
Prior to open or endo intervention:
• Supervised exercise
• Medical therapy
  • Statins, BBs, ASA, Cilostazol
• Aggressive multidisciplinary smoking cessation program
  • 6 month trial of smoking cessation


What if a patient can’t stop smoking?
Should patients with lifestyle limiting claudication be denied open surgical or endo-revascularization?
Active Tobacco Use & Bypass

Meta-analysis (29 eligible papers)

Results:
- Bypass graft failure ~ 3.09-fold increase in smokers
- Dose response relationship
- Smoking cessation prior to or after bypass:
  - Patency ~ nonsmoker

Active Tobacco Use & LE Bypass
Jones, DW et al. J Vasc Surg 2018

- VSGNE 1789 LEB 2003-2016:
  - Nonsmokers = 971
  - Smokers = 818
  - Results
    - Primary patency at 2 years 48% vs 61%; p=0.03
    - Propensity matched at 2 years 43% vs 58%; p=.02
    - 10-year survival 69% vs 76%; p<.01

Active Tobacco Use & LE Bypass
Kalbaugh CA et al. J Vasc Surg 2018

- Impact of smoking on post LEB for claud outcomes:
  - VSGNE 2004 – 2014
  - 2913 patients - LEB for claudication
  - 1437 active smokers vs 1476 former (>1y) smokers
  - Results:
    - Current smoking - significant predictor of:
      - MALE (HR, 1.27; 95% CI 1.00-1.60; P=.048)
      - MALE or Death (HR, 1.22; 95% CI 1.03-1.44; P=.02)

Active Tobacco Use & Endovascular interventions

Literature:

Mixson BS et al. J Vasc Surg 2017

- Markov decision analysis
  - Is revascularization (open and endo) in Active Smokers superior to medical management re QOL?
  - Retrospective cohort study
    - 311 claudicants: 94 active smokers, 217 nonsmokers
  - Results:
    - Increased QOL in smokers post revascularization vs medical therapy only.
    - QOL similar to non-smokers post revascularization
    - No increase in amputation rates up to 36mo
    - 26% of smokers quit following revascularization
Danbury Hospital study

Objective:
• Outcomes of endovascular interventions in active smokers with lifestyle limiting claudication vs nonsmokers

Methods:
• Retrospective
• 2007-2011

Methods

138 Total Patients
Endovascular Intervention for Claudication

47 Current Tobacco Users
91 Never Smokers + Former Smokers

Primary Endpoint: Reintervention
Secondary: Surgical Bypass, Limb Loss, Myocardial Infarction, Stroke and Death

<table>
<thead>
<tr>
<th>Variable of Interest</th>
<th>Smokers (%)</th>
<th>Non-Smokers (%)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
<td>Yes 34 (72.3%)</td>
<td>Yes 30 (33.0%)</td>
<td>&lt;0.01*</td>
</tr>
<tr>
<td>No 13 (27.7%)</td>
<td>No 16 (10.9%)</td>
<td>&gt;0.99</td>
<td></td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>Yes 26 (55.3%)</td>
<td>Yes 15 (16.6%)</td>
<td>&lt;0.01*</td>
</tr>
<tr>
<td>No 19 (40.4%)</td>
<td>No 76 (83.5%)</td>
<td>&gt;0.99</td>
<td></td>
</tr>
<tr>
<td>DM</td>
<td>Yes 16 (34.0%)</td>
<td>Yes 15 (16.6%)</td>
<td>&gt;0.99</td>
</tr>
<tr>
<td>No 31 (66.0%)</td>
<td>No 76 (83.5%)</td>
<td>&gt;0.99</td>
<td></td>
</tr>
<tr>
<td>Renal Insufficiency</td>
<td>Yes 4 (8.5%)</td>
<td>Yes 13 (14.3%)</td>
<td>&gt;0.99</td>
</tr>
<tr>
<td>No 42 (89.5%)</td>
<td>No 76 (83.5%)</td>
<td>&gt;0.99</td>
<td></td>
</tr>
<tr>
<td>Arterial Fibrillation</td>
<td>Yes 5 (10.6%)</td>
<td>Yes 13 (14.3%)</td>
<td>&gt;0.99</td>
</tr>
<tr>
<td>No 42 (89.4%)</td>
<td>No 76 (83.5%)</td>
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RESULTS

• Mean follow up 3.6 years for both groups

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Active Smokers</th>
<th>Non-Smokers</th>
<th>P-Value</th>
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<tbody>
<tr>
<td>Reintervention n (%)</td>
<td>19 (40.0%)</td>
<td>37 (41.0%)</td>
<td>0.85</td>
</tr>
<tr>
<td>Surgical Bypass n (%)</td>
<td>4 (8.5%)</td>
<td>11 (12.0%)</td>
<td>0.77</td>
</tr>
<tr>
<td>Limb Loss n (%)</td>
<td>2 (4.3%)</td>
<td>3 (3.3%)</td>
<td>&gt;0.99</td>
</tr>
<tr>
<td>MI n (%)</td>
<td>2 (4.3%)</td>
<td>7 (7.8%)</td>
<td>0.49</td>
</tr>
<tr>
<td>Stroke n (%)</td>
<td>2 (4.3%)</td>
<td>5 (5.5%)</td>
<td>&gt;0.99</td>
</tr>
<tr>
<td>Death n (%)</td>
<td>10 (21.2%)</td>
<td>19 (20.9%)</td>
<td>&gt;0.99</td>
</tr>
</tbody>
</table>

No statistically significant difference was noted between the two groups for any outcome measure

Danbury Hospital study

CONCLUSIONS

Active Smokers with LSL claudication
• Advocate smoking cessation
• Outcomes with respect to reintervention, surgical bypass and limb loss appear equivalent
• Should not be denied endovascular intervention
• Improved QOL post intervention may result in smoking cessation

Limitations:
• Small numbers of patients
• Retrospective
<table>
<thead>
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<th>Active Tobacco Use &amp; Bypass</th>
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NSQIP Cohort of 16,534 infrainguinal bypasses
- 6,614 smokers, 9,920 nonsmokers
- Nonsmokers – older, more comorbidities, more distal revascularization

Results:
- Independent association between smoking and early graft failure – *p*=0.03

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<td>Singh, A et al. <em>J Vasc Surg</em> 2008*</td>
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NSQIP data -123 VA medical centers ('95–’03)
- 14,788 pts - infrainguinal bypasses

Results:
- Smoking - significant risk factor for early graft failure only on univariate analysis

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