Vascular disease location, severity and progression in diabetic patients

Sven D. Stein, MD
Regiomed Vascular Center Sonneberg
Disclosure

Speaker name:

Sven D. Stein, MD

I have the following potential conflicts of interest to report:

- Consulting
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Other(s)

☒ I do not have any potential conflict of interest
Clinical Case

- 80 years old male patient
  - Diabetes mellitus type 2
  - Hypertension
  - Peripheral arterial occlusive Disease
    Fontaine Stage IV of left foot with none healing ulcer of dorsum of dig II with infection
Clinical Case
Clinical Case
Clinical Case
Prevalence of PAD in diabetics

- Prevalence in diabetics 8-30%
- Prevalence in patients with diabetic foot about 50%

Prompers L et al, Diabetologia. 2008 May;51(5):747-55
Haas TL, Nwadozi E, Appl. Physiol Nutr Metab. 2015 Dec;40(12):1221-32
Incidence of PAD in Diabetics

44985 men prospectively followed for 25 years

Outcome: clinically significant PAD
- 52 cases / 100000 person years for DM
- 30 cases / 100000 person years for ever smoking
Incidence of PAD in Diabetics

A. Duration of Hypertension (years)
- Hazard Ratio (95% CI) for Incident PAD
  - No HT (Reference)
  - ≤5
  - 6 to 15
  - >15
  - Hazard Ratio: 2.67, 2.24, 2.55
  - P = .95 for linear trend

B. Duration of Hypercholesterolemia (years)
- Hazard Ratio (95% CI) for Incident PAD
  - No HC (Reference)
  - ≤5
  - 6 to 15
  - >15
  - Hazard Ratio: 1.28, 1.53, 1.90
  - P = .05 for linear trend

C. Duration of Type 2 Diabetes (years)
- Hazard Ratio (95% CI) for Incident PAD
  - No T2D (Reference)
  - ≤5
  - 6 to 15
  - >15
  - Hazard Ratio: 2.80, 3.03
  - P < .001 for linear trend

<table>
<thead>
<tr>
<th>Cases, No.</th>
<th>Person-years, y</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>812,054</td>
</tr>
<tr>
<td>B</td>
<td>563,853</td>
</tr>
<tr>
<td>C</td>
<td>897,253</td>
</tr>
</tbody>
</table>
Comparison of lower extremity atherosclerosis in diabetic and non-diabetic patients using multidetector computed tomography

Ci He¹, Jin-gang Yang¹, Yun-ming Li², Jian Rong³, Fei-zhou Du¹, Zhi-gang Yang⁴ and Ming Gu¹*
<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Non-diabetic</th>
<th>Diabetic</th>
<th>( P )</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>854 (46.9%)</td>
<td>681 (63.1%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Plaque type</td>
<td></td>
<td></td>
<td>0.007</td>
</tr>
<tr>
<td>Non-calcified</td>
<td>217 (25.4%)</td>
<td>144 (21.2%)</td>
<td></td>
</tr>
<tr>
<td>Mixed</td>
<td>231 (27.1%)</td>
<td>233 (34.2%)</td>
<td></td>
</tr>
<tr>
<td>Calcified</td>
<td>406 (47.5%)</td>
<td>304 (44.6%)</td>
<td></td>
</tr>
<tr>
<td>Grade of stenosis</td>
<td></td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Mild (&lt;50%)</td>
<td>363 (42.5%)</td>
<td>299 (43.9%)</td>
<td></td>
</tr>
<tr>
<td>Moderate (≥50%)</td>
<td>242 (28.3%)</td>
<td>244 (35.8%)</td>
<td></td>
</tr>
<tr>
<td>Severe (≥75%)</td>
<td>152 (17.8%)</td>
<td>93 (13.7%)</td>
<td></td>
</tr>
<tr>
<td>Occlusion (=100%)</td>
<td>97 (11.4%)</td>
<td>45 (6.6%)</td>
<td></td>
</tr>
<tr>
<td>Plaque shape</td>
<td></td>
<td></td>
<td>0.018</td>
</tr>
<tr>
<td>Type I &lt; 25%</td>
<td>130 (15.2%)</td>
<td>91 (13.4%)</td>
<td></td>
</tr>
<tr>
<td>Type II &lt; 50%</td>
<td>377 (44.2%)</td>
<td>290 (42.6%)</td>
<td></td>
</tr>
<tr>
<td>Type III &lt; 75%</td>
<td>277 (32.4%)</td>
<td>211 (30.9%)</td>
<td></td>
</tr>
<tr>
<td>Type IV ≤ 100%</td>
<td>70 (8.2%)</td>
<td>89 (13.1%)</td>
<td></td>
</tr>
</tbody>
</table>

Note: Data were expressed as \( n \) (%).
New semiquantitative ultrasonographic score for peripheral arterial disease assessment and its association with cardiovascular risk factors

Luca Santoro¹, Pietro Manuel Ferraro², Andrea Flex¹, Antonio Nesci¹, Giuseppe De Matteis¹, Angela Di Giorgio¹, Vincenzo Zaccone¹, Giovanni Gambaro², Antonio Gasbarrini¹ and Angelo Santoliquido¹
<table>
<thead>
<tr>
<th>Smoking status</th>
<th>Total severity</th>
<th>Proximal</th>
<th>Distal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Univariate OR</td>
<td>Multivariate OR</td>
<td>Univariate OR</td>
</tr>
<tr>
<td>Age (1 year)</td>
<td>1.08 (1.06, 1.10)</td>
<td>—</td>
<td>1.07 (1.05, 1.09)</td>
</tr>
<tr>
<td>Male gender</td>
<td>4.17 (2.74, 6.34)</td>
<td>—</td>
<td>3.99 (2.61, 6.09)</td>
</tr>
<tr>
<td>BMI (^a) (1 kg m(^{-2}))</td>
<td>0.97 (0.93, 1.02)</td>
<td>—</td>
<td>0.97 (0.93, 1.02)</td>
</tr>
<tr>
<td>Packs per year (1U)</td>
<td>1.03 (1.02, 1.04)</td>
<td>1.02 (1.02, 1.03)</td>
<td>1.03 (1.02, 1.04)</td>
</tr>
<tr>
<td>Former</td>
<td>2.73 (1.76, 4.25)</td>
<td>1.62 (0.95, 2.78)</td>
<td>2.71 (1.74, 4.22)</td>
</tr>
<tr>
<td>Active</td>
<td>1.94 (1.10, 3.44)</td>
<td>2.65 (1.40, 5.01)</td>
<td>2.10 (1.17, 3.76)</td>
</tr>
<tr>
<td>Hypertension</td>
<td>2.91 (1.87, 4.53)</td>
<td>2.23 (1.40, 3.57)</td>
<td>2.96 (1.90, 4.63)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>2.36 (1.55, 3.58)</td>
<td><strong>1.94 (1.24, 3.02)</strong></td>
<td>2.13 (1.40, 3.25)</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>1.34 (0.90, 2.00)</td>
<td>1.52 (1.01, 2.30)</td>
<td>1.48 (0.99, 2.22)</td>
</tr>
<tr>
<td>CV family history</td>
<td>1.00 (0.62, 1.61)</td>
<td>1.63 (0.99, 2.67)</td>
<td>0.94 (0.59, 1.52)</td>
</tr>
<tr>
<td>Sedentary</td>
<td>1.82 (1.18, 2.83)</td>
<td>1.77 (1.12, 2.81)</td>
<td>1.41 (0.91, 2.19)</td>
</tr>
<tr>
<td>CV events</td>
<td>3.33 (2.07, 5.36)</td>
<td>1.95 (1.17, 3.23)</td>
<td>3.69 (2.28, 5.99)</td>
</tr>
</tbody>
</table>

Abbreviations: BMI, body mass index; CV, cardiovascular; OR, odds ratio; ULLA, ultrasonographic lower limbs atherosclerosis.

\(^a\)Multivariate models adjusted for age, gender and BMI.

\(^b\)Reference group, never smoked.
Severity and Outcome

File:Five surgeons participating in the amputation Wellcome L0034242.jpg; commons.wikimedia.org
Prognosis and Outcome

• Review of Outcome of Patients with Diabetic Foot ulcers
  – Ulcer healing rate >=60%
  – Major amputation:
    • 30 days, median 3.5%
    • 12 Month, median 15%
  – Minor amputation: median 38%
    (range 12-92%)
  – Mortality at 12 Month 20%, at 5 years 50%

Hinchliffe RJ et al; Effectiveness of revascularization of the ulcerated foot in patients with diabetes and peripheral arterial disease: a systematic review; Diabetes Metab ResRev 2016; 32 (Suppl. 1): 136-44
Mortality rates and mortality predictors in patients with symptomatic peripheral artery disease stratified according to age and diabetes

Thomas Mueller, MD, a Franz Hinterreiter, MD, b Christian Luft, MD, c Werner Poclz, PhD, d Meinhard Halmayer, MD, a and Benjamin Dieplinger, MD, a Linz, Austria (J Vasc Surg 2014;59:1291-9.)
Presentations of major peripheral arterial disease and risk of major outcomes in patients with type 2 diabetes: results from the ADVANCE-ON study

Kamel Mohammedi\textsuperscript{1*}, Mark Woodward\textsuperscript{1,2,3}, Yoichiro Hirakawa\textsuperscript{1}, Sophia Zoungas\textsuperscript{1,4}, Stephen Colagiuri\textsuperscript{5}, Pavel Hamet\textsuperscript{6}, Stephen Harrap\textsuperscript{7}, Neil Poulter\textsuperscript{8}, David R. Matthews\textsuperscript{9}, Michel Marre\textsuperscript{10,11,12}, John Chalmers\textsuperscript{1} and on behalf of the ADVANCE Collaborative Group

- N=516 with major PAD (ischaemic ulceration, amputation below the knee, history of revascularization)
- Follow up 10 years
Fig. 1  Cumulative incidence of all-cause mortality, major macrovascular events, cardiovascular death, and fatal or nonfatal myocardial infarction according to the absence (solid line) or the presence of major PAD (dashed line) at baseline (p < 0.0001 for all)
Conclusions

• Multilevel disease mostly affecting the calf vessels
• Severely ill patients (with ulcers)
  – Major amputation rate 15% in 12 month
  – Mortality rate 20% in 12 month
Dr. med. Sven Daniel Stein

Regiomed Vascular Center Sonneberg
Dept. Angiology/ Cardiology/ Diabetology
96515 Sonneberg, Germany
Phone +49 3675 821481
E-Mail: svendaniel.stein@medinos-kliniken.de
Vascular disease location, severity and progression in diabetic patients

Sven D. Stein, MD
Regiomed Vascular Center Sonneberg