Limb Salvage in Diabetic Ischemic Foot

Kritaya Kritayakirana, MD, FACS
Assistant Professor
Chulalongkorn University
April 30, 2017
Pre-Congress: Advanced Diabetic Foot Course

08.00-08.30 ลงทะเบียน
08.30-09.00 เปิดการประชุม
  ศ.ดร.ธีรศักดิ์ นพ.จอมจาร จันทรภักษ์
  ศ.ดร.ศิริวัล นพ.อภิรักษ์ ช่วงชุมนันท์
09.00-09.20 Burden and Pitfall in Management of Diabetic Foot Ulcer in Thailand  ศ.นพ.เทศ นิมมอสระค้า
09.20-09.40 Practical Guideline in Management Diabetic Foot Ulcer in Thailand  รศ.นพ.ทัพพ大军 อาภารนิช
09.40-10.00 Summary of the New Diabetic Foot Infection Guidelines (2016 IWGDF DFI guideline)  ศ.นพ.กิตติพันธ์ อุทัยเกษม
  อ.นพ.เพ็ชรภูมิ เบญญานิกร
10.00-10.20 Surgical Debridement and its Evidence  ศ.นพ.ทรัพย์ นฤิสน์
10.20-10.40 Break
10.40-11.00 Surgical Debridement Using Hydrosurgery  ศ.นพ.กิตติพันธ์ อุทัยเกษม
11.00-11.20 How Much Flow is enough for Healing  ผศ.นพ.กฤษฎา ภูษทกุล
11.20-11.40 Limb Salvage in Diabetic Ischemic Foot
11.40-12.00 Off Loading for Diabetic Foot Ulcer  รศ.นพ.ฤทุดา ศรีสวัสดิ์
12.00-13.00 Lunch
13.00-13.20 Hyperbaric Oxygen - Myth and Facts  นวสาวาช นพ.สันติสุข เจริญยิ่ง
13.40-14.00 Choosing the Ideal Dressing  อ.นพ.พรโชค สวัสดาเชิดชู
14.00-14.20 Silver Dressing for Diabetic Wound  ผศ.นพ.คงภูมิ คงภูมิ
14.20-14.40 How the Team Approach has changed the Practice  รศ.นพ.ฤทุดา ศรีสวัสดิ์
14.40-15.00 Break
Case

- Male 67 years old
- Underlying DM, HTN, TVD
- Present with gangrene at right big toe
  - Orthopedic went on amputation early December 2016
A 67 years old man
KCMH 2016

- BKA 38
- AKA 28
Diabetic foot Presentations

• Ulceration
• Ankle destruction
• Prevention
The treatment of diabetic foot ulcers begins with

- A comprehensive assessment of the ulcer
- Patient's overall medical condition.
- Underlying neuropathy
- Bony deformity
- Peripheral artery disease
The management of diabetic foot: A clinical practice guideline by the Society for Vascular Surgery in collaboration with the American Podiatric Medical Association and the Society for Vascular Medicine

Anil Hingorani, MD,a Glenn M. LaMuraglia, MD,b Peter Henke, MD,c Mark H. Meissner, MD,d Lorraine Loretz, DPM, MSN, NP,e Kathy M. Zinacker, DPM, MPH, FAPWCA,f Vickie R. Driver, DPM, MS, FAPWCA,g Robert Frykberg, DPM, MPH, FAPWCA,h Teresa L. Carmean, MD, FSVRM,j William Marrion, MD,j Joseph L. Mills Sr, MD,j and Mohammad Hassan Marad, MD, MPH,k Brooklyn, NY; Boston and Worcester, Mass; Arvada, Colo; Cleveland, Ohio; Chapel Hill, NC; Houston, Tex; and Rochester, Minn

Background: Diabetes mellitus continues to grow in prevalence and to consume an increasing amount of health care resources. One of the key areas of morbidity associated with diabetes is the diabetic foot. To improve the care of patients with diabetic foot and to provide an evidence-based multidisciplinary management approach, the Society for Vascular Surgery in collaboration with the American Podiatric Medical Association and the Society for Vascular Medicine developed this clinical practice guideline.

Methods: The committee made specific practice recommendations using the Grades of Recommendation Assessment, Development, and Evaluation system. This was based on five systematic reviews of the literature. Specific areas of focus included (1) prevention of diabetic foot ulceration, (2) off-loading, (3) diagnosis of osteomyelitis, (4) wound care, and (5) peripheral arterial disease.

Results: Although we identified only limited high quality evidence for many of the critical questions, we used the available evidence and considered the patients’ values and preferences and the clinical context to develop these guidelines. We included preventive recommendations such as those for adequate glycemic control, periodic foot inspection, and patient and family education. We recommend using custom therapeutic footwear in high risk diabetic patients, including those with significant neuropathy, foot deformities, or previous amputation. In patients with plantar diabetic foot ulcers (DFUs), we recommend off-loading with a total contact cast or removable fixed ankle walking boot. In patients with a new DFU, we recommend x-rays to rule out bone lesions to be followed by magnetic resonance imaging if a soft tissue abscess or osteomyelitis is suspected. We provide recommendations on comprehensive wound care and various debridement methods. For DFUs that fail to improve (>50% wound area reduction) after a minimum of 4 weeks of standard wound therapy, we recommend adjunctive wound therapy options. In patients with DFU who have peripheral arterial disease, we recommend revascularization by either surgical bypass or endovascular therapy.

Conclusion: Whereas these guidelines have addressed key areas in the care of DFUs, they do not cover all the aspects of this complex condition. Going forward as future evidence accumulates, we plan to update our recommendations accordingly. (J Vasc Surg 2016;63:3S-21S.)

Diabetes is one of the leading causes of chronic disease and limb loss worldwide, currently affecting 382 million people. It is predicted that by 2035, the number of reported diabetes cases will soar to 592 million.1 This disease affects the developing countries disproportionately as >80% of diabetes deaths occur in low- and middle-income countries.2 As the number of people with diabetes is increasing globally, its consequences are worsening. The World

From the NYU Lutheran Medical Center, Brooklyn,a the Massachusetts General Hospital and Harvard Medical School, Boston,b the University of Michigan, Ann Arbor,c the University of Washington, Seattle,d the UMass Memorial, Worcester,e the Geisinger Health System, Danville,f the Brown University, Adult Medical School, Providence,g the Carl T. Palmore Veterans Affairs Medical Center, Phoenix,h the University Hospitals Case Medical Center, Cleveland,i the University of North Carolina School of Medicine, Chapel Hill, the Baylor College of Medicine in Houston, Houston,j and the Mayo Clinic, Rochester.i

Author conflict of interest: none.

Correspondence: Anil Hingorani, MD, NYU Lutheran Medical Center, 150 55th St, Brooklyn, NY 11229 (e-mail: hingorani@nyulmc.com).

Independent peer review and oversight have been provided by members of the Society for Vascular Surgery Document Oversight Committee: Neal Glower, MD (Chair); Michael Carretta, MD, Mark Ederer, MD, Thomas Forbess, MD, Michel Mahamou, MD, Greg Moulton, MD, Russell Simon, MD, Thamar Aaron, MD, Rebecca Mccrinick, MD, and Thomas Wakefield, MD.

Copyright © 2016 by the Society for Vascular Surgery. Published by Elsevier Inc.

http://dx.doi.org/10.1016/j.jvs.2015.10.063

38
• Risk factor management
  – Smoking cessation
  – BP control <140/90: if DM <130/80
    • ACE inhibitors & beta blockers
  – Cholesterol control LDL<100, HDL >35,
  – Diabetes Management
    • Hb A1c < 6%
  – Pharmacotherapy
    • Vasodilator agents: beraprost
    • Antiplatelets: aspirin, clopidogrel
    • Hemorrheologic agents: cilostazol
  – Graded Exercise Regimen
    • 30 minutes at least every other day
Duration of Diabetes Mellitus and Incidence of Peripheral Artery Disease (PAD) Complications

The longer diabetes history extends, the likelihood of the incidence of developing a PAD complication increases.

[Subjects]
705 diabetic patients (406 male and 299 female patients)

[Methods]
The diagnosis with PAD was made when either of the followings was met:
(1) ABI≤0.8
(2) ABI≤0.8 with pulse difference between right/left and confirmed presence of intermittent claudication
(3) Calcification in the lower extremity with right/left pulse difference
(4) Calcification in the lower extremity with the presence of intermittent claudication

Hemodynamics and Probability of Healing of a Diabetic Foot Ulcer

![Graph showing the probability of healing versus ankle pressure, toe pressure, and TcPO2.](graph)

- Healing unlikely if toe pressure < 55 mmHg
Measuring

<table>
<thead>
<tr>
<th></th>
<th>tc PO₂ mmHg</th>
<th></th>
<th>tc PO₂ mmHg</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Ref.</td>
<td>25</td>
<td>1.00</td>
<td>40</td>
</tr>
<tr>
<td>1</td>
<td>23</td>
<td>0.94</td>
<td>64</td>
</tr>
<tr>
<td>2</td>
<td>53</td>
<td>2.14</td>
<td>30</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

ID: 26042017-0019

Date: 14.22.26.04.2017
Timer: 08:30
Calibrate
Setup
Event

TCM4 Series
Radiometer
Wagner wound classification

Grade 0 — No ulcer in a high risk foot
Grade 1 — Superficial ulcer involving the full skin thickness but not underlying tissues
Grade 2 — Deep ulcer, penetrating down to ligaments and muscle, but no bone involvement or abscess formation
Grade 3 — Deep ulcer with cellulitis or abscess formation, often with osteomyelitis
Grade 4 — Localized gangrene
Grade 5 — Extensive gangrene involving the whole foot
Grade 1 Superficial ulcer involving the full skin thickness but not underlying tissues
Grade 2 Deep ulcer, penetrating down to ligaments and muscle, but no bone involvement or abscess formation.
Grade 3 Deep ulcer with cellulitis or abscess formation, often with osteomyelitis
Grade 4 Localized gangrene
Surgery

• Indication when fail medical and exercise treatment
• PTA is preferred when possible in patients who are 50 years of age or younger, because they have a higher risk of graft failure after surgical therapy than do older patients
Occluded Aorta
SMALLER INCISIONS:
DECREASED PAIN/ QUICKER RECOVERY
Trans Atlantic Inter Society Consensus (TASC)
Inter-Society Consensus for the Management of Peripheral Arterial Disease (TASC II)

L. Norgren,* W.R. Hiatt,† I.A. Dormandy, M.R. Rutherford, K.A. Harris, and E.G. Fowkes on behalf of the TASC II Working Group, Örebro, Sweden and Denver, Colorado

INTRODUCTION

The Trans-Atlantic Inter-Society Consensus Document on Management of Peripheral Arterial Disease (TASC) was published in January 2000. 3 as a result of cooperation between fourteen medical and surgical vascular, cardiovascular, vascular radiology and cardiology societies in Europe and North America. This comprehensive document had a major impact on vascular care amongst specialists. In subsequent years, the field has progressed with the publication of the CoCaLi document ⁴ and the American College of Cardiology/American Heart Association Guidelines for the Management of Peripheral Arterial Disease.⁵ Aiming to continue to reach a readership of vascular specialists, but also physicians in primary health care who see patients with peripheral arterial disease (PAD), another consensus process was initiated during 2004. This new consensus document has been developed with a broader international representation, including Europe, North America, Asia, Africa and Australia, and with a much larger distribution and dissemination of the information. The goals of this new consensus are to provide an abbreviated document (compared with the publication in 2000), to focus on key aspects of diagnosis and management, and to update the information based on new publications and the newer guidelines, but not to add an extensive list of references. The document is to be found, provided they are recognized as common practice by the authors, with existing evidence. The recommendations are graded according to levels of evidence. It should also be emphasized that good practice is based on a combination of the scientific evidence described below, patients' preferences, and local availability of facilities and trained professionals. Good practice also includes appropriate specialist referral.

Process

Representatives of sixteen societies from Europe, North America, Australia, South Africa and Japan were selected from their respective society and were called together in 2004 to form the new Working Group. Specialists in health economics, health outcomes and evidence based medicine were also included to elaborate on the text for the following sections: history, epidemiology and risk factors; management of risk factors; intermittent claudication; critical limb ischemia; acute limb ischemia; and technologies (intervention/revascularization and imaging).

The Working Group reviewed the literature and, after extensive correspondence and meetings, proposed a series of draft documents with clear recommendations for the diagnosis and treatment of PAD. Each participating society reviewed and commented on these draft consensus documents. The liaison member from each society then took these views back to the Working Group, where all of the amendments, additions and alterations suggested by each participating society were discussed, and the final Consensus Document was agreed upon.

The participating societies were then again invited to review the final document and endorse it if they agreed with its contents. If an individual participating society did not accept any specific recommendation, this is clearly indicated in the final document. Therefore, except where such specific exclusions are indicated, this Consensus Document represents the views of all of the participating societies.

Compared with the original TASC, more emphasis has been put on diabetes and PAD. The text is presented in such a way that vascular specialists will still find most of the information they require, while general practitioners and primary health physicians will easily find guidance for diagnostic and diagnostic procedures, referral of patients and expected outcome of various treatment options.

Grading of recommendations

Recommendations and selected statements are rated according to guidance issued by the former US Agency for Health Care Policy and Research, now renamed the Agency for Healthcare Research and Quality.
<table>
<thead>
<tr>
<th>Lesion Type</th>
<th>Characteristics</th>
<th>Recommended Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Single stenosis ≤10 cm long</td>
<td>Percutaneous transluminal angioplasty strongly preferred</td>
</tr>
<tr>
<td></td>
<td>Single occlusion ≤5 cm long</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Multiple lesions, each ≤5 cm in length</td>
<td>Percutaneous transluminal angioplasty generally preferred</td>
</tr>
<tr>
<td></td>
<td>Single lesion ≤15 cm long, not involving the popliteal artery below the knee</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Single or multiple lesions in the absence of continuous tibial vessels for distal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>bypass</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Heavily calcified occlusion ≤5 cm long</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Single popliteal stenosis</td>
<td></td>
</tr>
</tbody>
</table>
| C           | Multiple lesions >15 cm long                                                       | Percutaneous transluminal angioplasty or surgery, depending |}

Surgery generally preferred
The Society for Vascular Surgery Lower Extremity Threatened Limb Classification System: risk stratification based on wound, ischemia, and foot infection (WIfI).

J Vasc Surg. 2014 Jan;59(1)
SVS WIfI

- **Wound**
- **Ischemia**
- **Foot Infection**
  - 0 none >0.8
  - 1 mild 0.6-0.79
  - 2 moderate 0.4-0.59
  - 3 severe <0.4
a, Estimate risk of amputation at 1 year for each combination

<table>
<thead>
<tr>
<th></th>
<th>Ischemia – 0</th>
<th>Ischemia – 1</th>
<th>Ischemia – 2</th>
<th>Ischemia – 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>W-0</td>
<td>VL</td>
<td>VL</td>
<td>VL</td>
<td>VL</td>
</tr>
<tr>
<td>W-1</td>
<td>VL</td>
<td>VL</td>
<td>L</td>
<td>M</td>
</tr>
<tr>
<td>W-2</td>
<td>L</td>
<td>L</td>
<td>M</td>
<td>H</td>
</tr>
<tr>
<td>W-3</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>fl-0</td>
<td>fl-1</td>
<td>fl-2</td>
<td>fl-3</td>
</tr>
</tbody>
</table>

b, Estimate likelihood of benefit of/requirement for revascularization (assuming infection can be controlled first)

<table>
<thead>
<tr>
<th></th>
<th>Ischemia – 0</th>
<th>Ischemia – 1</th>
<th>Ischemia – 2</th>
<th>Ischemia – 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>W-0</td>
<td>VL</td>
<td>VL</td>
<td>L</td>
<td>M</td>
</tr>
<tr>
<td>W-1</td>
<td>VL</td>
<td>VL</td>
<td>L</td>
<td>M</td>
</tr>
<tr>
<td>W-2</td>
<td>VL</td>
<td>VL</td>
<td>M</td>
<td>H</td>
</tr>
<tr>
<td>W-3</td>
<td>VL</td>
<td>VL</td>
<td>M</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>fl-0</td>
<td>fl-1</td>
<td>fl-2</td>
<td>fl-3</td>
</tr>
</tbody>
</table>
**W**: Wound/clinical category

**SVS grades for rest pain and wounds/tissue loss (ulcers and gangrene):**
0 (ischemic rest pain, ischemia grade 3; no ulcer) 1 (mild) 2 (moderate) 3 (severe)

<table>
<thead>
<tr>
<th>Grade</th>
<th>Ulcer</th>
<th>Gangrene</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No ulcer</td>
<td>No gangrene</td>
</tr>
<tr>
<td></td>
<td>Clinical description: ischemic rest pain (requires typical symptoms + ischemia grade 3); no wound.</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Small, shallow ulcer(s) on distal leg or foot; no exposed bone, unless limited to distal phalanx</td>
<td>No gangrene</td>
</tr>
<tr>
<td></td>
<td>Clinical description: minor tissue loss. Salvageable with simple digital amputation (1 or 2 digits) or skin coverage.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Deeper ulcer with exposed bone, joint or tendon; generally not involving the heel; shallow heel ulcer, without calcaneal involvement</td>
<td>Gangrenous changes limited to digits</td>
</tr>
<tr>
<td></td>
<td>Clinical description: major tissue loss salvageable with multiple (≥3) digital amputations or standard TMA ± skin coverage.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Extensive, deep ulcer involving forefoot and/or midfoot; deep, full thickness heel ulcer ± calcaneal involvement</td>
<td>Extensive gangrene involving forefoot and/or midfoot; full thickness heel necrosis ± calcaneal involvement</td>
</tr>
<tr>
<td></td>
<td>Clinical description: extensive tissue loss salvageable only with a complex foot reconstruction or nontraditional TMA (Chopart or Lisfranc); flap coverage or complex wound management needed for large soft tissue defect</td>
<td></td>
</tr>
</tbody>
</table>
I: Ischemia
Hemodynamics/perfusion: Measure TP or TcPO2 if ABI incompressible (>1.3)
SVS grades 0 (none), 1 (mild), 2 (moderate), and 3 (severe).

<table>
<thead>
<tr>
<th>Grade</th>
<th>ABI</th>
<th>Ankle systolic pressure</th>
<th>TP, TcPO2</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>≥0.80</td>
<td>&gt;100 mm Hg</td>
<td>≥60 mm Hg</td>
</tr>
<tr>
<td>1</td>
<td>0.6-0.79</td>
<td>70-100 mm Hg</td>
<td>40-59 mm Hg</td>
</tr>
<tr>
<td>2</td>
<td>0.4-0.59</td>
<td>50-70 mm Hg</td>
<td>30-39 mm Hg</td>
</tr>
<tr>
<td>3</td>
<td>≤0.39</td>
<td>&lt;50 mm Hg</td>
<td>&lt;30 mm Hg</td>
</tr>
<tr>
<td>Clinical manifestation of infection</td>
<td>SVS</td>
<td>IDSA/PEDIS infection severity</td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------------------------------------------------------------------------</td>
<td>-----</td>
<td>-------------------------------</td>
<td></td>
</tr>
<tr>
<td>No symptoms or signs of infection</td>
<td>0</td>
<td>Uninfected</td>
<td></td>
</tr>
<tr>
<td>Infection present, as defined by the presence of at least 2 of the following items:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Local swelling or induration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Erythema $&gt;0.5$ to $\leq 2$ cm around the ulcer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Local tenderness or pain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Local warmth</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Purulent discharge (thick, opaque to white, or sanguineous secretion)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local infection involving only the skin and the subcutaneous tissue (without involvement of deeper tissues and without systemic signs as described below).</td>
<td>1</td>
<td>Mild</td>
<td></td>
</tr>
<tr>
<td>Exclude other causes of an inflammatory response of the skin (eg, trauma, gout, acute Charcot neuro-osteoarthropathy, fracture, thrombosis, venous stasis)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local infection (as described above) with erythema $&gt;2$ cm, or involving structures deeper than skin and subcutaneous tissues (eg, abscess, osteomyelitis, septic arthritis, fasciitis), and No systemic inflammatory response signs (as described below)</td>
<td>2</td>
<td>Moderate</td>
<td></td>
</tr>
<tr>
<td>Local infection (as described above) with the signs of SIRS, as manifested by two or more of the following:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Temperature $&gt;38^\circ$ or $&lt;36^\circ$C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Heart rate $&gt;90$ beats/min</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Respiratory rate $&gt;20$ breaths/min or $\text{PaCO}_2 &lt; 32$ mm Hg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• White blood cell count $&gt;12,000$ or $&lt;4000$ cu/mm or $10%$ immature (band) forms</td>
<td></td>
<td>Severe$^a$</td>
<td></td>
</tr>
</tbody>
</table>
Bypass versus angioplasty in severe ischaemia of the leg

• Among 224 patients assigned to PTA, 217 underwent the procedure, immediate technical failure occurring in 43 (20 percent).

• Among 228 assigned to bypass surgery, 196 underwent the procedure.

ACC/AHA 2011

• For patients that have an estimated life expectancy of two years or less, or those who do not have autogenous vein available as a conduit, balloon angioplasty is reasonable as the initial procedure, in selected patients, to improve distal blood flow.
ACC/AHA 2011

• For patients with an estimated life expectancy of more than two years, and who have available autogenous vein conduit, a bypass surgery is reasonable to perform as the initial treatment to improve distal blood flow.
Vascular Exam

<table>
<thead>
<tr>
<th>Pulse</th>
<th>Rt</th>
<th>Lt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Femoral artery</td>
<td>2+</td>
<td>2+</td>
</tr>
<tr>
<td>Popliteal artery</td>
<td>2+</td>
<td>2+</td>
</tr>
<tr>
<td>Dorsalis pedis artery</td>
<td>-ve/mono</td>
<td>1+</td>
</tr>
<tr>
<td>Posterior tibial artery</td>
<td>-ve/mono</td>
<td>1+</td>
</tr>
<tr>
<td>ABI</td>
<td>1.0</td>
<td>1.3</td>
</tr>
</tbody>
</table>
Angiogram with angioplasty
Angiogram

Femoropopliteal Segment
Angiogram

BTK lesion

Arch of foot
Balloon Angioplasty

Preballoon

Postballoon
Vascular Exam

<table>
<thead>
<tr>
<th>Pulse</th>
<th>Rt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Femoral artery</td>
<td>2+</td>
</tr>
<tr>
<td>Popliteal artery</td>
<td>2+</td>
</tr>
<tr>
<td>Dorsalis pedis artery</td>
<td>1+</td>
</tr>
<tr>
<td>Posterior tibial artery</td>
<td>biphasic</td>
</tr>
<tr>
<td>ABI</td>
<td>noncompressible</td>
</tr>
</tbody>
</table>
• 18 – 25 Jan 2017
  – Admit for CABG
  – Post operation no complication
Conclusion

- Multidisciplinary
  - Endocrinologist
  - Cardiologist
  - Nephrologist
  - Orthopedist
  - PM&R
  - Nutritionist
  - Surgeon
- Hyperbaric chamber
- Stem cell
- Etc.
Limb Salvage in Diabetic Ischemic Foot

Kritaya Kritayakirana, MD, FACS
Assistant Professor
Chulalongkorn University
April 30, 2017