U/S Guided Interventions for Complex Lower Extremity Disease

A Vascular Surgeons Effort to Significantly Reduce Radiation Exposure

Bryan T. Fisher Sr., MD          January 23, 2017
Chief of Vascular Surgery and Co-Director of Limb Preservation, Centennial Medical Center
Disclosures

• Abbott Medical
  • Faculty Speaker
  • Research Consultant

• Cardiovascular Systems Inc
  • Faculty Speaker
  • Education Consultant

• W. L. GORE
  • Registry Parcticipant
  • Faculty Speaker

• Cordis (Cardinal Health)
  • Educational Consultant
  • Faculty Speaker
Objectives

• Understand the importance of radiation exposure over the course of a successful career

• Illustrate the feasibility of performing complex tibial interventions with minimal contrast and radiation exposure with a two man team

• What we did at Centennial Medical Center

• Case Illustration
The Problem

- In early 2000, an roughly 650,000 percutaneous transluminal coronary angioplasty (PTCA) procedures were performed on adults in the United States¹

- Coronary artery stent insertion doubled from 157 to 318 per 100,000 adults, aged 45-64, from 1996 to 2000¹
The Risks

• Increasing number of case reports of skin changes
  • hands
  • lens of the eye in operators and assistants

• Cancer
  • Uncommon
    • Leukemia
    • Breast Ca
The Jihad Effect

• Story well known

• Visit to Leipzig, Germany

• The rest is history
The Rest Is History in the US

Original Studies

Tibio-Pedal Arterial Minimally Invasive Retrograde Revascularization in Patients with Advanced Peripheral Vascular Disease: The TAMI Technique, Original Case Series

J.A. Mustapha, MD, Fadi Saab, MD, Theresa McGoff, BSN, Carmen Heaney, BSN, Larry Diaz-Sandoval, MD, Matthew Sevensma, DO, and Barbara Karenko, DO

Background: A tibial-pedal access method is needed for patients with advanced peripheral artery disease (PAD) unable to tolerate common femoral artery (CFA) access and intervention due to body habitus or comorbidities. This is the first case series reporting an alternative technique to revascularize such patients. Using ultrasound (US) and the tibio-pedal arterial minimally invasive retrograde revascularization (TAMI)
A Different Approach

- Limited staffing
  - Often issues with staff staying late
  - Priority given to other specialties

- Limited capital
  - Resources spread over multiple departments

- Limited Interest
  - Wouldn’t last long

- Unlimited radiation
  - Reached annual limit @ month 5!
This Got Their Attention

<table>
<thead>
<tr>
<th>Quarter</th>
<th># of Amputations</th>
<th>% of Amputations</th>
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<tbody>
<tr>
<td>Q1 2013</td>
<td>31.2</td>
<td>4.5%</td>
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<tr>
<td>Q2 2013</td>
<td>27.3</td>
<td>4.4%</td>
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<tr>
<td>Q3 2013</td>
<td>39.3</td>
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<tr>
<td>Q4 2013</td>
<td>37.4</td>
<td>0.0%</td>
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- Arterial Wounds (x10)
- # of Amputations
- % of Amputations
Centennial Setup
“Body Flossing”
What Are We Doing?
Why Ultrasound?
Capable of So Much
Overview

• Materials
  • GE system Fixed Unit
  • GE U/S Station
  • Jake and me!
  • No crossing devices
  • No re-entry devices

• Methods
  • 10 consecutive cases series utilizing as much u/s as possible to reduce radiation exposure
  • Complex cases only
    • Multi-level (above and below knee)
    • More than 1 tibial
    • Pedal arch intervention
      • U/S limited below the ankle
Results

Radiation Exposure and Case Length

<table>
<thead>
<tr>
<th>Case</th>
<th>Radiation Exposure (milligray)</th>
<th>Case Length (min)</th>
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<tbody>
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Case

- 64 year old diabetic with type II DM, hyperlipidemia and htn presents with “neuropathy” of the foot and a small medial arch wound

- Multiple specialists
  - “small vessel disease”
  - "nothing can be done"

- Exam
  - Palpable DP and PT

- Noninvasive studies
  - ABI normal
  - Great TBI .4
Treatment and Final Result
Post Procedure

• Some tingling in toes, but greatly improved

• TBI .75

• Wound healed at 4 weeks
Conclusion

• Radiation exposure is bad but necessary

• U/S guided interventions are feasible without many resources

• If you don’t have one, find your Jake!
Thank You

• Partners
  • Billy Kim
  • Allen Lee
  • Adam Richter

• Right Hand Man
  • Jacob Swenson
  • Best Radiology Tech in the Universe

• Jihad Mustapha MD/Christopher Lesar MD
Thank You (Cont)
Bibliography
References


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