Cost Analysis: Amputation vs. Revascularization

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I have no relationships with industry or other financial disclosures.
Are limb preservations worthwhile?

Do they provide value to patients?

And to society?
The *Reality* of Outcomes

**INFRAINGUINAL BYPASS FOR LIMB SALVAGE**

**IDEAL RESULTS**

- Ideal Result 14%
- Operative death or complications only 8%
- Long-term 92%

- Less than Ideal 86%

- 24% Wound complications (27 pts.)
- Decrease in functional status (28 pts.)
- Repeat Surgery (61 pts.)

- 9% assisted living
- 3% dependent
- 8% non-ambulatory

- 54% Repeat Surgery

- ~15% limb loss

The Exponential Rise in Health Care Expenditures

Federal Spending on Medicare and Medicaid
As budget negotiations continue, lawmakers and White House officials are considering ways to slow the growth of federal spending on Medicare and Medicaid, which is projected to continue rising at a rapid pace.

The Federal Government is Asking for “Value”

- Patient Protection and Affordable Care Act
- Independent Advisory Payment Boards
  - ensuring that Medicare expenditures stay within legislated growth limits
- Center for Medicare and Medicaid Innovation
  - new health care delivery methods and payment systems

Medicare & Medicaid Is Talking About “Value”

CENTERS FOR MEDICARE & MEDICAID SERVICES

Roadmap for Implementing Value Driven Healthcare in the Traditional Medicare Fee-for-Service Program
Insurers Are Talking About “Value”

Value-Based Benefits

Because your plan includes Value-Based Benefits, if you are at risk for cardiovascular disease (taking high blood pressure medications in combination with high cholesterol medications) or have asthma, diabetes, or coronary artery disease (CAD), or depression associated with any of these conditions, your coverage can help you more affordably manage your care. Also, if you are a current smoker and are ready to quit, your Value-Based Benefits coverage gives you access to no-cost smoking cessation programs and medications (when prescribed by your doctor).

Fill your prescriptions through our convenient, low-cost mail service pharmacy, and you’ll pay the same copayment for a three-month supply of certain Tier 1 and Tier 2 medications as you would for a one-month supply from a retail pharmacy. This is a savings of up to eight copayments per year for each medication.

Your spouse and covered dependents are also eligible for these savings.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Value-Based Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma</td>
<td>Pay less for a three-month supply of certain antiasthmatic medications through the mail service pharmacy. This will help you afford your medications and stay out of the emergency room.</td>
</tr>
<tr>
<td>Diabetes</td>
<td>Pay less for a three-month supply of certain medications and supplies to help manage blood sugar when you use the mail service pharmacy to fill prescriptions. There are no copayments for the first two office visits in each calendar year for certain diabetic monitoring care. You can use those two office visits for diabetes evaluation and management, diabetic foot care, and diabetic eye exams.</td>
</tr>
</tbody>
</table>
Employers (as Payers) Are Talking About “Value”

About Us

Mission Statement
To trigger giant leaps forward in the safety, quality and affordability of health care by:
• Supporting informed healthcare decisions by those who use and pay for health care; and,
• Promoting high-value health care through incentives and rewards.

The Leapfrog Group is a voluntary program aimed at mobilizing employer purchasing power to alert America’s health industry that big leaps in health care safety, quality and customer value will be recognized and rewarded. Among other initiatives, Leapfrog works with its employer members to encourage transparency and easy access to health care information as well as rewards for hospitals that have a proven record of high quality care.
Employers (as Payers) Are Talking About “Value”
The state’s largest health care system says it will redesign care for thousands of patients and reduce administrative costs as part of a major new initiative intended in part to make treatment at its teaching hospitals more affordable.

Partners HealthCare, a physician and hospital organization that includes Massachusetts General and Brigham and Women’s hospitals, also plans to launch a “public education campaign” early next year to improve its image, which has taken a pounding this year in the debate over soaring health care costs.

Dr. Gary Gottlieb, Partners’ president, has been introducing the initiative in a speech...
How do we measure “value” or cost-effectiveness?
What Is “Value” in Health Care?

Value = dollars spent per health-related outcome
Economic Analysis of Health Technologies

\[
\text{cost-utility} \quad (\text{US$ / QALY}) \quad = \quad \frac{\Delta \text{monetary cost}}{\Delta \text{health benefits}}
\]

Sources of Costs in Health Care

- **Direct costs**: expenditures for resources that can be directly linked to specific patients (ex. medications)

- **Indirect costs**: tied to costs of production, but lacking 1:1 relationship (ex. housekeeping)

- **Overhead**: not tied to production (exs. human resources, accounting and finance)

Monetary Costs: Perspective Matters

Perspectives:
- short- vs. long-term?
- total vs. inpatient?
- societal vs. payor?
- relative to what?
The MOVIE Study: Model to Optimize healthcare Value for Ischemic Extremities
MOVIE Study Collaborators

Division of Vascular Surgery and Endovascular Therapy
Michael E. DeBakey Department of Surgery
Baylor College of Medicine (Houston, Texas)

- Michael Belkin, M.D.
- C. Keith Ozaki, M.D.
- Matthew T. Menard, M.D.
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- James Chambers, M.Pharm., M.Sc.
- Pei-Jung (“Paige”) Lin, Ph.D.
- Joshua Cohen, Ph.D.

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Department of Surgery
Brigham and Women’s Hospital (Boston, Massachusetts)

- Neal R. Barshes, M.D., M.P.H.
- Panos Kougias, M.D.
The MOVIE Study: Primary Objective

To compare the costs and health benefits of various management strategies for Rutherford category 5 critical limb ischemia in U.S. medical centers
The hypothetical scenario:

68 year-old man with

- tissue loss in a salvageable foot
- chronic arterial ischemia
- ambulatory
- living independently
The MOVIE Model: Strategies Examined

1. Infrainguinal bypass; subsequent surgical revision(s) as needed*
2. Infrainguinal bypass; subsequent endovascular revision(s)/intervention(s) as needed*
3. Endovascular intervention; subsequent infrainguinal bypass and surgical revision(s) as needed*
4. Endovascular intervention; subsequent re-interventions as needed*
5. Primary amputation
6. Local wound care; major amputation as needed

* strategy modeled up to six total interventions (ex. surgery + as many as five subsequent surgical or endovascular interventions)
The MOVIE Model: Overview of Methodology

- computerized Markov model of management/outcome
  - Patient-oriented clinical states
  - 1,000 trials of 1,000 hypothetical patient cohorts
  - Ten one-year cycles
- Probabilistic sensitivity analysis
  - Deterministic sensitivity analyses for pre-selected parameters
- All costs calculated in terms of 2009 U.S. dollars
- Standard (3.5%) discounting of costs, effects
- Microsoft Excel with Visual Basic
## Alternative Patient-Centered Endpoints

<table>
<thead>
<tr>
<th>Model</th>
<th>Strategy</th>
<th>Cost per limb-year</th>
<th>Cost per year of ambulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Primary amputation</td>
<td>N/A</td>
<td>$15,527</td>
</tr>
<tr>
<td>3</td>
<td>Bypass + surgical revision</td>
<td>$8,640</td>
<td>$6,934</td>
</tr>
<tr>
<td>4</td>
<td>Bypass + endo. revision</td>
<td>$7,021</td>
<td>$5,634</td>
</tr>
<tr>
<td>5</td>
<td>Endovascular intervention</td>
<td>$10,752</td>
<td>$8,660</td>
</tr>
<tr>
<td>6</td>
<td>Initial endovascular intervention; bypass for failures</td>
<td>$10,399</td>
<td>$8,350</td>
</tr>
</tbody>
</table>

Limb Preservation is Worthwhile: A Synopsis

1. **Does leg amputation have a significant negative impact?**
   - Yes.
   

2. **Are limb preservation efforts effective and durable?**
   - Yes.
   

3. **Are limb preservation efforts higher risk than amputation?**
   - No.
   

4. **Are limb preservation efforts worthwhile (i.e. cost-effective)?**
   - Yes.
   

5. **Even for patients without adequate saphenous vein?**
   - Yep.
   

6. **How about for frail, elderly patients?**
   - Even more so.
   
A Cost-Effective Approach to Revascularization

Recommendations
1. Understand and optimize your “value” equation
   • Decrease costs – short-term and long-term
   • Improve patient-centered outcomes
   • Work across the spectrum of care (not just your “niche”)

2. Support efforts to link reimbursement with patient outcomes
Thank you for your attention!
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