Quality Improvement in a Limb Preservation Program

Graeme E. McFarland, MD
Assistant Professor
Co-Director UAB Advanced Limb Preservation Program
Division of Vascular Surgery and Endovascular Therapy
University of Alabama at Birmingham
OUTLINE

• What exactly is QUALITY IMPROVEMENT (QI)?
• Establishment of a Limb Preservation Program
• What has already been done?
• How does the VQI apply to QI in a Limb Preservation Program?
QUALITY IMPROVEMENT

• “Consists of systematic and continuous actions that lead to measurable improvement in health care services and the health status of targeted patient groups.”
APPROACH TO QI

Current System
“How things are done now”

Systems and Processes
- Access to care
- Patient safety
- Evidenced based care
- Care coordination
- Cultural competence

Improved Performance
- Efficiency
- Outcomes
- Patient Satisfaction

- Often involves more than one discipline
  - Complex

- Separates what is thought to be happening from what is really happening
- Indicates whether changes lead to improvements
- Comparisons of performance across sites (VQI)
QI is most effective if it is individualized to meet the needs of a specific organization’s health service delivery system.
PROCESS MAPPING

• By mapping a particular clinical pathway for a clinical service, an organization gains a better understanding of what and how care is provided.

• By comparing a map to one that shows optimal care and is congruent with evidenced-based guidelines, it sees other opportunities to provide and improve delivered care.

• See what has worked for other organizations, make changes to match what works, confirm it works….this is how quality improvement functions.
BENEFITS OF A QI PROGRAM

• Improved clinical outcomes

• Improved efficiency – reduce waste and costs

• Recognize and solve problems before they occur

• Improved communication with resources internal and external to the organization
• Real-time benchmarked reports
  • Physicians and hospitals can assess quality of care delivered
    • Physician and institution level
  • Compare to local, regional, and national data
  • Trend outcomes
  • Opportunities for quality initiatives
  • Large sample obtainment in a relatively short amount of time
    • Leads to timely data that can be applied to current practice

• Center Opportunity Profile for Improvement (COPI)
REGIONAL QUALITY GROUPS

• Translating national data into quality improvement is not straightforward
• Stimulate regional ownership of the process
• Specific quality improvement initiatives

• Regional groups are charged with implementing quality improvement
  • e.g. VSGNE increased regional use of a patch for CEA from 87% - 96% and significantly decreased the incidence of restenosis at 1 year. (J Vasc Surg 2010;52:897-904.)
THE LIMB PRESERVATION PROGRAM

• Multidisciplinary approach to limb preservation
• Rapid assessment
• Improved wound healing
• Enhanced revascularization
• Goal: Decrease amputation, maintain functional limbs
• Large variation in care exist – where quality improvement comes in
Patients with PAD Who Underwent Major Leg Amputation
n=20,464

Amputation With Vascular Intervention in Year Prior To Amputation
n=9,349 (46%)

Amputation Without Any Vascular Intervention in Year Prior To Amputation
n=11,115 (54%)

Diagnostic Endovascular Intervention Only
n=3,493 (17%)

Therapeutic Endovascular Intervention Only
n=2,265 (11%)

Open Surgery Only
n=575 (3%)

Both Endovascular Intervention and Open Surgery
n=653 (4%)

• How can we use the VQI for quality improvement in the development and growth of a Limb Preservation Program

• An example looking at LOS after infrainguinal bypass surgery:
  
  • Increased institutional and regional length of stay following infrainguinal bypass surgery → Enhanced Recovery Program
B: Rate of LOS > 7 days by Center (2016-August 2018)

C: Rate of LOS > 7 days in Your Region (2015-August 2018)

D: Rate of LOS > 7 days in Your Region (2015-August 2018)

Detailed results for 2015-August 2018

- Number of procedures meeting inclusion criteria
- Mean (SD) [Median] post-op length of stay
- Number of procedures included in analysis
- Observed rate of LOS > 7 days included in analysis
- Expected rate of LOS > 7 days included in analysis
- P-value for O/E comparison
- P-value for comparison of 2011-2014 vs. 2015-August 2018 observed rates

Because the multivariate model presented in the COPI table is used to calculate expected rates of LOS > 7 days, any patients missing data on any factors in that model must be excluded from the analysis.
ENHANCED RECOVERY PROGRAM (ERP)

- Multimodal approach to perioperative management
- Reduce surgical stress response
- Improve postoperative outcomes
- Decrease LOS
- Eliminate racial/ethnic surgical disparities
SMOKING CESSATION

Initial Visit:
Identify Patients who are currently smoking at intake

Smoking Cessation Clinic Protocol:
- Patient Education
  - Supportive and empathetic discussion
  - Discuss the Importance of smoking cessation
  - Acknowledge that quitting is hard, do not trivialize
  - Explain why tobacco is addictive, how medication can help and how it works
- Help to choose a low stress quit date
- Recommend elimination of cigarettes from home and remove potential triggers
- Encourage other present family members to quit along with patient
- Medication
  - First line: Wellbutrin + Nicotine patch (dose tailored to daily cigarette use)
  - Start Wellbutrin/NRT 7 days prior to chosen quit day
  - Chantix if patient prefers or if contraindication to Wellbutrin
  - No NRT while on Chantix, decrease cigarette consumption by half leading up to quit date
  - Discuss side effects (if not discussed, patient is likely to stop medication)
  - Provide written educational materials reinforcing discussion and medication regimen
  - Recommend patients consult the 1-800-QUIT-NOW (800-784-8669)

Document Smoking Cessation Intervention in EMR

Follow up visit:
- Current smoking status identified at intake
- Did the patient join any cessation programs?
- Have they used medication?
- If the patient did not quit, offer medication again and discuss importance again
- If successfully quit, make sure to discuss and praise success

No Follow up Visit:
- Nurse/Quality Manager contact via phone once a month regarding smoking status
- Do they need refills or need to speak to a provider?

Document in EMR
PDCA METHOD

Plan
August-December 2017
- Identify patient population
- Establish baseline metrics - LOS, SSI %, variable cost per case, readmission rate
- Identify champions for each component of multidisciplinary team
- Multidisciplinary meetings to identify early barriers

Adjust
May 2018-present
- Make process adjustments based on data from monitoring metrics and feedback from multidisciplinary champions

Check
May 2018-present
- Multidisciplinary meetings to identify barriers and determine areas for process improvement
- Monitor metrics

Do
January-May 2018
- Execute work plans developed in multidisciplinary meetings
- Biweekly multidisciplinary meetings to report successes in implementation and identify barriers
OUTCOME METRICS

• Observed to Expected Mortality
• Observed to Expected Length of Stay
• 30-day All Cause Readmissions
• Surgical Site Infections
• Variable Cost/Case
OBSERVED TO EXPECTED MORTALITY PERFORMANCE THROUGH NOVEMBER 2018

Project Started

Go-Live

Source: UAB Care-ERAS Vascular, Tableau
VASCULAR ERAS ENROLLMENT

- Go live: May 2018
- 48 ERAS via “ERAS + General” since January 29, 2019

Vascular ERAS Monthly Enrollment

**Source:** UAB Care ERAS Champions Tableau
**Time:** May – Nov’ 18
Median Length of Stay
May-November 2018

Source: Manual Audit
ERAS ELIGIBLE PATIENTS-AVERAGE O/E LOS INDEX PERFORMANCE THROUGH NOVEMBER 2018

ERAS Eligible Patients-Average O/E LOS Index

Source: UAB Care-ERAS Vascular, Tableau
30-DAY ALL CAUSE READMISSIONS
PERFORMANCE THROUGH NOVEMBER 2018

ERAS Eligible Patients-30% Day All Cause Readmissions

Source: UAB Care-ERAS Vascular, Tableau
SURGICAL SITE INFECTION NUMBER PERFORMANCE THROUGH NOVEMBER 2018

Source: UAB Care-ERAS Vascular, Tableau
## PROCESS METRICS
### PERFORMANCE THROUGH NOVEMBER 2018

<table>
<thead>
<tr>
<th>ERAS Elements Measured</th>
<th>Compliance (n=1) May</th>
<th>Compliance (n=4) June</th>
<th>Compliance (n=2) July</th>
<th>Compliance (n=4) August</th>
<th>Compliance (n=5) September</th>
<th>Compliance (n=6) October</th>
<th>Compliance (n=6) November</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preop Education Rate</td>
<td>100</td>
<td>75</td>
<td>100</td>
<td>50</td>
<td>40</td>
<td>66.7</td>
<td>83.3</td>
</tr>
<tr>
<td>Block Rate</td>
<td>100</td>
<td>100</td>
<td>50</td>
<td>100</td>
<td>80</td>
<td>66.7</td>
<td>100</td>
</tr>
<tr>
<td>Multimodal Analgesia Rate</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>75</td>
<td>100</td>
<td>83.3</td>
<td>83.3</td>
</tr>
<tr>
<td>ERAS Body Temperature Rate</td>
<td>0</td>
<td>75</td>
<td>0</td>
<td>25</td>
<td>60</td>
<td>66.7</td>
<td>16.67</td>
</tr>
<tr>
<td>ERAS Early Diet Rate</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>75</td>
<td>80</td>
<td>100</td>
<td>83.3</td>
</tr>
<tr>
<td>ERAS Foley Removal Rate</td>
<td>100</td>
<td>75</td>
<td>100</td>
<td>50</td>
<td>80</td>
<td>80</td>
<td>83.3</td>
</tr>
<tr>
<td>ERAS DVT Prophylaxis Rate</td>
<td>0</td>
<td>75</td>
<td>100</td>
<td>100</td>
<td>80</td>
<td>66.7</td>
<td>83.33</td>
</tr>
<tr>
<td>ERAS Pain Score Rate</td>
<td>100</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>60</td>
<td>50</td>
<td>66.7</td>
</tr>
<tr>
<td>No Side Effects Rate</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>ERAS Average Fluid</td>
<td>198.2</td>
<td>259</td>
<td>217</td>
<td>171</td>
<td>283.9</td>
<td>322.7</td>
<td>275^2</td>
</tr>
</tbody>
</table>
CONCLUSION

• Quality improvement is an active process involving multiple team members working towards a common goal.

• Clinical audit has a long history of describing outcomes and challenging established attitudes or practice.
  - VQI is an essential component of this practice.

• Established metrics (Objective Performance Goals) provide benchmarks for CLTI patients and goals for the development and growth of Limb Preservation Centers.
THANK YOU
**Table 1**

**Objective performance goals (OPGs)**

Definition of Objective Performance Goals from the SVS OPG Working Group.

<table>
<thead>
<tr>
<th>Safety OPGs at 30 Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Adverse Limb Events (Amputation or Major Reintervention) (MALE)</td>
</tr>
<tr>
<td>Major Adverse Cardiovascular Events (MI, Stroke or Death) (MACE)</td>
</tr>
<tr>
<td>Above-Ankle Amputation</td>
</tr>
<tr>
<td>Efficacy OPGs at 1 Year</td>
</tr>
<tr>
<td>Freedom from Major Adverse Limb Events or Post-Operative Death (MALE+POD)</td>
</tr>
<tr>
<td>Limb Salvage</td>
</tr>
<tr>
<td>Survival</td>
</tr>
<tr>
<td>Amputation-Free Survival (AFS)</td>
</tr>
<tr>
<td>Freedom From Reintervention, Amputation, or Restenosis (RAS)</td>
</tr>
<tr>
<td>Freedom From Reintervention or Amputation (RAO)</td>
</tr>
</tbody>
</table>

From the Society for Vascular Surgery

**Validation of the Society for Vascular Surgery’s Objective Performance Goals for critical limb ischemia in everyday vascular surgery practice**

Philip P. Goodney, MD, MS,1,2 Andrea Schurman, MD,3 Randall R. DeMartino, MD,4 Brian W. Nolan, MD, MS,1 Nathaniel D. Hewstone, MPH,1 Michael S. Conte, MD,1 Richard J. Powell, MD,4 and Jack L. Cronenwett, MD,1 for the Vascular Study Group of New England, Lebanon, NH; Worcester, Mass; and San Francisco, Calif.

Background: To develop standardized metrics for expected outcomes in lower extremity revascularization for critical limb ischemia (CLI), the Society for Vascular Surgery (SVS) has developed objective performance goals (OPGs) based on aggregate data from randomized trials of lower extremity bypass (LEB). It remains unknown, however, if these targets can be achieved in everyday vascular surgery practice.

Methods: We applied SVS OPG criteria to 1639 patients undergoing 1639 LEB operations for CLI with autogenous vein (excluding patients on dialysis) within the Vascular Study Group of New England (VSGNE). Each of the individual OPGs was calculated within the VSGNE database, along with its surrounding 95% confidence intervals (CIs) and compared to published SVS OPGs using χ² comparisons and survival analysis.

Results: Across most risk areas, patients in the VSGNE and SVS OPG cohorts were similar (clinical high-risk [age >80 years and tissue loss]: 15.7% VSGNE; 16.2% SVS OPG; P = .58; anatomic high risk [infraop arterial target artery]: 57.8% VSGNE; 66.2% SVS OPG; P = .32). However, the proportion of VSGNE patients designated as conduit high risk (lack of single-segment great saphenous vein) was lower (10.2% VSGNE; 20.9% SVS OPG; P < .001). The primary safety endpoint, major adverse limb events (MALE) at 30 days, was lower in the VSGNE cohort (3.2% VSGNE; 2.4-4.6) than the SVS OPG cohort (6.2% VSGNE; 4.2-8.1; P = .05). The primary efficacy OPG endpoint, freedom from any MALE or postoperative death within the first year (MALE + postoperative death [POD]), was similar between VSGNE and SVS OPG cohorts (77% VSGNE and 76% SVS OPG; 95% CI, 5.7% VSGNE; 5.7% SVS OPG; P = .58). In the remaining safety and efficacy OPGs, the VSGNE cohort met or exceeded the benchmarks established by the SVS OPG cohort.

Conclusions: Community and academic centers in everyday vascular surgery practice can meet OPGs derived from centers of excellence in LEB. Quality improvement initiatives, as well as clinical trials, should incorporate OPGs in their outcome measures to facilitate communication and comparison of risk-adjusted outcomes in the treatment of CLI. (J Vasc Surg. 2011;54:1008-1.)