## Five-Year Mortality In Medicare Patients Undergoing Interventions For CLTI And IC Is Worse Than We Thought

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EXCEPTIONAL CARE. WITHOUT EXCEPTION.

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## Peripheral Arterial Disease

- Most common symptoms
  - Intermittent claudication (IC)
  - Chronic limb-threatening ischemia (CLTI), characterized by rest pain or tissue loss
- Most prevalent in Medicare patients
- Historically associated with poor survival
- Not well characterized in the long-term

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## Claudication

- Non-invasive vs invasive interventions
- Interventions more common
- Balance upfront risk with long-term durability and survival
- Goal of 50% success at 2 years

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## Chronic Limb Threatening Ischemia

- Open vs. endo
- Balance upfront risk vs. durability
- BASIL – at 2 years benefit is towards open interventions for limb salvage

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## Long-term Survival

- Historically poorly reported
- Improved understanding of survival in PAD Medicare patients could:
  - Help guide interventions
  - Set expectations for physicians and patients

## Methods

- VISION VQI Medicare-linked data
- January 2010-May 2021
- Primary outcome - survival
- Kaplan-Meier
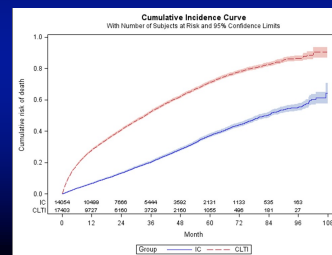- Multivariable analysis

## Methods

- Interventions
  - Peripheral vascular interventions (PVI)
  - Infrainguinal bypass (IIB)
  - Suprainguinal bypass (SIB)
- 5-year survival analysis

## PVI

- 31,457 PVI procedures
- 45% for IC and 55% for CLTI
- Average age 75
- 57% male sex
- PVI for IC compared with CLTI were
  - younger
  - currently smoking
  - fewer comorbidities
  - more stenting
  - more aorto-iliac interventions

## PVI - 5 Year Mortality

- Claudicants - 37.2%
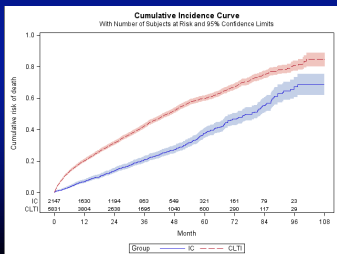- CLTI – 71.1%



## PVI – Mortality Multivariable Analysis

| Covariate | HR | 95% CI | P-Value |
|---|---|---|---|
| End staged renal disease | 3.1 | 2.9-3.3 | <.001 |
| CLTI vs. IC | 2.02 | 1.93-2.12 | <.001 |
| Congestive heart failure | 1.65 | 1.58-1.73 | <.001 |
| Anemia | 1.43 | 1.36-1.51 | <.001 |
| COPD | 1.37 | 1.32-1.43 | <.001 |
| Prior major amputation | 1.32 | 1.03-1.68 | <.05 |
| Diabetes | 1.23 | 1/18-1.28 | <.001 |
| Pre-operative anticoagulation | 1.19 | 1.13-1.25 | <.001 |
| White race | 1.14 | 1.08-1.2 | <.001 |
| Male sex | 1.13 | 1.09-1.18 | <.001 |
| Current smoker | 1.08 | 1.02-1.13 | <.01 |
| Coronary artery disease | 1.08 | 1.04-1.13 | <.001 |
| Prior inflow stent | 1.08 | 1.01-1.16 | <.05 |
| Age, year | 1.04 | 1.04-1.05 | <.001 |
| Pre-admission home living | .54 | .51-.57 | <.001 |
| Pre-operative statin | .86 | .83-9 | <.001 |
| Obesity | .86 | .82-9 | <.002 |
| Pre-operative aspirin | .87 | .83-91 | <.001 |
| Pre-operative aspirin and P2Y12 antagonist | .91 | .86-96 | <.001 |

## IIB

- 7978 IIB
- 27% for IC and 73% for CLTI
- Average age 73
- 64% male sex
- IIB for IC, compared with CLTI
  - younger
  - currently smoking
  - fewer comorbidities
  - fewer tibial targets

## IIB - 5 Year Mortality
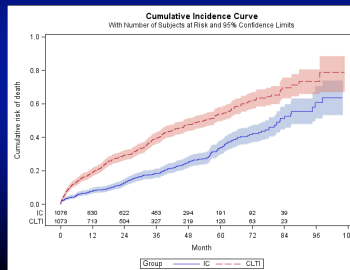
- Claudicants - 37.8%
- CLTI – 60%



Cumulative Incidence Curve
With Number of Subjects at Risk and 95% Confidence Limits

## IIB – Mortality Multivariable Analysis

| Covariate | HR | 95% CI | P-Value |
|---|---|---|---|
| End staged renal disease | 3.56 | 3.1-4.1 | <.001 |
| Prior major amputation | 2.7 | 1-7.24 | <.05 |
| CLTI vs. IC | 1.6 | 1.45-1.77 | <.001 |
| Congestive heart failure | 1.56 | 1.43-1.7 | <.001 |
| COPD | 1.42 | 1.31-1.54 | <.001 |
| Anemia | 1.35 | 1.24-1.48 | <.001 |
| Diabetes | 1.2 | 1.11-1.3 | <.001 |
| Pre-operative anticoagulation | 1.16 | 1.05-1.28 | <.01 |
| Male sex | 1.15 | 1.06-1.24 | <.001 |
| White race | 1.13 | 1.02-1.25 | <.05 |
| Age | 1.05 | 1.05-1.06 | <.001 |
| Home living | .6 | .53-.69 | <.001 |
| Obesity | .85 | .78-.93 | <.001 |
| Aspirin | .86 | .79-.95 | <.001 |

## SIB

- 2149 SIB
- 50% for IC and 50% for CLTI
- Average age 72
- 52% male sex
- SIB for IC, compared with CLTI
  - younger
  - currently smoking
  - fewer comorbidities
  - fewer extra-anatomical bypasses

## SIB - 5 Year Mortality

- Claudicants - 33.8%
- CLTI – 53.8%



Cumulative Incidence Curve
With Number of Subjects at Risk and 95% Confidence Limits

## SIB – Mortality Multivariable Analysis

| Covariate | HR | 95% CI | P-Value |
|---|---|---|---|
| End-stage renal disease | 3.87 | 2.6-5.8 | <.001 |
| Prior major amputation | 2.24 | 1.3-3.85 | <.01 |
| Anemia | 1.68 | 1.34-2.1 | <.001 |
| CLTI vs. IC | 1.64 | 1.39-1.94 | <.001 |
| Congestive heart failure | 1.39 | 1.13-1.72 | <.01 |
| COPD | 1.33 | 1.13-1.72 | <.001 |
| Diabetes | 1.21 | 1.02-1.44 | <.05 |
| Age | 1.06 | 1.04-1.07 | <.001 |
| Pre-operative home living | .45 | .32-.63 | <.001 |
| Aspirin | .82 | .68-.99 | <.05 |
| Primary Medicare | .5 | .33-.77 | <.01 |

## Conclusions

- Long-term survival in Medicare patients undergoing interventions for PAD is poor
- Particularly for patients with CLTI of whom almost two-thirds were not alive at 5 years
- Patients with ESRD, anemia, COPD, CHF at higher risk across all procedures

## Conclusions

- Survival for patients undergoing elective interventions for IC was also poor
- These data can help guide discussions and expectations with patients about the type of intervention for CLTI and the benefits of any intervention for IC