Impact Of Community-level Socioeconomic Disadvantage on Outcomes Following Lower Extremity Amputation

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Introduction

- Socioeconomic status (SES) influences PAD progression and treatment, with disadvantaged patients more likely to present with advanced disease and undergo primary amputation over revascularization.
- Limited access to vascular care contributes to disparities, with only 8% of patients seeing a primary care physician before lower extremity amputation (LEA) and 30% receiving a vascular assessment.

Objective

- This study assesses the effect of community-level socioeconomic disadvantage on outcomes after LEA for critical limb-threatening ischemia (CLTI).

Methods

- Data: Vascular Quality Initiative (VQI) was queried for LEA procedures performed for CLTI from 2003-2024.
- ADI measured community-level socioeconomic disadvantage.
  - Median ADI score categorized into quintiles (Q1–Q5), with Q5 representing the highest socioeconomic disadvantage.
- Trends in patient characteristics across ADI quintiles were evaluated using the Cuzick test.
- Perioperative outcomes and 5-year mortality were assessed using multivariable logistic regression and Cox regression
- Outcomes were stratified by major (above-ankle) versus minor amputation.

Tables

Table I. Baseline characteristics of patients undergoing lower extremity amputation, stratified by ADI Score quintile and amputation severity.

	Q1 (N=4029)	Q2 (N=3700)	Q3 (N=3317)	Q4 (N=7628)	Q5 (N=3566)	Cuzick Test Statistic	P-value
Age (Mean (SD))	66.7 (12.6)	65.4 (12.3)	65.7 (12.3)	63.8 (12.4)	63.1 (12.2)	-15.1	**<0.001**
Amputation							
Minor Amputation	27%	29%	25.3%	25%	21%	5.3	**<0.001**
Major amputation	73%	71%	75%	75%	79%		
Prior Procedures							
Major Amputation	7.3%	8.0%	7.8%	7.8%	8.5%	0.9	0.39
Minor Amputation	39%	40%	39%	36%	33%	-5.1	**<0.001**
Ipsilateral Amputation	46%	48%	47%	44%	42%	-4.4	**<0.001**
Ipsilateral Inflow Procedure	8.3%	11%	12%	12%	14%	4.4	**<0.001**
Ipsilateral Bypass	18%	18%	18%	17%	16%	-1.4	0.15
Ipsilateral Stent	38%	33%	35%	32%	28%	-6.4	**<0.001**
Urgency							
Elective	60%	55%	58%	58%	61%	-2.5	**0.01**
Urgent	29%	28%	29%	30%	33%		
Emergent	11%	16%	12%	11%	6.4%		

ADI: Area Deprivation Index; BKA: Below knee amputation; AKA: Above knee amputation

Table II. Multivariable outcomes following LEA, stratified by ADI Score quintile and amputation severity. (Quintile 1 = reference)

	Q2	Q3	Q4	Q5
Perioperative Morality	aOR [95% CI],P-Value	aOR [95% CI],P-Value	aOR [95% CI],P-Value	aOR [95% CI],P-Value
All Amp.	1.0 [0.81, 1.18], 0.8	0.9 [0.74, 1.1], 0.3	1.0 [0.85, 1.2], >0.9	1.1 [0.89, 1.3], 0.4
Major Amp.	1.0 [0.83, 1.3], 0.8	0.9 [0.71, 1.1], 0.3	1.0 [0.85, 1.2], 0.8	1.2 [0.92, 1.5], 0.2
Minor Amp.	0.7 [0.48, 1.1], 0.1	0.7 [0.47, 1.1], 0.2	0.8 [0.56, 1.1], 0.2	0.8 [0.52, 1.3], 0.2
5-Year Mortality	aHR [95% CI], P-Value	aHR [95% CI], P-Value	aHR [95% CI], P-Value	aHR [95% CI], P-Value
All Amp	1.2 [1.1, 1.3], **0.002**	1.1 [1.0, 1.2], **0.04**	1.2 [1.1, 1.3],**<0.001**	1.2 [1.1, 1.4], **<0.001**
Major Amp	1.2 [1.1, 1.4],**<0.001**	1.1 [0.99, 1.2], 0.09	1.2 [1.1, 1.3], **<0.001**	1.3 [1.1, 1.4], **<0.001**
Minor Amp	1.0 [0.83, 1.2], >0.9	1.1 [0.94, 1.4], 0.2	1.1 [0.91, 1.3], 0.4	1.2 [0.98, 1.5], 0.08

Outcomes adjusted for: center volume, prior procedures, amputation severity, insurance status, age, sex, body mass index, coexisting conditions, smoking history, and medication use. Q1-Q5: Area deprivation index quintiles. P<0.05 considered significant.

Results

- Higher ADI quintiles were associated with:
  - Lower rates of prior minor amputation and revascularization.
  - Higher rates of major and above-knee amputation.
  - More frequent presentation with ischemic tissue loss, but lower rates of acute infection (**Table I**)
- Perioperative mortality similar across quintiles (**Table II**)
- 5-year mortality increased with socioeconomic disadvantage (**Table II**)
- Prior major and minor amputations were associated with lower perioperative and 5-year mortality.
- Prior revascularization was not significantly associated with mortality outcomes.

Conclusions

- CLTI patients with higher community-level socioeconomic disadvantage:
  - Have lower preoperative healthcare system engagement.
  - Present with more severe disease requiring higher amputation levels.
  - Have similar perioperative mortality but higher 5-year mortality.
- Findings highlight substantial outcome disparities.
- Improving timely access to vascular care may mitigate the impact of socioeconomic disadvantage on procedural risk.

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