



Identifying the Incidence and Risk Factors for Reamputation among Patients Who Underwent Foot Amputation

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Background

- 66,000 diabetic patients had lower extremity amputation in the United States in 2006.
- In patients with peripheral vascular disease and diabetes,
 - High ipsilateral reamputation rate (60% in 5 years)
 - High mortality (5 year survival rate in patients with AKA and BKA: 29%)
- Reported risk factors for reamputation or a non-healing wound
 - Heel lesions
 - Age
 - End stage renal disease
 - Severe ischemia

Aims of This Study

1. To identify the incidence of and risk factors for ipsilateral reamputation after forefoot amputation
2. To evaluate if postoperative infection increases the risk of reamputation
3. To evaluate if the risk of reamputation is affected by the duration of antimicrobial therapy after amputation

Methods

- Approved by Veterans Affairs Pittsburgh Healthcare System (VAPHS) Institutional Review Board
- A retrospective cohort study

Subjects

- Patients who had foot amputation for non-traumatic reason from January 2002 to December 2004 at VAPHS
- Only the initial amputation was evaluated
- Followed up for 3 years or until death.

Statistical Analysis

- A multivariable logistic regression model was used if *p* value was <.1 in univariable analysis
- Stata/IC, version 10.1 and SPSS, version 18.0
- All *p* values ≤.05: significant

Results

- 116 patients were included.
- 57 patients (49.1%) had ipsilateral amputations in 3 years.
- 53 patients (45.7%) died in 3 years.
- 16 patients (13.8%) developed postoperative infections.
 - The meantime to onset of the infection was 12.4 ± 6.0 days.
- Microbiology
 - 7 patients` blood cultures and 12 patients` intraoperative cultures were positive.
 - No predominant organism isolated
 - No difference in the 2 groups

Table 1. Risk Factors for Reamputation in Univariable Analysis

Risk factors	No. (%) of cases		<i>p</i> value
	Involving patients with reamputation (n=57)	Involving patients without reamputation (n=59)	
Male sex	57 (100)	58 (98.3)	1
Age, years, mean (range)	67.8 (34-92)	65.9 (36-86)	0.821
Urgent surgery	18 (31.6)	10 (16.9)	0.066
Upper level of amputation ¹	5 (8.8)	0 (0)	0.026
Operation time (min), mean (range)	44 (3-387)	40 (9-299)	0.836
Open wound	39 (68.4)	30 (50.8)	0.054
Hospitalization (day)	8.37 (0-42)	4.29 (0-30)	0.0026
Smoke	19 (43.2)	22 (45.8)	0.798
Diabetes	50 (87.7)	43 (72.9)	0.071
Insulin dependent diabetes	36 (63.2)	23 (39.0)	0.028
End stage renal disease	5 (8.8)	3 (5.1)	0.486
Coronary artery disease	34 (59.6)	26 (44.1)	0.093
Immunosuppressant use	2 (3.5)	0 (0)	0.239
Prior amputation	22 (38.6)	17 (28.8)	0.265
Prior revascularization	11 (19.3)	10 (16.9)	0.743
Concurrent revascularization	8 (14.0)	14 (23.7)	0.183
Ulcer	49 (89.0)	52 (88.1)	0.873
Gangrene	41 (71.9)	25 (42.4)	0.001
No pulse on dorsalis pedis	14 (46.7)	24 (58.5)	0.322
Systemic infection	29 (50.9)	21 (35.6)	0.097
Malnutrition	40 (95.2)	32 (84.2)	0.141
Ischemia in ABI ²	21 (72.4)	25 (64.1)	0.469
Long course antibiotic use ³	19 (33.9)	10 (16.9)	0.027
Postoperative infection	10 (17.5)	6 (10.2)	0.29

Note

1- Hindfoot and midfoot amputation were compared to metatarsal and toe amputation

2- ABI, ankle-brachial index

3- Antibiotics for longer than 2 weeks were compared to antibiotics for 2 weeks or less than 2 weeks

Table 2. Risk Factors for Reamputation in Multivariable Logistic Regression Model

Variable	<i>p</i> value	OR	(95% CI)
Gangrene on admission	0.003	3.82	(1.60-9.12)
Insulin dependent diabetes	0.012	2.93	(1.26-6.78)
Coronary artery disease	0.056	2.27	(0.98-5.26)
Long course antibiotic use	0.09	2.29	(0.88-5.96)

Note - OR, odds ratio CI, confidence interval

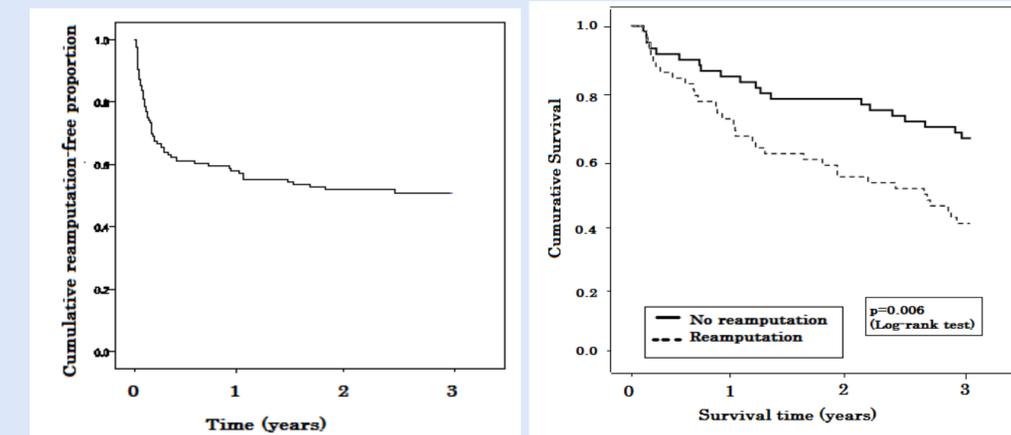


Figure 1 (left) Kaplan-Meier curves of reamputation-free survival times in 3 years
Figure 2 (right) Kaplan-Meier curves of survival proportion in patients with reamputation compared with patients without reamputation

Discussion/ Conclusions

- About half of patients required ipsilateral reamputation and died in 3 years.
- Gangrene on admission and history of insulin dependent diabetes were significant risk factors (*p*=0.003, *p*=0.012).
- Long duration of antibiotic use after amputation and postoperative infection did not change the risk of reamputation.
- Early surgical intervention with determination of amputation levels using noninvasive blood flow measurements, imaging and intraoperative histological diagnosis may decrease the need for reamputation.