

Introduction

Multidisciplinary care with vascular surgery and plastic surgery is integral for lower extremity free flap (LEFF) success in the chronic wound population with diabetes and peripheral vascular disease^{1,2}. A previous study from our study demonstrated a case series of patients who received targeted revascularization prior to their LEFF³. As our institution has implemented pre-LEFF angiogram protocols⁴, we expand on this concept and evaluate the outcomes in a larger cohort of patients who received targeted revascularization (TR) to the recipient vessel for LEFF anastomosis versus non-targeted revascularization (NR) of arterial recipients prior to LEFF.

Methods

LEFF patients who underwent preoperative endovascular revascularization (ER) from July 2011 to January 2023 were reviewed. Location of ER, demographics, perioperative details, and outcomes were collected. TR was performed on the same vessel as the flap recipient and NR was located on a different vessel than the flap recipient.

Results

- Both TR and NR groups had a high prevalence of diabetes, peripheral artery disease, neuropathy, and chronic kidney disease
- After LEFF, both TR and NR groups had similar rates of a postoperative angiogram (42.9% vs. 48.2%, p=0.694) and re-intervention (35.7% vs. 40.7% p=0.701).
- No significant differences were found in rates of any postoperative flap complications (p=0.898), takeback (p=0.352), partial flap necrosis (p=0.648), or dehiscence (p=0.729).
- Amputation rates were similar between TR and NR (17.9% vs. 14.8%, p=1.000).

	Total	TR	NR	p-value
	No. (%)	No. (%)	No. (%)	
	55 (100.0)	28 (50.9)	27 (49.1)	
Patient Demographics				
Age, mean ± SD	60.3 ± 10.9	60.9 ± 10.0	59.8 ± 11.9	0.726
BMI (kg/m2), median [IQR]	28.5 [6.0]	29.9 [5.4]	28 [4.9]	0.045*
Sex, Male	40 (72.7)	22 (78.6)	18 (66.7)	0.322
Comorbidities				
CCI, mean ± SD	5.3 ± 1.9	5.4 ± 1.8	5.2 ± 2.0	0.694
Diabetes	48 (87.3)	26 (92.9)	22 (81.5)	0.252
Peripheral Artery Disease	40 (72.7)	19 (67.9)	21 (77.8)	0.409
Neuropathy	40 (72.7)	20 (71.4)	20 (74.1)	0.826
History of Venous Thromboembolism	5 (9.1)	3 (10.7)	2 (7.4)	1.000
Chronic Kidney Disease	17 (30.9)	11 (39.3)	6 (22.2)	0.171
Congestive Heart Failure	7 (12.7)	1 (3.6)	6 (22.2)	0.051

Preoperative LE Angiogram Findings & Endovascular Intervention				
Pre-Intervention Vessel Run-Off				0.125
0-VRO	7 (12.7)	6 (21.4)	1 (3.7)	
1-VRO	19 (34.6)	11 (39.3)	8 (29.6)	
2-VRO	23 (41.8)	9 (32.1)	14 (51.9)	
3-VRO	6 (10.9)	2 (7.1)	4 (14.8)	
Time from Angio Intervention to FTT (days), median (IQR)	9 [8]	8 [4.5]	10 [9]	0.121
Location of Endovascular Intervention				
Multiple Vessels	21 (38.2)	14 (50.0)	7 (25.9)	0.066
Upstream Location	10 (18.2)	1 (3.6)	9 (33.3)	0.005*

Postoperative Complications				
Flap Success	54 (98.2)	27 (96.4)	27 (100.0)	1.000
Takeback (POD0-7)	5 (9.1)	4 (14.3)	1 (3.7)	0.352
Partial Flap Necrosis (POD 0-12)	6 (10.9)	3 (10.7)	3 (11.1)	0.648
Hematoma	7 (12.7)	3 (10.7)	4 (14.8)	0.705

Secondary Vascular Intervention				
Post-LEFF Angiogram	25 (45.5)	12 (42.9)	13 (48.2)	0.694
Post-LEFF Vascular Intervention	21 (38.2)	10 (35.7)	11 (40.7)	0.701

Long-Term Outcomes				
Amputation	9 (16.4)	5 (17.9)	4 (14.8)	1.000
Follow-Up (months), median (IQR)	13.8 [23]	11.3 [24.3]	18.8 [22.6]	0.238

Figures

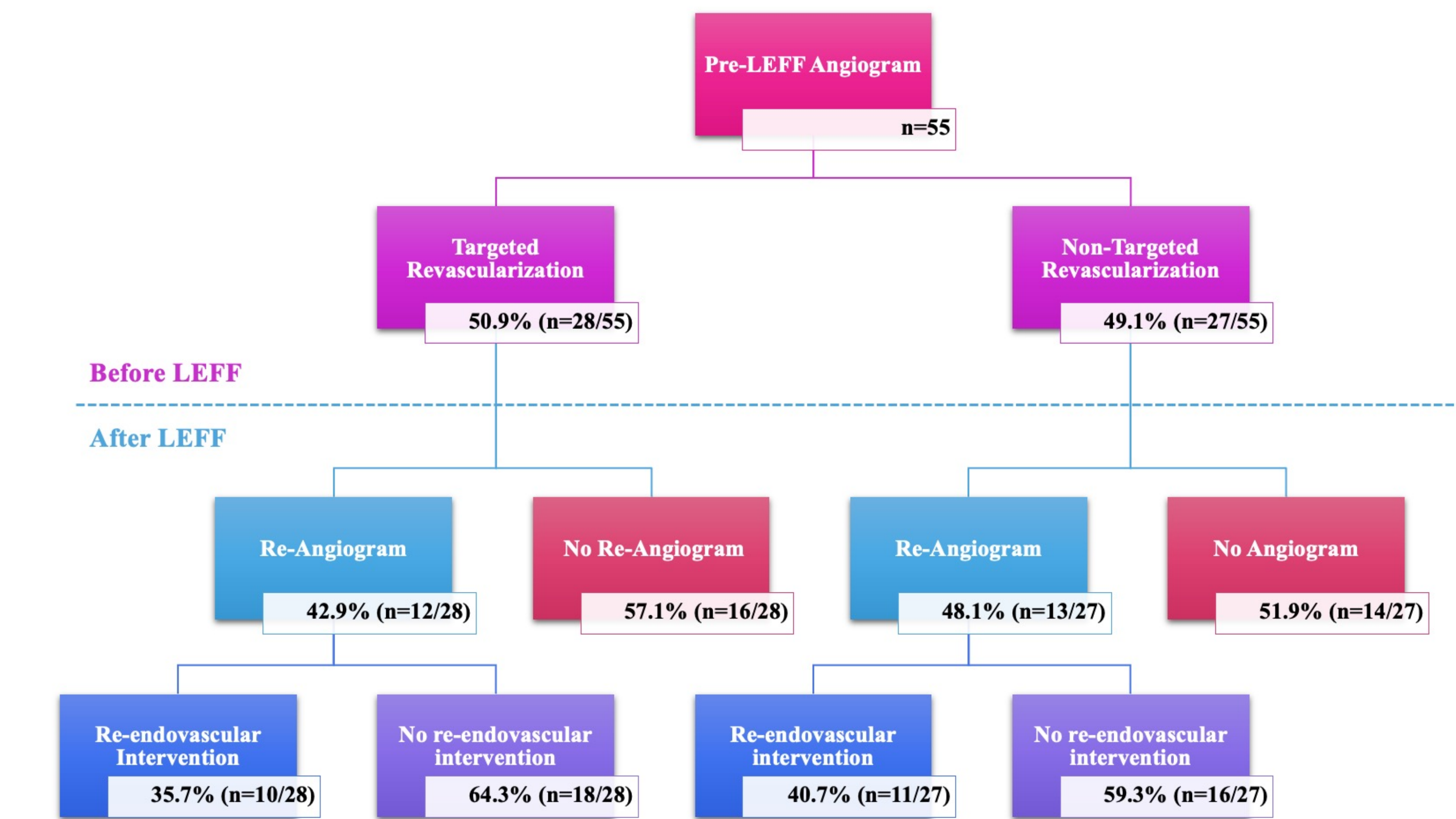


Figure 1. Rates of Post-LEFF Endovascular Revascularization for Targeted Revascularization and Non-Targeted Revascularization Patient Cohorts.

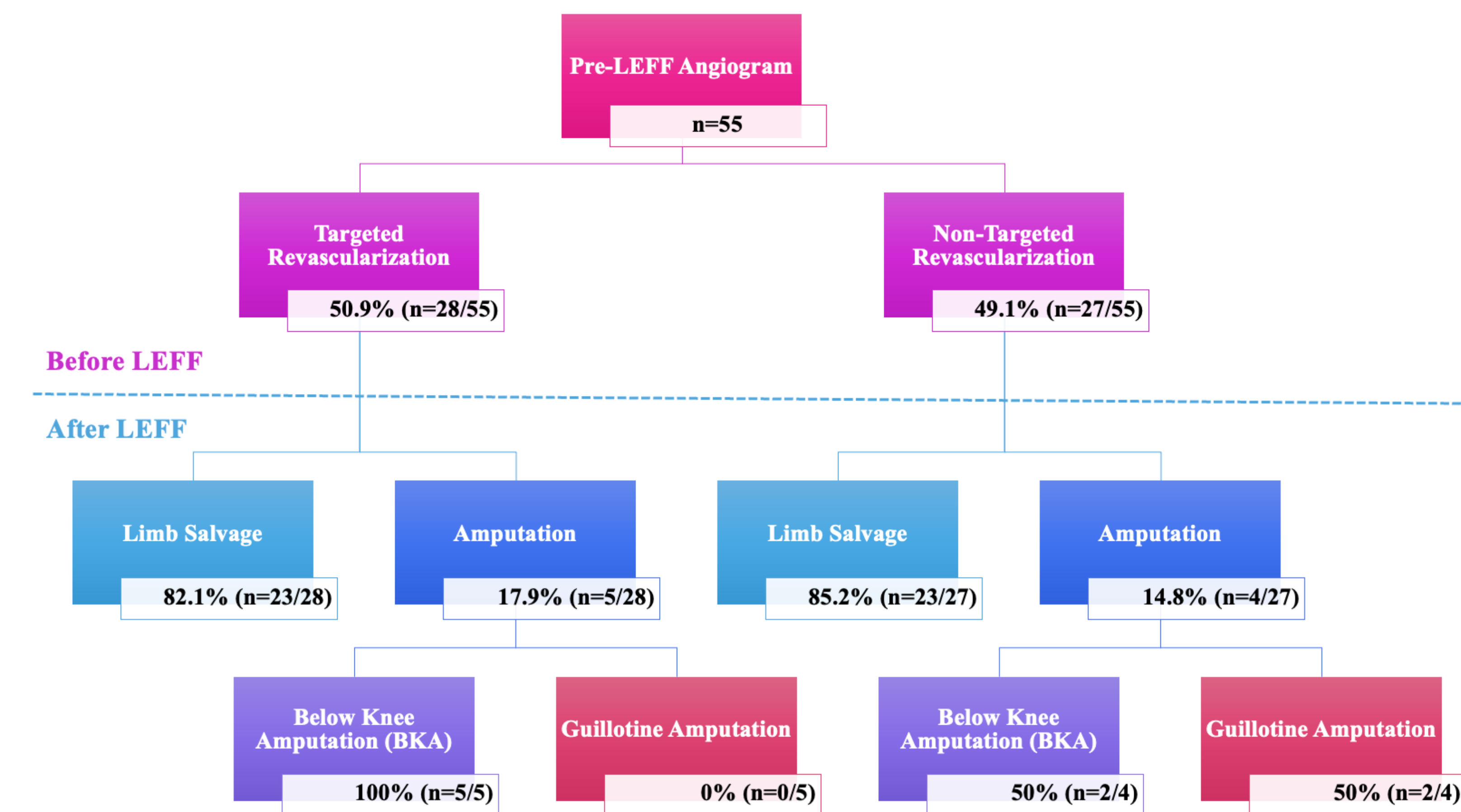


Figure 2. Limb Salvage Outcomes for Targeted Revascularization and Non-Targeted Revascularization Patient Cohorts.

Limitations or next steps

Our study was limited to a small sample size (n=55) and inherently limited in its design as a retrospective review, due to the reliance on the quality and data provided in electronic medical records as a retrospective study. Nevertheless, our study remains one of the largest to date that evaluates the effects of both targeted and non-targeted revascularization in patients undergoing LEFF for wounds related to PVD and are valuable in our vasculo-plastic approach to limb salvage.

Conclusion

Close follow-up with plastic and vascular surgery is essential for limb salvage in patients who undergo endovascular revascularization prior to LEFF, as nearly half of our study cohort required additional endovascular procedures for limb salvage. There were no significant differences in complication rates between TR and NR groups after LEFF, demonstrating that TR is safe to perform, and its effects can be augmented with NR to improve vascularization of the surrounding soft tissue.

References

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