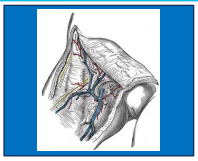
How to accurately evaluate availability and nonavailability of ipsilateral or contralateral great saphenous vein for use for potential bypasses in patients being treated for severe CLTI: How can one determine optimal treatment.



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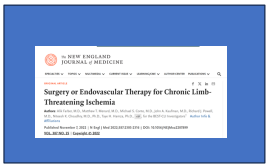
Background

- **BEST CLI**
- **Randomized trial**
- **Cohort 1 : Patients who had a single segment of GSV that could be used for surgery**



Randomization to Treatment strategy
Previous studies have established that bypass surgery using a single segment of great saphenous vein of at least 3 mm in diameter provides superior outcomes to alternative bypass conduits;[13] accordingly, patients were enrolled into one of two parallel trial cohorts based on a pre-randomization duplex ultrasound of the right and left great saphenous veins.

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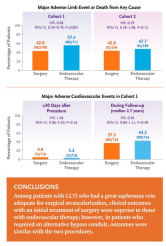
BEST CLI Results



CONCLUSIONS

Among patients with CLTI who had an adequate great saphenous vein for surgical revascularization (cohort 1), the incidence of a major adverse limb event or death was significantly lower in the surgical group than in the endovascular group. Among the patients who lacked an adequate saphenous vein conduit (cohort 2), the outcomes in the two groups were similar.

CONCLUSIONS

Among patients with CLTI who had a great saphenous vein adequate for surgical revascularization, clinical outcomes with an initial treatment of surgery were superior to those with endovascular therapy; however, in patients who required an alternative bypass conduit, outcomes were similar with the two procedures.

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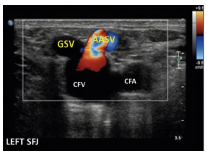
What is adequate GSV?

- Reviewed 239 reversed GSV bypasses placed for CLI
- Grafts categorized as < 3mm, 3 mm, 3.5 mm, and ≥ 4 mm
- Primary graft patency was significantly lower for < 3 mm grafts.
- Length of graft also played a role in patency.
- **Conclusion: Long 3mm and all less than 3 mm reversed GSV grafts should be considered at increased risk for failure**



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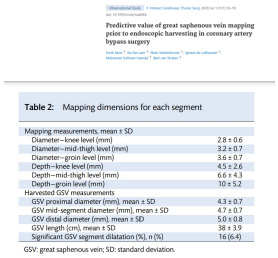
Predictive value of GSV mapping

- Prospective registry of 251 patients
- GSV mapping performed at 3 determined sites
- After harvesting and preparing the GSV, outer diameters were measured
- Appropriate graft size was defined as an outer diameter between 3 and 6 mm



Predictive value of great saphenous vein mapping prior to endoscopic harvesting in coronary artery bypass surgery

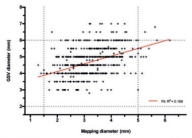
Table 2: Mapping dimensions for each segment

Mapping measurements, mean ± SD	
Diameter—knee level (mm)	2.8 ± 0.6
Diameter—mid-thigh level (mm)	3.2 ± 0.7
Diameter—groin level (mm)	3.6 ± 0.7
Depth—knee level (mm)	4.5 ± 2.6
Depth—mid-thigh level (mm)	6.6 ± 4.3
Depth—groin level (mm)	10 ± 5.2
Harvested GSV measurements	
GSV proximal diameter (mm), mean ± SD	4.3 ± 0.7
GSV mid-segment diameter (mm), mean ± SD	4.7 ± 0.7
GSV distal diameter (mm), mean ± SD	5.0 ± 0.8
GSV length (cm), mean ± SD	38 ± 3.9
Significant GSV segment dilatation (%), n (%)	16 (6.4)

GSV: great saphenous vein; SD: standard deviation.

Predictive value of GSV mapping

- Total 753 GSV segments analyzed
- Average mapping diameter was 3.2 mm
- Harvested GSV had a mean diameter of 4.7 mm
- Mapping diameters were overall significantly correlated with actual GSV diameters (correlation coefficient 0.47, p < 0.001)
- From harvested GSV segments, 96.4% had suitable outer diameters
- If the preoperative mapping diameters were between 1.5 and 5 mm, 96.6% of the GSVs had suitable dimensions after endoscopic vein harvesting for CORONARY bypass



Predictive value of great saphenous vein mapping prior to endoscopic harvesting in coronary artery bypass surgery

Figure 1: All GSV measurements are represented by the diamonds. The 2 horizontal dotted lines illustrate the appropriate GSV size, between 2 and 6 mm. Simple linear regression was performed, illustrated by the red line. GSV: great saphenous vein.

Prevalence of vein mapping

- Data from a multicenter clinical data warehouse 2008-2019 for patients undergoing endovascular first treatment of infrainguinal CLTI ***before the publication of BEST-CLI***
- Only included patients who would have been eligible for enrollment in BEST CLI
- Adequate SSGSV defined as healthy vein > 3mm in diameter from the groin through the knee

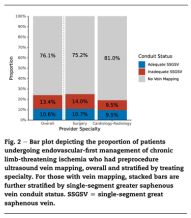


Fig. 2 — Bar plot depicting the proportion of patients undergoing endovascular-first management of chronic limb-threatening ischemia who had preprocedure ultrasound vein mapping, overall and stratified by treating specialty. For those with vein mapping, stacked bars are further stratified by single-segment greater saphenous vein conduit status. SSGSV = single-segment great saphenous vein.

Prevalence of vein mapping

- A total of 142 patients who were candidates for either surgical or endovascular treatment underwent endovascular first management of CLTI. Ultrasound assessment for SSGSV was not performed in 76% of patients prior to endovascular first intervention
- Of those who underwent pre-procedure vein mapping, 44% had adequate SSGSV for bypass

Real-World Vein Mapping Practice Patterns Before Endovascular Treatment of Limb Ischemia

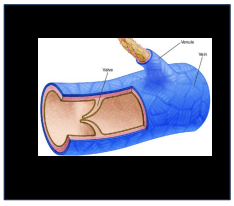
Discussion

In this examination of vein mapping utilization prior to the publication of BEST-CLI, we found that 76.1% of patients undergoing endovascular-first infra-inguinal revascularization for CLTI did not have a preprocedure evaluation of potential vein conduit. Among those who did undergo preprocedure vein mapping, nearly half (44%) were found to have a healthy SSGSV measuring at least 3.0 mm in diameter from the groin through the knee. Ultimately, no convincing associations between the decision to perform vein mapping and patient characteristics were discovered. These results highlight the variability in existing clinical practice and suggest potential opportunities for quality improvement efforts to standardize the preprocedure evaluation of patients with CLTI.

Study Objectives

- BEST CLI noted that in patients with an adequate SSGSV, surgical bypass resulted in superior outcomes when compared to endovascular intervention.
- Thus, the prevalence of an adequate SSGV is an essential factor in planning appropriate intervention.
- The percentage of severe PAD patients with an adequate SSGSV is not well defined
- Objective to study the real world prevalence of adequate SSGSV in patients with severe PAD

- Single center retrospective analysis of patients with severe PAD (ABI < 0.6) who underwent bilateral sonographic GSV mapping from May – November of 2023
- Ipsilateral GSV defined as the symptomatic limb with the lowest ABI.
- GSV diameter measurements obtained in seven locations from the SFJ to the distal calf.
- To be considered "adequate" SSGSV, we defined that all unilateral GSV diameter measurements from the SFJ to the mid calf should be at least 3 mm.
- Prior bypass patients excluded.



Study Results

- Total 70 patients included

	Total (n=70) No. (%)
Age, years (±SD)	75.5 (9.9)
Male Sex	29 (41.4)
Race	
White	48 (68.6)
Black	14 (20.0)
Asian	0 (0)
Other	8 (11.4)
Medical History	
Obesity	16 (22.9)
Hypertension	69 (98.6)
Hyperlipidemia	69 (98.6)
Diabetes	41 (58.6)
Current Smoker	10 (14.3)
Coronary Artery Disease	44 (62.9)
Myocardial Infarction	16 (22.9)
Angina	8 (11.4)
Prior Coronary Artery Bypass Graft Procedure	9 (12.9)
Prior Percutaneous Coronary Intervention	25 (35.7)
Dialysis	1 (1.4)
Congestive Heart Failure	15 (21.4)
Stroke	14 (20.0)

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Study Results

N=8 (11.4%) had completely adequate ipsilateral SSGSV

	Total (n=70) No. (%)	Adequate Ipsilateral SSGSV (n=8) No. (%)	Inadequate Ipsilateral SSGSV (n=62) No. (%)	*P*-Value
Age, years (±SD)	75.5 (9.9)	75 (9.5)	76 (10.3)	0.78
Male Sex	29 (41.4)	3 (37.5)	26 (41.9)	0.81
Race				
White	48 (68.6)	6 (75.0)	42 (67.7)	0.68
Black	14 (20.0)	1 (12.5)	13 (21.0)	0.57
Asian	0 (0)	0 (0)	0 (0)	1.0
Other	8 (11.4)	1 (12.5)	7 (11.3)	0.92
Medical History				
Obesity	16 (22.9)	4 (50.0)	12 (19.4)	0.052
Hypertension	69 (98.6)	8 (100.0)	61 (98.4)	0.72
Hyperlipidemia	69 (98.6)	8 (100.0)	61 (98.4)	0.72
Diabetes	41 (58.6)	7 (87.5)	34 (54.8)	0.08
Current Smoker	10 (14.3)	9 (14.5)	1 (12.5)	0.88
Coronary Artery Disease	44 (62.9)	7 (87.5)	37 (59.7)	0.13
Myocardial Infarction	16 (22.9)	3 (37.5)	13 (21.0)	0.29
Angina	8 (11.4)	1 (12.5)	7 (11.3)	0.92
Prior Coronary Artery Bypass Graft Procedure	9 (12.9)	0 (0.0)	9 (14.5)	0.25
Prior Percutaneous Coronary Intervention	25 (35.7)	5 (62.5)	20 (32.3)	0.09
Dialysis	1 (1.4)	1 (12.5)	0 (0.0)	0.11
Congestive Heart Failure	15 (21.4)	1 (12.5)	14 (22.6)	0.51

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Study Results

Table 1. Demographics, past medical history, and limb status of the total, adequate ipsilateral SSGSV, and inadequate ipsilateral SSGSV cohort.

	Total (n=70) No. (%)	Adequate Ipsilateral SSGSV (n=8) No. (%)	Inadequate Ipsilateral SSGSV (n=62) No. (%)	*P*-Value
Chronic Obstructive Pulmonary Disease	10 (14.3)	1 (12.5)	9 (14.5)	0.88
Chronic Kidney Disease	16 (22.9)	4 (50.0)	12 (19.4)	0.07
Medication				
Statin	62 (88.6)	7 (87.5)	55 (88.7)	0.92
Aspirin	43 (61.4)	6 (75.0)	37 (59.7)	0.74
Clopidogrel	43 (61.4)	4 (50.0)	39 (62.9)	0.48
Direct-Acting Oral Anticoagulant	26 (37.1)	2 (25.0)	24 (38.7)	0.45
Beta Blocker	32 (45.7)	5 (62.5)	27 (43.5)	0.31
Opiate	7 (10.0)	2 (25.0)	5 (8.1)	0.13
Previous Intervention				
Infrainguinal Revascularization of Ipsilateral Limb	56 (80.0)	5 (62.5)	51 (82.3)	0.19
Limb Status				
Ankle-Brachial Index in Ipsilateral Limb (±SD)	0.50 (0.13)	0.50 (0.10)	0.50 (0.15)	0.95
Contralateral SSGSV Adequate	**7 (10.0)**	**4 (50.0)**	**3 (4.8)**	**<0.001**

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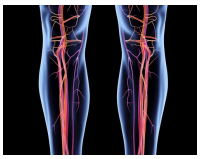
Summary of Results

- Only 11.4% of patients had a completely adequate ipsilateral GSV
- If contralateral vein was also included, the rates of SSGSV adequacy increased to 14.3%.
- No differences in demographics between patients who had adequate SSGSV and those who did not
- Seven patients (10%) were missing ipsilateral GSV due to prior coronary bypass, and one patient (1.4%) had SVT noted in their GSV
- Patients who had an inadequate ipsilateral GSV were less likely to have an adequate contralateral SSGSV



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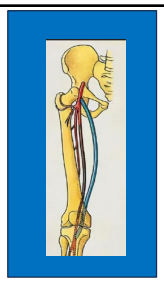
Additional results

- The rates of GSV diameter ≥ 3 mm decreased as measurements were recorded more distally.
- 80% of GSVs were adequate at the level of the SFJ
- 21% were adequate at the proximal calf level
- Only 9% were adequate at the distal calf level



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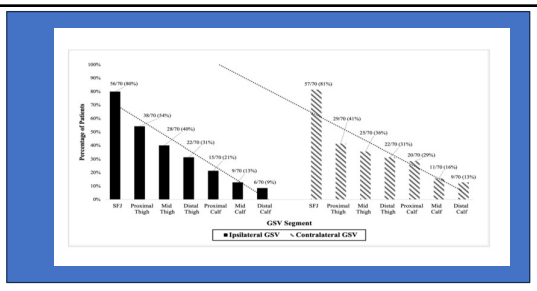

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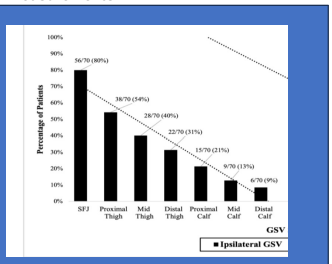
Ipsilateral GSV measurements



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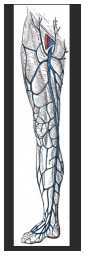
- Majority of patients who present with severe PAD may not have a sonographically adequate ipsilateral nor contralateral GSV available for bypass to the infrageniculate popliteal or tibial arteries.
- The rates of GSV diameter ≥ 3mm were low overall.
- Despite the improved outcomes in surgical bypass patients demonstrated in BEST-CLI, endovascular intervention may likely remain frequently utilized due to the low prevalence of an adequate SSGSV.



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Other methods of GSV assessment?

- CTA typically used for preoperative planning
- GSV is usually well seen on CTA
- 203 patients who underwent infrainguinal bypass
- 73 legs in 47 patients examined with both CTA and sonography
- CTA and US measurements moderately correlated (r = 0.53) across all measurement locations
- Correlation was progressively reduced moving distally.
- Conclusion: Level of error between CTA and US measurements would not be clinically acceptable

Computed Tomography Angiography in the Assessment of Great Saphenous Vein as Conduit for Infrainguinal Bypass Surgery

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Thank you.....

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