

## AFRICAN AMERICAN PATIENT OUTCOMES AFTER SAPHENOUS ABLATION FOR ADVANCED VENOUS DISEASE

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### CONFLICTS OF INTEREST

- None

### BACKGROUND

- **Chronic Venous Insufficiency**
  - > 25 million people in the US
  - 10-15% of Men
  - 20-25% of Women
- **Racial Diversity in the US**
  - 2010: 9 million people multiracial
  - 2020: 33.8 million people multiracial
- **Racial Disparities in Healthcare**
  - Non-White patients: Increased number of major amputations
  - African American patients: Present with advanced stages of venous disease

### METHODOLOGY

- Dataset: Society for Vascular Surgery Vascular Quality Initiative (SVS-VQI)
- Time Period: 2014- 2020
- All patients who underwent unilateral GSV thermal ablation
- > 1 year follow-up data
- Three groups: White, Black/African American, Hispanic
- Sample size: 9,009 patients
  - Females: 64%; Males: 36%
  - White: 7,892 (88%), Hispanic 627 (7%) and Black/African Americans 490 (5%)
- Outcomes:
  - VCSS Score
  - CEAP Score
  - Patient Reported Outcomes

### PREOPERATIVE CHARACTERISTICS

Variable	Total (N = 9009)	White (n = 7892, 87.6%)	African American (n = 490, 5.44%)	Hispanic (n = 627, 7%)	P value
Age, years	Mean ± SD 56.17 ± 13	56.53 ± 14	55.96 ± 12	51.67 ± 13	<.001
Median	57	58	56	50	
Gender					.038
Male	2968 (32.9)	2638 (33.2)	171 (34.9)	179 (28.6)	
Female	6041 (67.1)	5254 (66.8)	319 (65.1)	448 (71.5)	
BMI					<.001
Underweight	221 (2.4)	209 (2.6)	54 (11)	18 (2.8)	
Normal	2732 (30.3)	2394 (30.3)	138 (28)	230 (36.7)	
Overweight	5090 (56.3)	4640 (58.8)	233 (47.6)	217 (34.6)	
Obese	976 (10.8)	819 (10.4)	95 (19.4)	62 (9.9)	
Insurance					.039
Government	2673 (29.7)	2270 (28.8)	145 (29.6)	158 (25.2)	
Private	6336 (70.3)	5622 (71.2)	345 (70.4)	469 (74.8)	
Periprocedural anticoagulation	1928 (21.4)	1822 (23.1)	54 (11)	52 (8.3)	<.001
Performance site					<.001
Hospital outpatient	110 (1.2)	89 (1.1)	7 (1.4)	14 (2.2)	
Hospital inpatient	3 (0.03)	3 (0.04)	—	—	
Ambulatory center	146 (1.6)	140 (1.8)	4 (0.8)	2 (0.3)	
Office	259 (2.9)	259 (3.3)	—	—	

### DISEASE SEVERITY AND POST OP OUTCOMES

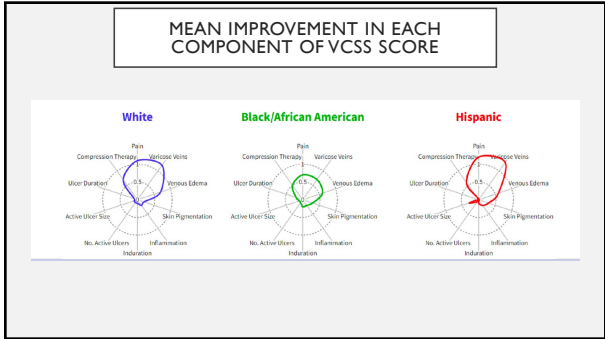
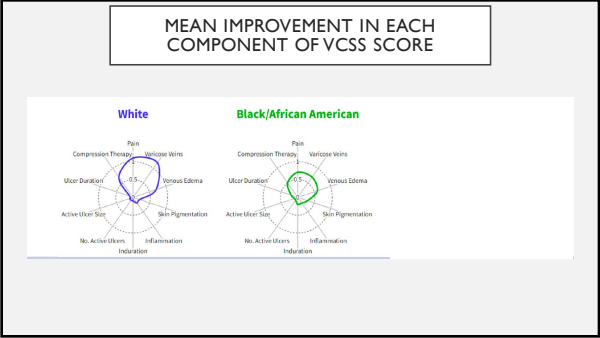
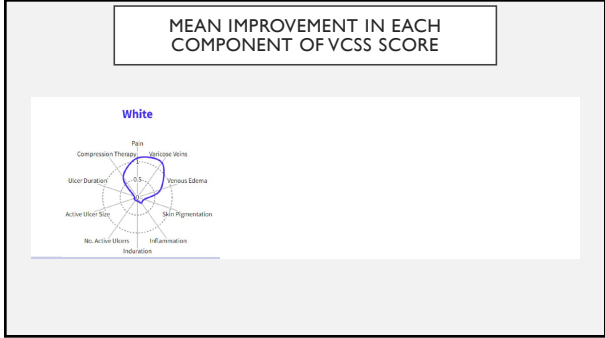
History	Total (N = 9009)	White (n = 7892, 87.6%)	African American (n = 490, 5.44%)	Hispanic (n = 627, 7%)	P value
Superficial phlebitis	1129 (12.5)	912 (11.6)	112 (22.9)	105 (16.9)	<.001
DVT	366 (4.1)	323 (4.1)	42 (8.6)	11 (1.7)	<.001
Venous ulcers	2933 (32.6)	2625 (33.3)	111 (22.6)	109 (17.2)	<.001
PE	4 (0.04)	—	—	—	.003
Phlebectomies No.					
None	779 (8.7)	695 (8.8)	21 (4.3)	43 (6.8)	
1-3	2289 (25.4)	2056 (26.1)	94 (19.2)	137 (21.7)	
4-5	442 (4.9)	402 (5.1)	23 (4.7)	17 (2.7)	
≥6	381 (4.2)	347 (4.4)	17 (3.5)	17 (2.7)	
Preoperative CEAP class					<.001
C0	256 (2.8)	236 (3.0)	14 (2.8)	16 (2.5)	
C1	52 (0.6)	48 (0.6)	3 (0.6)	1 (0.1)	
C2	2040 (22.6)	1826 (23.1)	114 (23.3)	94 (15.0)	
C3	4077 (45.3)	3632 (46.0)	213 (43.5)	244 (39.0)	
C4	1835 (20.4)	1698 (21.6)	103 (21.2)	141 (22.5)	
C5	219 (2.4)	183 (2.3)	23 (4.7)	13 (2.1)	
C6	170 (1.9)	148 (1.9)	12 (2.4)	10 (1.6)	
Nonoperatively					<.001
Missed workdays after procedure	Mean ± SD 2.16 ± 3	2.12 ± 2.98	2.94 ± 3.27	2.23 ± 3.25	
Median	1	1	2	1	
Follow-up visit					.012
Within 30 days	674 (7.5)	576 (7.3)	32 (6.5)	36 (5.7)	
After 30 days	2882 (32.1)	2492 (31.4)	169 (34.5)	221 (35.1)	

# I. IMPROVEMENT IN VCSS SCORES

### IMPROVEMENT IN VCSS SCORE

VCSS component	All patients	Race			P-value
		White	African American	Hispanic	
Pain	1.05 ± 1.0	1.07 ± 1.0	0.74 ± 0.99	1.22 ± 0.94	<.001
Varicose veins	1.14 ± 1.09	1.15 ± 1.09	0.72 ± 0.98	1.20 ± 1.08	<.001
Venous edema	0.7 ± 0.95	0.7 ± 0.95	0.65 ± 0.97	0.68 ± 0.89	.837
Skin pigmentation	0.2 ± 0.67	0.2 ± 0.67	0.3 ± 0.7	0.3 ± 0.6	.813
Inflammation	0.19 ± 0.64	0.16 ± 0.67	0.2 ± 0.67	0.2 ± 0.64	.955
Induration	0.13 ± 0.52	0.13 ± 0.51	0.17 ± 0.59	0.14 ± 0.48	.583
Active ulcers	0.06 ± 0.67	0.16 ± 0.58	0.11 ± 0.59	0.03 ± 0.14	.282
Active ulcer size	0.059 ± 0.35	0.058 ± 0.35	0.02 ± 0.47	0.3 ± 0.22	.247
Ulcer duration	0.065 ± 0.39	0.062 ± 0.39	0.16 ± 0.6	0.051 ± 0.22	.280
Compression therapy	0.68 ± 1.94	0.7 ± 1.96	0.46 ± 1.82	0.90 ± 1.42	<.001
<b>Total score</b>	<b>4.22 ± 4.13</b>	<b>4.25 ± 4.13</b>	<b>3.52 ± 4.4</b>	<b>4.42 ± 3.76</b>	<b>&lt;.001</b>

Total score = sum of all VCSS components. Boldface P values represent statistical significance.



# 2. IMPROVEMENT IN PATIENT REPORTED OUTCOMES

PATIENT REPORTED OUTCOMES (PRO)

PRO Item	All patients	Patient race			P value
		White	African American	Hispanic	
Heaviness	1.41 ± 1.7	1.44 ± 1.7	0.99 ± 1.6	1.43 ± 1.8	<.001
Achiness	1.56 ± 1.7	1.58 ± 1.7	1.13 ± 1.6	1.63 ± 1.8	<.001
Swelling	1.35 ± 1.8	1.37 ± 1.8	1.0 ± 1.6	1.37 ± 1.9	<.001
Throbbing	1.17 ± 1.5	1.17 ± 1.5	1.01 ± 1.5	1.23 ± 1.7	.041
Itching	0.69 ± 1.4	0.68 ± 1.3	0.64 ± 1.4	0.78 ± 1.5	.55
Appearance	1.39 ± 1.6	1.41 ± 1.6	1.03 ± 1.54	1.41 ± 1.7	<.001
Work impact	1.14 ± 1.5	1.16 ± 1.5	0.83 ± 1.5	1.1 ± 1.5	<.001
Total score	8.71 ± 8.1	8.82 ± 8.0	6.64 ± 8.3	8.95 ± 9.1	<.001

Data presented as mean ± standard deviation.  
 Boldface P values represent statistical significance.

3. CORRELATION BETWEEN VCSS SCORE & PRO IMPROVEMENTS

RELATIONSHIP BETWEEN VCSS AND PRO SCORES

	β Coefficient	95% CI	P value
VCSS			
White	Reference		
African American	-0.72	-1.10 to -0.34	<.001
Hispanic	0.29	-0.04 to 0.64	.054
PROs			
White	Reference		
African American	-0.77	-1.53 to -0.02	.043
Hispanic	0.33	-0.13 to 1.18	.114

CI: Confidence Interval.  
 Boldface P values represent statistical significance.

4. IMPROVEMENT IN CEAP SCORES

IMPROVEMENT IN CEAP CLASS BEFORE AND AFTER PROCEDURE

CEAP class	White			African American			Hispanic		
	Before procedure	After procedure	Δ %	Before procedure	After procedure	Δ %	Before procedure	After procedure	Δ %
C0	126 (1.6)	3059 (38.8)	+372	84 (17.1)	229 (46.7)	+29.6	46 (7.3)	353 (56.3)	+49
C1	46 (0.6)	631 (8)	+74	3 (0.6)	24 (4.9)	+4.3	3 (0.5)	54 (8.6)	+8.1
<C1			+44.6			+33.9			+57.1
C2	1826 (23.1)	1567 (19.9)	-32	54 (11)	72 (14.7)	3.7	160 (25.5)	89 (14.2)	-11.3
C3	3632 (46)	1410 (17.9)	-281	161 (32.9)	82 (16.7)	-16.2	244 (38.9)	70 (11.2)	-27.7
C4	1591 (20.2)	830 (10.5)	-97	103 (21)	33 (6.7)	-14.3	141 (22.5)	56 (8.9)	-13.6
C5	183 (2.3)	223 (2.8)	+0.5	23 (4.7)	32 (6.5)	+1.8	13 (2.1)	2 (0.3)	-1.8
C6	488 (6.2)	172 (2.2)	-4	62 (12.7)	18 (3.7)	-9	20 (3.2)	3 (0.5)	-2.7

IMPROVEMENT IN CEAP CLASS BEFORE AND AFTER PROCEDURE

CEAP class	White			African American			Hispanic		
	Before procedure	After procedure	Δ %	Before procedure	After procedure	Δ %	Before procedure	After procedure	Δ %
C0	126 (1.6)	3059 (38.8)	+372	84 (17.1)	229 (46.7)	+29.6	46 (7.3)	353 (56.3)	+49
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C3 DISEASE IS THE MOST COMMON INDICATION FOR GSV ABLATION ACROSS ALL RACES

### IMPROVEMENT IN CEAP CLASS BEFORE AND AFTER PROCEDURE

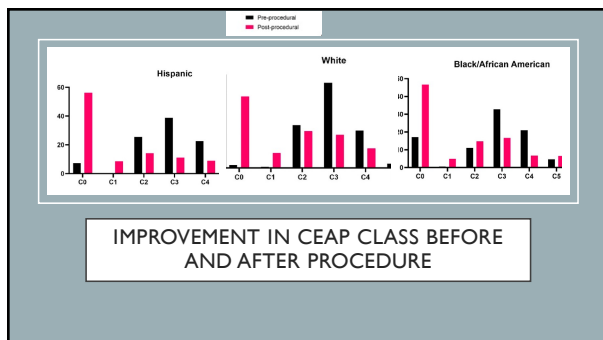
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C1	46 (0.6)	631 (8)	+7.4	3 (0.6)	24 (4.9)	+4.3	3 (0.5)	54 (8.6)	+8.1
<C1			+44.6			+3.9			+57.1
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C5	183 (2.3)	223 (2.8)	+0.5	23 (4.7)	32 (6.5)	+1.8	13 (2.1)	2 (0.3)	-1.8
C6	488 (6.2)	172 (2.2)	-4	62 (12.7)	18 (3.7)	-9	20 (3.2)	3 (0.5)	-2.7

**AFRICAN AMERICANS PRESENT WITH THE HIGHEST PROPORTION OF C5 AND C6 DISEASE**

### IMPROVEMENT IN CEAP CLASS BEFORE AND AFTER PROCEDURE

CEAP class	White			African American			Hispanic		
	Before procedure	After procedure	Δ %	Before procedure	After procedure	Δ %	Before procedure	After procedure	Δ %
C0	126 (1.6)	3059 (38.8)	+37.2	84 (7.1)	229 (46.7)	+29.6	46 (7.3)	353 (56.3)	+49
C1	46 (0.6)	631 (8)	+7.4	3 (0.6)	24 (4.9)	+4.3	3 (0.5)	54 (8.6)	+8.1
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C5	183 (2.3)	223 (2.8)	+0.5	23 (4.7)	32 (6.5)	+1.8	13 (2.1)	2 (0.3)	-1.8
C6	488 (6.2)	172 (2.2)	-4	62 (12.7)	18 (3.7)	-9	20 (3.2)	3 (0.5)	-2.7

**AFRICAN AMERICANS HAVE THE LEAST PROPORTION OF POST-PROCEDURE <C1 DISEASE**



- ### SUMMARY
- Black/African Americans
    - Higher incidence of history of DVT and phlebitis
    - More likely to present with the most advanced form of venous disease (C5, C6)
  - VCSS Outcomes
    - Black/African Americans had the least improvement in the mean VCSS score
    - Black/African Americans had the least improvement in pain, varicose veins, edema and need for compression
  - PRO Outcomes
    - Black/African Americans had the least improvement in heaviness, achiness, swelling, throbbing, appearance and impact on occupation
  - CEAP Outcomes
    - Black/African Americans had the least improvement to postoperative <C1 disease
  - Positive correlation between VCSS and PRO Outcomes

**Black or African American patients undergo great saphenous vein ablation procedures for advanced venous disease and have the least improvement in their symptoms after these procedures**

Ahmed Zikri, MD, MSc, MPH, Christopher DeWen, BS, Bilal Akram, BS, Abdul-Wahab Parscha, BS, and Fabian Aziz, MD, FACS, DFVLS, Aesculap, Inc

**ABSTRACT**  
 Objective: Chronic venous insufficiency is an increasingly prevalent problem in the United States, with ~25 million to 30 million currently affected. Previous work has shown that racial/ethnicity and low socioeconomic status are associated with a worse clinical presentation and response to treatment. The present study aimed to determine the relationship between race/ethnicity, patient variables, hospital outcomes, and response to treatment for patients presenting for chronic venous insufficiency intervention.  
 Methods: We performed a retrospective analysis of all patients who underwent endovenous ablation (radiofrequency or laser) of the great saphenous vein to treat symptomatic, chronic venous insufficiency using Vascular Quality Initiative data from 2006 to 2020. Patient characteristics and outcomes were analyzed stratified by patient race. The 7-day and the 90-day clinical severity score and improvement in patient-reported outcomes. Patient characteristics, CEAP (clinical, etiology, anatomic, pathophysiology) classification, prior venous interventions, length of stay, and time to follow-up were compared between races.  
 Results: The database consisted of 9000 predominantly female patients (n = 8204/8770) with a mean age distribution of 56 years. Of the 9000 patients, 7053 are White (80.6%), 1427 Hispanic (16.0%), and 420 Black or African American (4.7%). The Hispanic cohort was younger than their White and Black/African American counterparts. Black/African American patients presented with more advanced clinical stages than did the White and Hispanic groups. The clinical stage according to race was as follows: C1-Black/African American, 52.9%; Hispanic, 36.9%; White, 40%. C2-Black/African American, 4.7%; Hispanic, 2.1%; White, 2.2%. C3-Black/African American, 12.7%; Hispanic, 2.2%; White, 6.2%. Black/African American patients were more likely to present at nonweight or obese class 3 (P < .001) and less likely to be taking postoperative medication (P = .001). Non-White race was associated with a higher probability of treatment in the hospital setting (Black/African American, 16.6%; P = .001; Hispanic, 16.6%; P = .001; Black/African American patients (22.4 v 4.4, P < .001) demonstrated lower mean improvement postoperatively in both the venous clinical severity score and patient-reported outcomes than their White (4.25 v 4.13, P = .13, P < .001) and Hispanic (4.42 v 4.37, P = .001) counterparts.

