Shaun LEE Qingwei, Singapore General Hospital
Kathleen GIBSON, Lake Washington Vascular Surgeons
CHAN Sze Ling, SingHealth Health Services Research Centre
Harsha Pitumpe RATHNAWEERA, Changi General Hospital
CHONG Tze Tec, Singapore General Hospital
TANG Tjun Yip , Singapore General Hospital

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A comparison between Caucasian and Asian superficial venous anatomy and reflux pattern – Implications for potential precision endovenous ablation therapy

INTRODUCTION

- Chronic venous insufficiency (CVI) is a common condition and the prevalence increases with age.
- Radiofrequency ablation (RFA) or endovenous later ablation (EVLA) are first-line treatment for truncal reflux[1] but are commonly associated with discomfort and risk of skin and nerve damage[2].
- Non-thermal, non-tumescent (NTNT) technologies have been introduced to improve the patient experience[3,4]. The treatment of choice depends on individuals' venous anatomical characteristics and superficial reflux patterns.
- However, most device-related venous outcome data were derived from Caucasian cohorts and may not extrapolate to other ethnicities.

OBJECTIVES

To investigate possible differences between Caucasians and Asians with regards to their pre-operative venous reflux patterns and truncal vein characteristics.

METHODS

- Prospective study of patients with CVI in Changi General Hospital (Asian cohort) and a private practice in Bellevue, Washington, USA (Caucasian cohort).
- Demographic, clinical and vein characteristics from duplex ultrasound were collected.
- These characteristics were compared between patients from the 2 sites using Mann-Whitney U test, Chi-square or Fisher 's exact test, as appropriate, using legs as the unit of analysis.

RESULTS

Table 1: Patient demographics

Variable	Singapore (n = 127)	US (n = 137)	P
Age, median (range)	64 (18 – 88)	51 (23 – 92)	<0.01
Male gender, n (%)	64 (50.4)	32 (23.4)	<0.01
Race, n (%)			
Singapore Asians			
Chinese	82 (64.6)	0	
Malays	33 (26.0)	0	
Indians	10 (7.9)	0	
US Asians	0	10 (7.3)	
Eurasian	2 (1.6)	0	
Caucasian	0	120 (87.6)	
Hspanic	0	6 (4.4)	
Black	0	1 (0.7)	
Body mass index, median (range)	26.0 (16.8 – 41.4)	26.6 (17.5 – 48.5)	0.41

Table 2: Presentation of venous disease

Variable	Singapore (n= 200 legs)	US (n = 200 legs)	p
Side, n (%)			
Left	99 (49.5)	103 (51.5)	0.76
Right	101 (50.5)	97	
CEAP, n (%)			
1-2	62 (31.0)	109 (54.5)	<0.01
3	78 (39.0)	56 (28.0)	
4a	28 (19.5)	15 (7.5)	
4b	13 (6.5)	9 (4.5)	
5-6	8 (4.0)	11 (5.5)	
Venous Clinical Severity Score (VCSS) , median (range)	8 (3-22)	6 (1-22)	<0.01

CEAP: Clincal, aetiological, anatomical and pathophysiological elements

Table 3: Great saphenous vein (GSV) diameter and location comparison

Variable	Singapore (n=200 legs)	US (n= 200 legs)	P
Vein sizes (mm) , median (range)			
Proximal calf	3.0 (1.0-7.0)	4.6 (0-14.0)	<0.01
Mid-calf	2.55 (1.0-7.0)	3.35 (1.4-13.3)	<0.01
Knee	3.0 (1.0-8.0)	4.75 (0-15.7)	<0.01
Mid-thigh	3.0 (1.0-16.0)	5.8 (1.8-19.5)	<0.01
Proximal thigh	5.0 (1.0-15.0)	6.5 (2.7-19.0)	<0.01
GSV reflux , n (%)	197 (98.5)	18.1 (90.5)	<0.01
Start site , n (%)			<0.01
Ankle	1 (0.5)	1 (0.6)	
Mid-calf	2 (1.0)	23 (12.7)	
Knee	11 (5.6)	7 (3.9)	
SFJ	171 (86.8)	132 (72.9)	
Thigh	12 (6.1)	13 (7.2)	
Pelvic	0	5 (2.8)	
End site, n (%)			<0.01
Ankle	184 (93.4)	84 (46.4)	
Mid-calf	9 (4.6)	58 (32.0)	
Knee	3 (1.5)	12 (6.6)	
Thigh	1 (0.5)	27 (14.9)	
Out of fascia (OOF) , n (%)	61 (30.5)	47 (23.5)	0.32
Site , n (%)			<0.01
Ankle	6 (9.8)	0	
Mid-calf	17 (27.9)	11 (23.4)	
Knee	15 (24.6)	4 (8.5)	
Thigh	23 (37.7)	32 (68.1)	

- Patients from Singapore tended to present with more severe venous disease and worse symptoms on presentation compared to their Caucasian counterparts.
- Vein diameters were larger in the US cohort compare to the Singaporean cohort (median 5.7 mm vs. 2.9 mm, p<0.01).
- There was a correlation between vein size and VCSS scores in both groups , suggesting a relationship between large thigh GSV diameter and advanced venous symptoms.

CONCLUSION

- The predominantly Asian cohort from Singapore had smaller diameter truncal veins, longer segments of truncal vein reflux and presented later with more advanced CVI compared to their American counterparts.
- Having such information could potentially help clinicians select a more suitable type of endovenous treatment for the individual.
- Future randomized trials investigating venous device efficacy should include Asian patients to compare outcomes.

References:

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