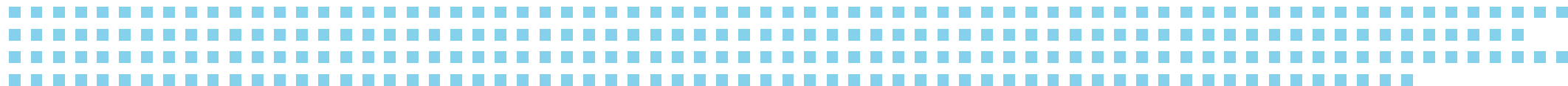


**THE EPIDEMIOLOGY AND RISK FACTORS OF
CHRONIC VENOUS INSUFFICIENCY IN A GENERAL
POPULATION IN THE NETHERLANDS – RESULTS
FROM THE ROTTERDAM STUDY**

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Renate van den Bos, dermatologist
Erasmus MC Rotterdam, the Netherlands
June 11th 2022



INTRODUCTION

- Chronic venous insufficiency (CVI) is a common health problem
- Overall health care costs for CVI: 1-2% of total health care costs in European countries¹⁻⁴
- CVI has significant impact on patient's health-related quality of life⁵

1. Davies AH. The Seriousness of Chronic Venous Disease: A Review of Real-World Evidence. *Adv Ther.* 2019;36(Suppl 1):5-12.

2. Lafuma A, Fagnani F, Peltier-Pujol F, Rauss A. [Venous disease in France: an unrecognized public health problem] La maladie veineuse en France: un probleme de sante publique meconnu. *J Mal Vasc.* 1994;19(3):185-9.

3. Rabe E, Pannier F. Societal costs of chronic venous disease in CEAP C4, C5, C6 disease. *Phlebology.* 2010;25 Suppl 1:64-7.

4. Van den Oever R, Hepp B, Debbaut B, Simon I. Socio-economic impact of chronic venous insufficiency. An underestimated public health problem. *Int Angiol.* 1998;17(3):161-7.

5. Kurz X, Kahn SR, Abenham L, Clement D, Norgren L, Baccaglini U, et al. Chronic venous disorders of the leg: epidemiology, outcomes, diagnosis and management. Summary of an evidence-based report of the VEINES task force. *Venous Insufficiency Epidemiologic and Economic Studies. Int Angiol.* 1999;18(2):83-102.

INTRODUCTION

Current literature

Bonn Vein Study ⁶

- 2000-2001
- General population in Bonn, Germany
- Aged 18-79 years

Prevalence of CVI (C3-6): 17.1%

Prevalence of truncal reflux: 17.7% in men
23.5% in women

Edinburgh Vein Study ⁷

- 1998
- General population Edinburgh
- Mean age men 45.8 years, women 44.8 years

Prevalence of CVI (Basle): 9.4% in men
6.6% in women

Prevalence of truncal reflux: 39.7% in men
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6. Maurins U, Hoffmann BH, Losch C, Jockel KH, Rabe E, Pannier F. Distribution and prevalence of reflux in the superficial and deep venous system in the general population--results from the Bonn Vein Study, Germany. J Vasc Surg. 2008;48(3):680-7.

7. Evans CJ, Allan PL, Lee AJ, Bradbury AW, Ruckley CV, Fowkes FG. Prevalence of venous reflux in the general population on duplex scanning: the Edinburgh vein study. J Vasc Surg. 1998;28(5):767-76.

INTRODUCTION

Aim

- 1 To investigate the prevalence of CVI and superficial truncal incompetence in a general population in The Netherlands
- 2 To assess which risk factors are associated with CVI and truncal vein incompetence

METHODS

Rotterdam Study

- Cross-sectional population based study embedded in Rotterdam Study
- Rotterdam Study = Large prospective study among adults living in Rotterdam
- First cohort in 1990 → all Ommoord residents with age >55 years
- Cohort RS-4 (2016) → Ommoord residents with age >40 and not yet participant of Rotterdam Study



METHODS

Data collection

1



Baseline: Interview on demographics

*Among other things:
age, body mass index,
medical history, skin
type, etc.*

2

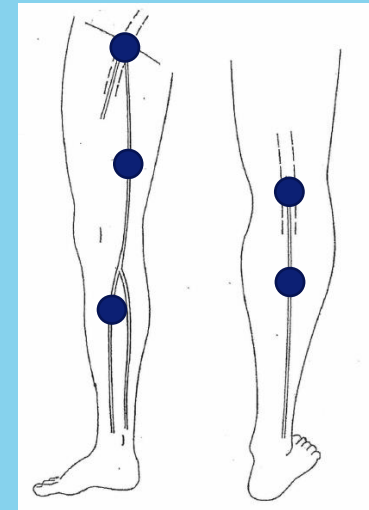


Clinical examination

- *C of CEAP
Classification*
- *Both legs scored
separately*

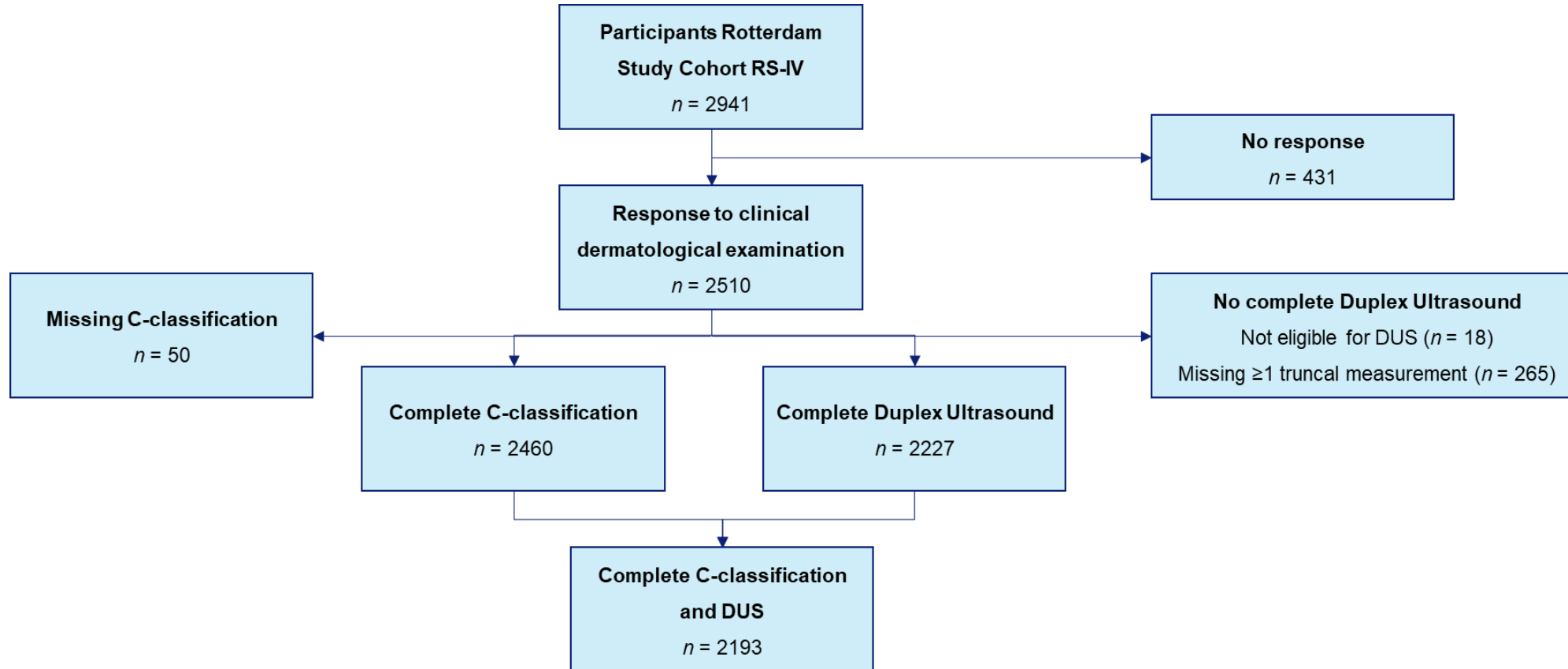
Duplex Ultrasound

- *Saphenofemoral junction*
- *Great saphenous vein above
and below the knee*
- *Saphenopopliteal junction*
- *Small saphenous vein*



RESULTS

Participant flow



RESULTS

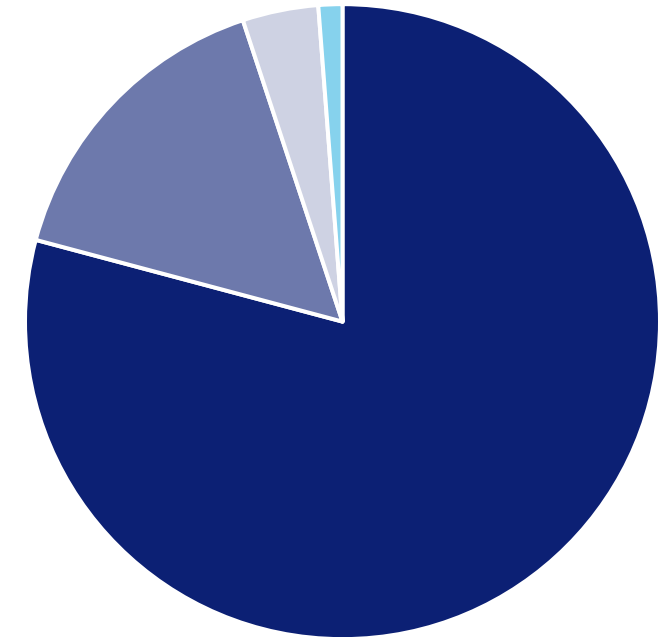
Baseline demographics

	Total n = 2510	Male n = 1069	Female n = 1441
Age, median (IQR)	54 (13)	54 (16)	54 (12)
Body Mass Index (kg/m²), n (%)			
< 18	11 (0.4)	0	11 (0.8)
18 – 24.9	773 (30.8)	274 (25.6)	499 (34.6)
25 – 29.9	1065 (42.3)	534 (50.0)	531 (36.8)
≥ 30	661 (26.3)	261 (24.4)	400 (27.8)
Skin type according to Fitzpatrick, n (%)			
I – Pale white	129 (5.1)	46 (4.3)	83 (5.8)
II – White	1682 (67.0)	751 (70.3)	931 (64.6)
III – White to olive	390 (15.6)	166 (15.5)	224 (15.5)
IV – Light brown	142 (5.7)	50 (4.7)	92 (6.4)
V – Brown	123 (4.9)	34 (3.2)	89 (6.2)
VI – Brown to black	39 (1.6)	18 (1.7)	21 (1.5)
Missing	5 (0.2)	4 (0.4)	1 (0.1)
Current smoker, n (%)	401 (16.0)	169 (15.8)	232 (16.1)
Current alcohol user, n (%)	1972 (78.6)	907 (84.8)	1065 (73.9)

RESULTS

Prevalence of clinical (C) stages of CEAP

	Highest of both legs n = 2460	Right leg n = 2460	Left leg n = 2460
C0 – C1	1947 (79.1)	2025 (82.3)	2032 (82.6)
C2	388 (15.8)	327 (13.3)	325 (13.2)
C3	95 (3.9)	83 (3.4)	81 (3.3)
C4 – C6	30 (1.2)	25 (1.0)	22 (0.9)



■ C0-C1 ■ C2 ■ C3 ■ C4-6

RESULTS

Prevalence of truncal reflux

	Total n = 2227	Right leg n = 2227	Left leg n = 2227
Prevalence of reflux per vein segment			
GSV	20.2 (18.5 – 21.9)	12.7 (11.4 – 14.2)	13.7 (12.3 – 15.2)
SSV	6.8 (5.8 – 8.0)	4.2 (3.4 – 5.1)	3.6 (2.9 – 4.5)
SFJ	5.5 (4.6 – 6.5)	3.6 (2.8 – 4.4)	3.3 (2.6 – 4.1)
SPJ	4.3 (2.9 – 6.0)	2.9 (1.9 – 4.1)	3.3 (2.3 – 4.6)
GSV + SFJ	4.3 (3.5 – 5.2)	2.8 (2.2 – 3.6)	2.4 (1.8 – 3.1)
SSV + SPJ	1.8 (1.3-2.5)	1.1 (0.7 – 1.6)	0.9 (0.6 – 1.4)
Overall prevalence of reflux			
Reflux in ≥1 venous trunk	23.4 (21.7 – 25.3)	15.3 (13.8 – 16.9)	16.0 (14.5 – 17.6)

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RESULTS

Presence of truncal reflux

	Reflux in ≥ 1 venous trunk n (%) n = 513	No truncal reflux n (%) n = 1680
C0 – C1	260 (50.7)	1499 (89.2)
C2	187 (36.5)	149 (8.9)
C3	49 (9.6)	26 (1.5)
C4-6	17 (3.3)	6 (0.4)

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	Truncal reflux in ≥ 1 venous trunk		Chronic venous insufficiency (C3-C6)	
	Adjusted OR	P	Adjusted OR	P
Gender, female	1.45 (1.17-1.79)	0.001	1.73 (1.16-2.58)	0.007
Age, years				
40-59	Ref		Ref	
60-79	1.43 (1.13-1.81)	0.003	4.42 (2.88-6.77)	<0.001
80-99	1.75 (1.12-2.72)	0.014	10.7 (6.07-18.9)	<0.001
Body Mass Index, kg/cm²				
< 18	1.86 (0.47-7.39)	0.376		
18-25	Ref		Ref	
25-30	1.44 (1.12-1.85)	0.004	2.08 (1.19-3.62)	0.010
>30	1.76 (1.34-2.30)	<0.001	3.20 (1.82-5.64)	<0.001
Current smoker	0.77 (0.57-1.03)	0.077	0.76 (0.41-1.44)	0.406
Current alcohol consumer	0.95 (0.74-1.21)	0.667	1.39 (0.84-2.30)	0.204
Skin type*				
I – III	Ref		Ref	
IV - VI	0.59 (0.41-0.84)	0.003	0.36 (0.14-0.91)	0.030
Education				
Low	Ref		Ref	
Average	0.94 (0.72-1.24)	0.660	1.10 (0.68-1.77)	0.700
High	0.97 (0.71-1.31)	0.835	0.99 (0.56-1.77)	0.971

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Our study

- 2016-2019
- General population in Rotterdam
- Mean age 54 years

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5.1%

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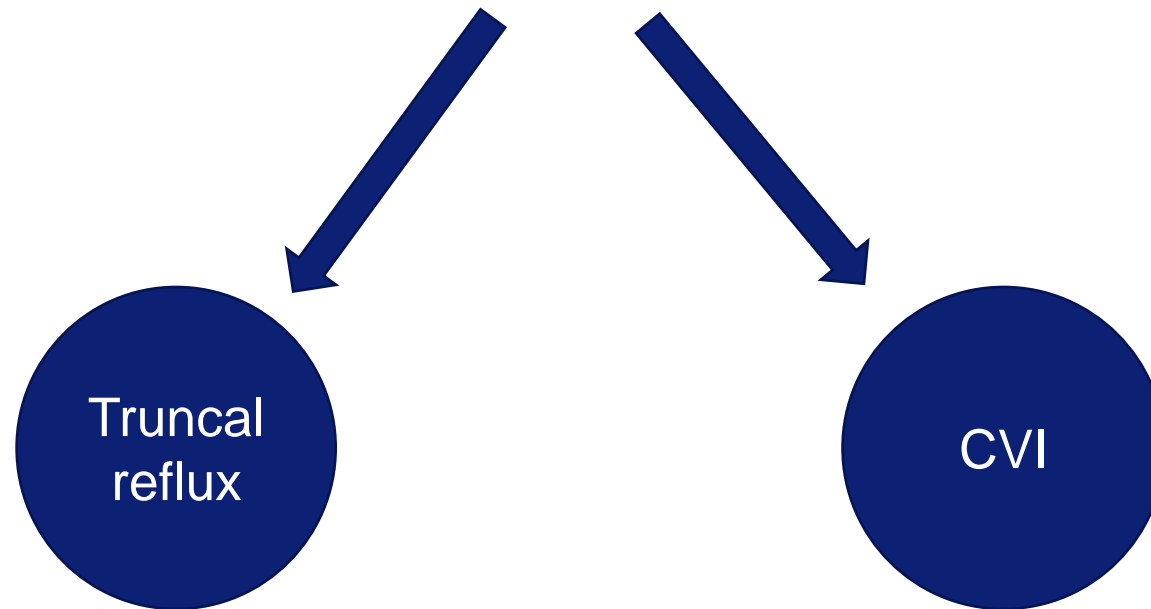
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Risk factors

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- Age
- Body Mass Index



THANK YOU FOR YOUR ATTENTION