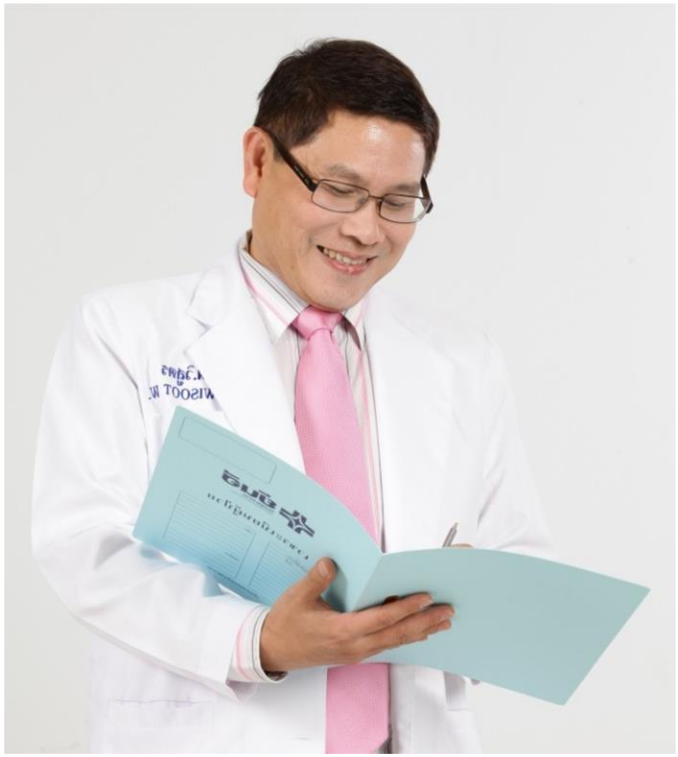
Mechano Chemical Ablation (MOCA) CLARIVEIN



Dr. Wisoot Wongklahan
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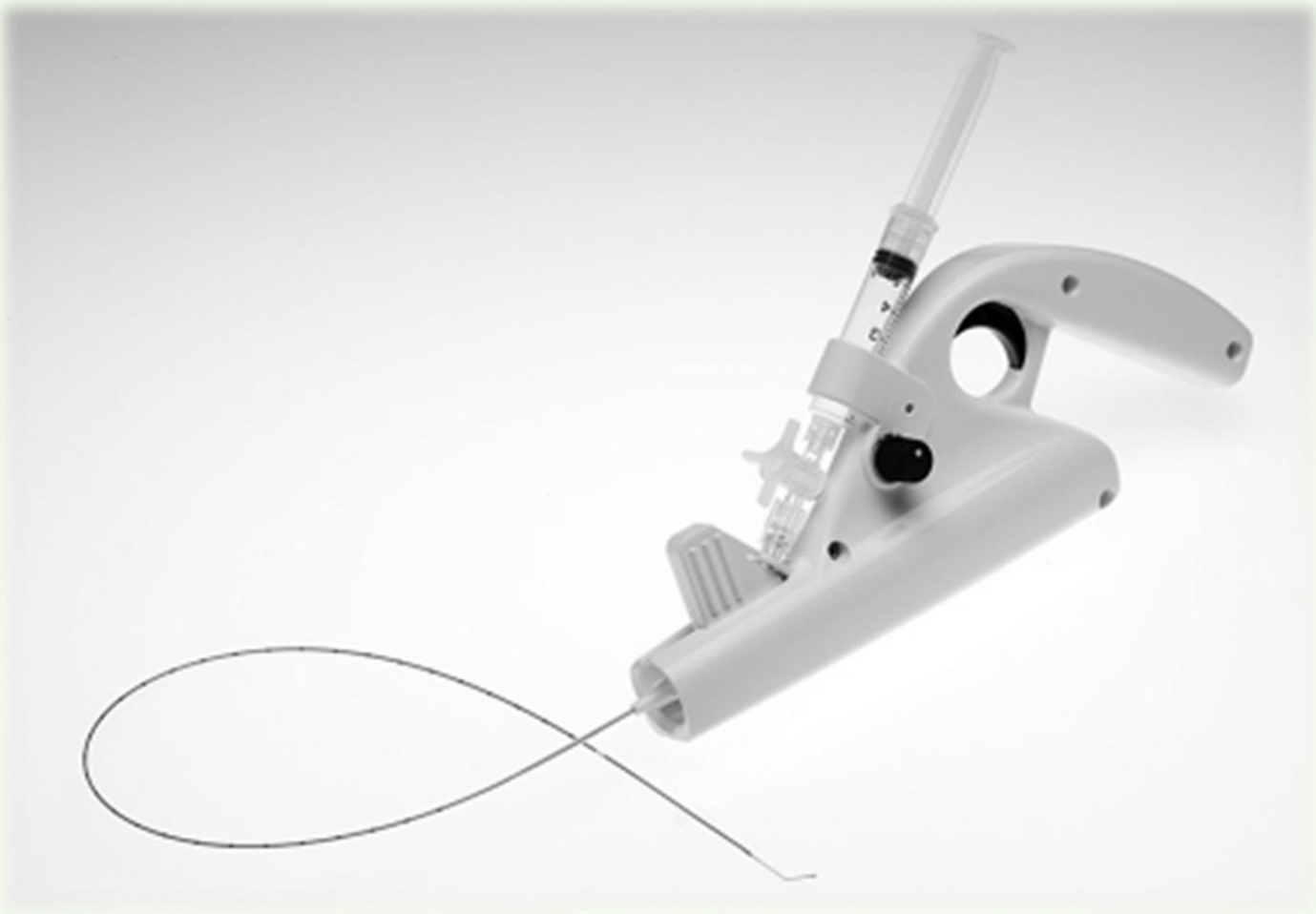
Mechano Chemical Ablation (MOCA) CLARIVEIN



Mechano Chemical Ablation (MOCA) CLARIVEIN

- Developed in 2005
- Dr. Michael Tal (Intervention Radiologist)
- FDA Approved - May 2008
- CE Mark - May 2010
- 1st in man clinical trial By Steve Elias, Feb 2009
  Published 2011
- Clinical use 2010 Europe and USA
- Up to 2013 (3 years) 12,000 procedures
- Up to 2015 40,000 procedures
- 2013-2019 (7 years) 180,000 procedures globally

Mechano Chemical Ablation (MOCA) CLARIVEIN

1st venous ablation technique to employ hybrid (dual injury) technique built in 1 catheter based delivery system

- Endomechanical ablation by tip of catheter rotating wire (3,500 rpm)
- Endovenous Chemical Ablation (EVCA) by injection of sclerosant over the rotating wire.
- Combine action result more effective way of endovenous ablation

Mechano Chemical Ablation (MOCA) CLARIVEIN

Component

- **Cartridge Unit / Catheter Assembly**

- Catheter 45, 65 cm (length) with side part connection
- Double layer
  - inner wire with tip bud
  - outer plastic tub
- Marked and excellent visualization
- Small profile < 3F

- **Motor Drive unit/handle**

Mechano Chemical Ablation (MOCA) CLARIVEIN

Procedure

- Same as other endovenous treatment except
- No need for tumescent anesthetic
- Tip of catheter 2-3 cm from SFJ (GSV)

  Curvature of fascia (SSV)
- Only one injection at entry point
- Beginning with wire rotation without pull back 2-3 sec
- Also 5-10 cm at proximal flush with saline so vein closed by wire abrasion done

Mechano Chemical Ablation (MOCA) CLARIVEIN

Procedure (Continue)

- Spinning wire and sclerosant injection with pull back rate 7sec/1cm (1.5mm/sec), (then 45cm ~5min, 65cm ~7min)

  Sclerosant: 1.5-2% polidocanol

  0.1ml/1cm, 45cm =4.5 ml

■ Fig. 8.3 Mechanical occlusion chemically assisted wire rotating.

Ref. ATLAS of Endovascular Venous Surgery

Jose l. Almeida, MD, FACS

Mechano Chemical Ablation (MOCA) CLARIVEIN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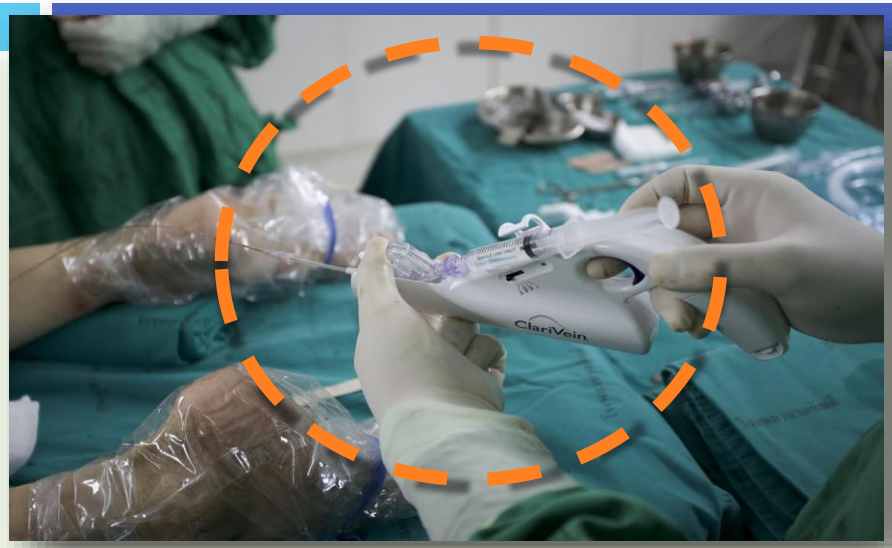
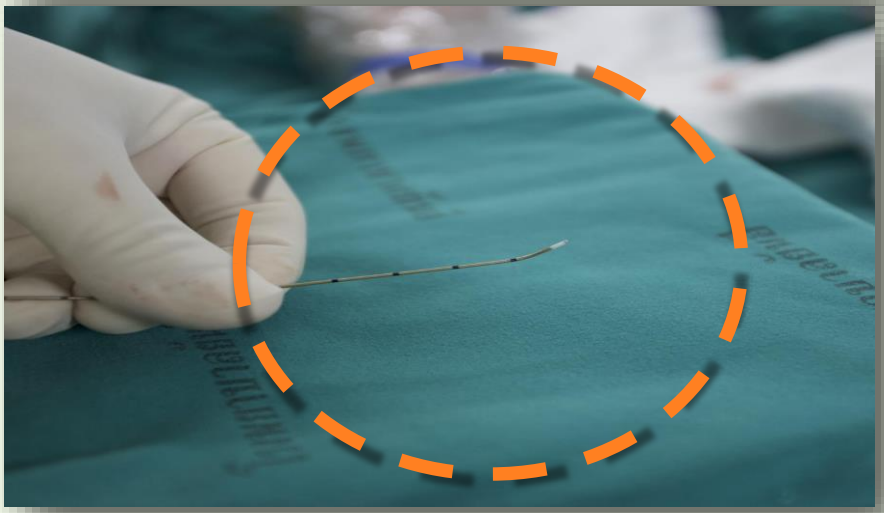
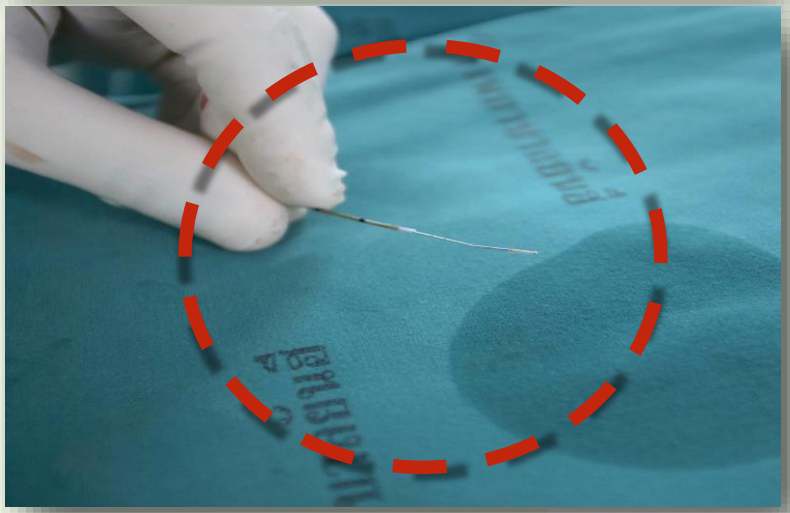
Mechano Chemical Ablation (MOCA) CLARIVEIN







Mechano Chemical Ablation (MOCA) CLARIVEIN

Post Procedure

- Foot dorsiflexion for calf muscle pump clear sclerosant from deep vein
- Immediate U/S for checking patency of deep vein and assess proximal ablation edge position
- Pt. start exercise e.g. walking for 5-10 min
- Then 30-60 min/day for 14 days
- Stocking high thigh class I and for 48hr (continuous) then only day time 1-3 weeks
- FU U/S 3-7 days, 1 month then every 3 months

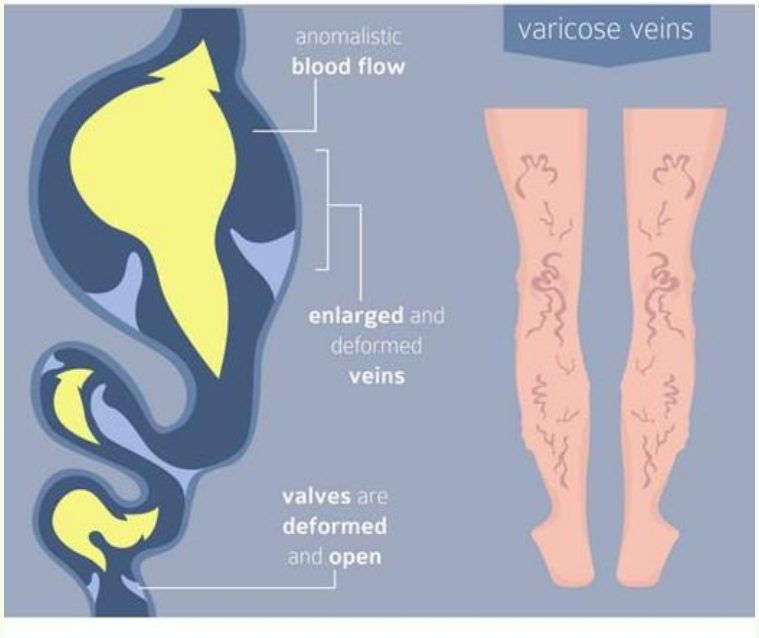
Mechano Chemical Ablation (MOCA) CLARIVEIN

Limitation

- Vein too long – 60 cm ↑, more puncture
- Vein too big – up to 19 mm
- Tortuous vein

  – multiple puncture

  - antegrade procedure



Mechano Chemical Ablation (MOCA) CLARIVEIN

Complication

- Bruise or ecchymosis, hematoma
- Induration
- Pain more than 1 week, transient phlebitis 4x

Mechano Chemical Ablation (MOCA) CLARIVEIN

Advantage (Over Thermal Ablation)

- No tumescent anesthesia
- No risk of thermal injury to skin, nerve, muscle and blood vessel
- No need for maintenance for energy source
- Less PAIN compare to ETA (Endovenous Thermal Ablation)
- Faster recovery time
- No foreign body left (vs Glue)
- Short procedural time : 27 min/1 leg , 39 min/2 leg
- Scarless
- Treat vein Below knee : - lower leg great saphenous vein down to ankle
  - small saphenous vein

Mechanochemical endovenous ablation Systemic review

Table 1. Overview of results of MOCA treatment in published clinical studies.

	van Eekeren et al.[13]	Elias and Raines[14]	Boersma et al.[15]	Vun et al.[16]	Bishawi et al.[17]/ Kim et al.[18a]	Deijen et al.[19]	Lam et al.[20] Liquid	Lam et al.[20] Microfoam	Bootun et al.[21]/ Lane et al.[22a]	Tang et al.[23]	van Eekeren et al.[24]/ Witte et al.[25]
Country	Netherlands	USA	Netherlands	Australia	USA	Netherlands	Netherlands	Netherlands	UK	UK	Netherlands
Study design	P	P	P	n/a	P	n/a	RCT	RCT	RCT	P	P
Population											
Total	30	30	50	57	126	570	53	23	83	393	106
GSV	30	30	0	51	126	438	53	23	77	333	106
SSV	0	0	50	6	0	132	0	0	6	60	0
Sclerosant	POL 1.5%	STS 1.5%	POL 2.0%/ 1.5%	STS 1.5%	STS or POL	POL 2.0%/ 1.5%	POL 2.0 or 3.0%	POL 1.0% microfoam	STS 2.0%	STS 2.0%	POL 2.0%/1.5%
Technical success (%)	100	100	100	n/a	100	98	n/a	n/a	n/a	100	99
Anatomical success, *n* (%)											
up to 8 weeks	26/30 (87)	29/30 (97)	50/50 (100)	52/57 (91)	126/126 (100)	457/506 (90)[b]	46/53 (87)	7/23 (30)	64/69 (93)	382/393 (97)	n/a
6 months	n/a	29/30 (97)	n/a	n/a	84/89 (94)	n/a	n/a	n/a	54/62 (87)	n/a	96/103 (93)
1 year	n/a	n/a	44/47 (94)	n/a	75/79 (95)	n/a	n/a	n/a	n/a	n/a	90/102 (88)
2 years	n/a	n/a	n/a	n/a	60/65 (92)	n/a	n/a	n/a	n/a	n/a	64/71 (90)
3 years	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	42/48 (88)
Clinical success											
VCSS	3 → 1*	n/a	3 → 1*	n/a	9.5 → 3*	n/a	6 → 3*		5 → 2*	n/a	4 → 1*
Major complications	none	none	none	n/a	none	2 PE/2 DVT/1 paresthesia	none		1 DVT	none	none

P: prospective cohort; RCT: randomized controlled trial; GSV: great saphenous vein; SSV: short saphenous vein; n/a: not available; VCSS: venous clinical severity score; DVT: deep venous thrombosis; PE: pulmonary embolism.

*Two publications on same patient population.

[b]Median follow up of 54 days (range 12–266 days)/anatomical success 92% in GSV/87% in SSV.

*Statistically significant.

Reference:
Witte M, Zeebregts C, de Borst, GJ *et al*. Mechanochemical endovenous ablation of saphenous veins using the ClariVein: A systematic review. *Phlebology* 2017;32:649-657.

Ultrasound findings after treatment

- MOCA will appear sponge-like with no flow and can delay 3-7 days

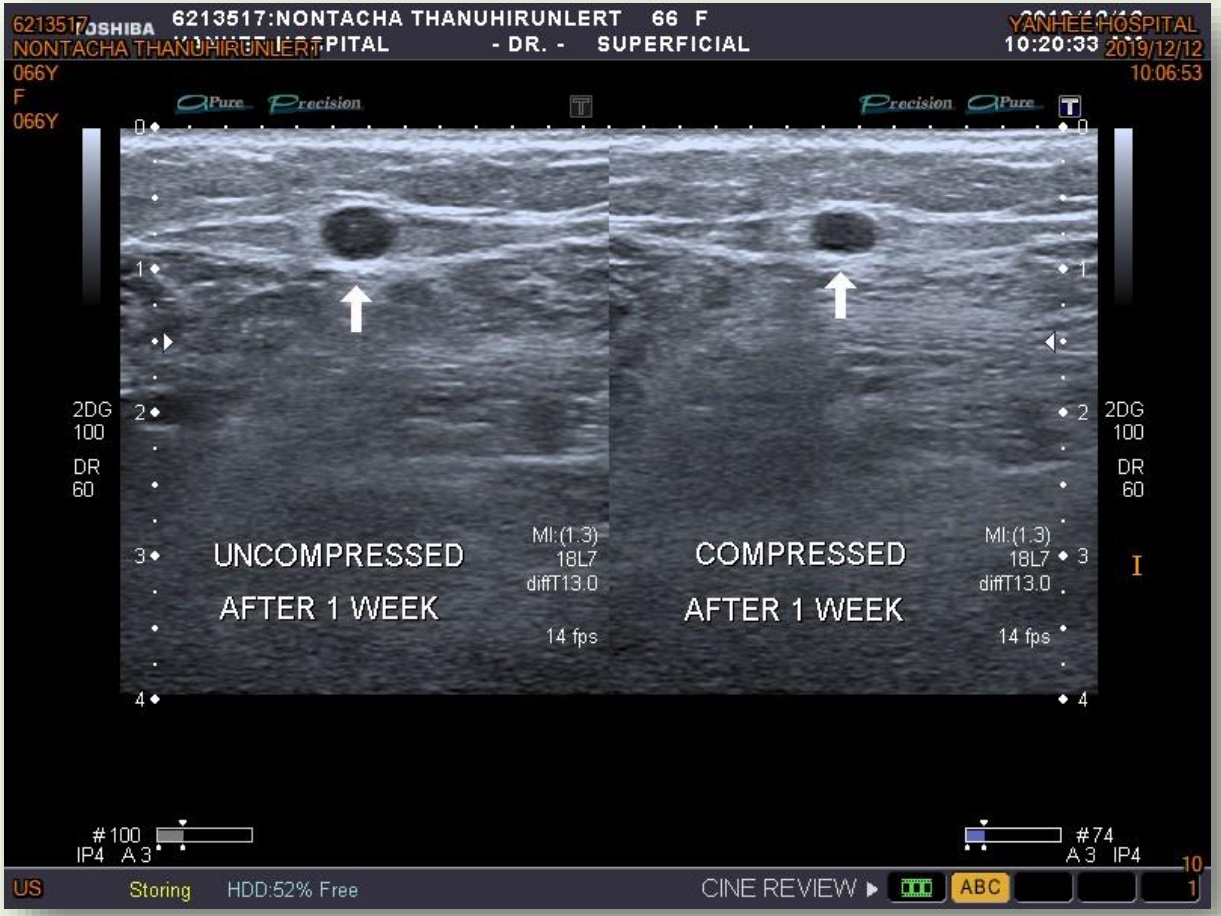


Table I. Comparison of thermal and nonthermal ablative techniques

Technique	Early occlusion rate, %	1-year occlusion rate, %	2-year occlusion rate, %	3-year occlusion rate, %	4-year occlusion rate, %
RFA	90-100	85-98	85-96	68-92	89
EVLA	93-100	89-100	74-97	79-100	76-96
Endovenous foam	45-96	67-93	53-97	53-79	NA
ClariVein	87-99	88-97	96-97	NA	NA
VenaSeal	93-99	92-93	92	NA	NA

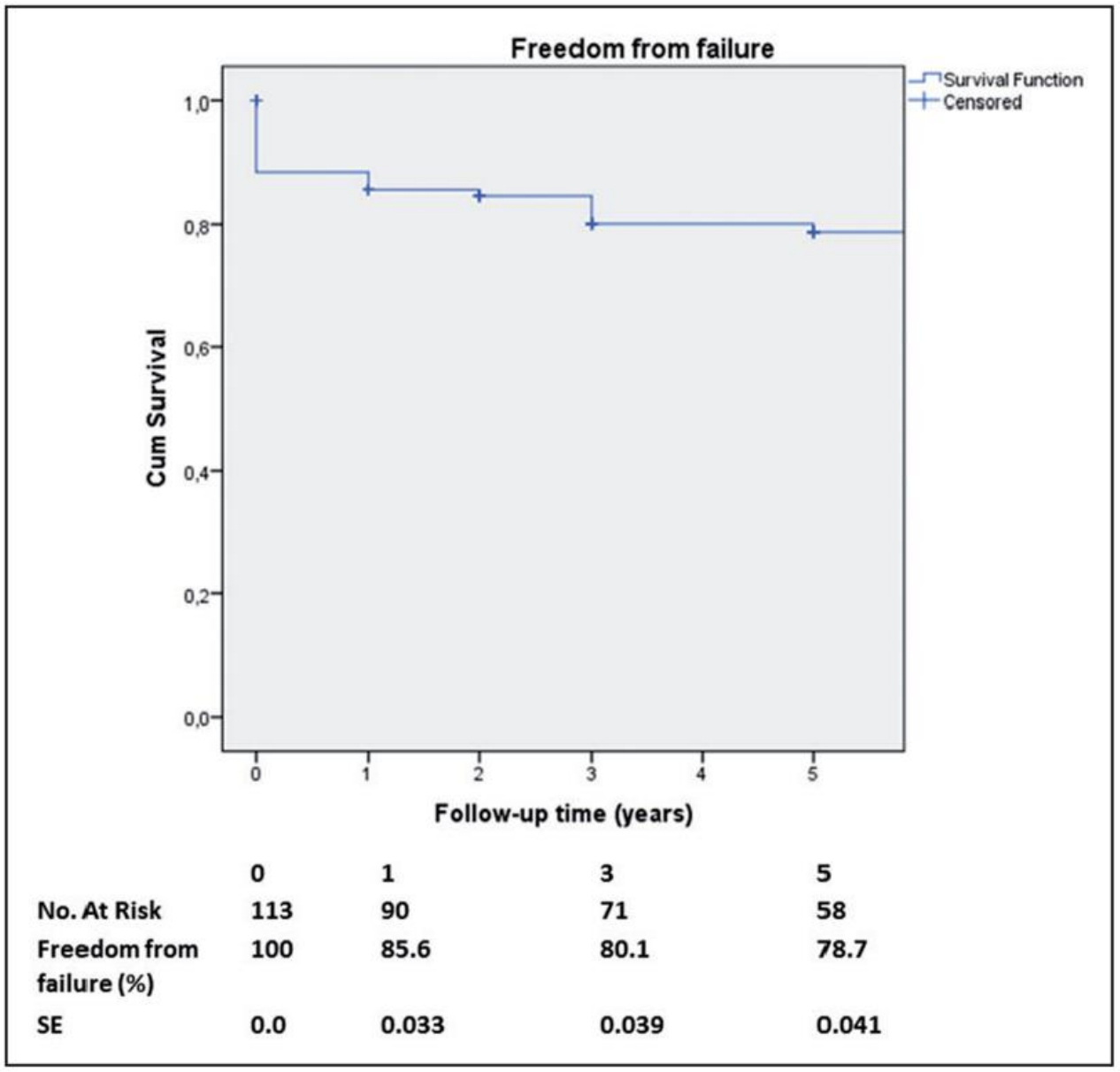
EVLA, Endovenous laser ablation; *NA*, not available; *RFA*, radiofrequency ablation.
van Eekeren RR, et al. Semin Vasc Surg 2014;27:118-36.
Morrison N, et al. J Vasc Surg 2015;61:985-94.
Almeida JI, et al. Phlebology 2015;30:397-404.

Reference:
Kugler, N and Brown, K.An update on the currently available nonthermal ablative options in the management of superficial venous disease. *J Vasc Surg: Venous Lymphat Disord* 2017;5:422-429.

Five-year outcomes of MOCA

- 94 patients (113 GSV)
- 5-year FU data 75 limbs (66.4%)
- Freedom from anatomical failure 78.7%
- This study is unique in that it is the first prospective study to report the longest FU (5years) after MOCA using polidocanol as the sclerosant

Reference:
Thierens N, Holewijn S, Vissers W, et al. Five-year outcomes of mechano-chemical ablation of primary great saphenous vein incompetence. *Phlebology* 2019; 0:1-7.



	0	1	3	5
No. At Risk	113	90	71	58
Freedom from failure (%)	100	85.6	80.1	78.7
SE	0.0	0.033	0.039	0.041

Freedom from anatomical failure after MOCA during five years' follow-up

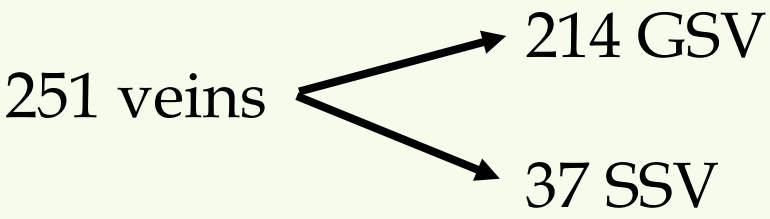
Reference:
Thierens N, Holewijn S, Vissers W, et al. Five-year outcomes of mechano-chemical ablation of primary great saphenous vein incompetence. *Phlebology* 2019; 0:1-7.

Yanhee Vein Center Experience

Year	Number of Patients
2558	21
2559	42
2560	27
2561	28
2562 (10 months)	28
TOTAL	**146**

Total patients	146
Total veins treated	251

Yanhee Vein Center Experience



Vein	Average Diameter	Minimum (mm)	Maximum (mm)
GSV	5.51	2	12.2
SSV	4.32	1.6	10.5

Yanhee Vein Center Experience

Age	Female	Male	Total
10-20	1	0	1
21-30	5	0	5
31-40	26	2	28
41-50	31	5	36
51-60	38	5	43
61-70	17	3	20
71-80	9	1	10
81-90	3	0	3
Total	**130**	**16**	**146**

87%

Percentage:

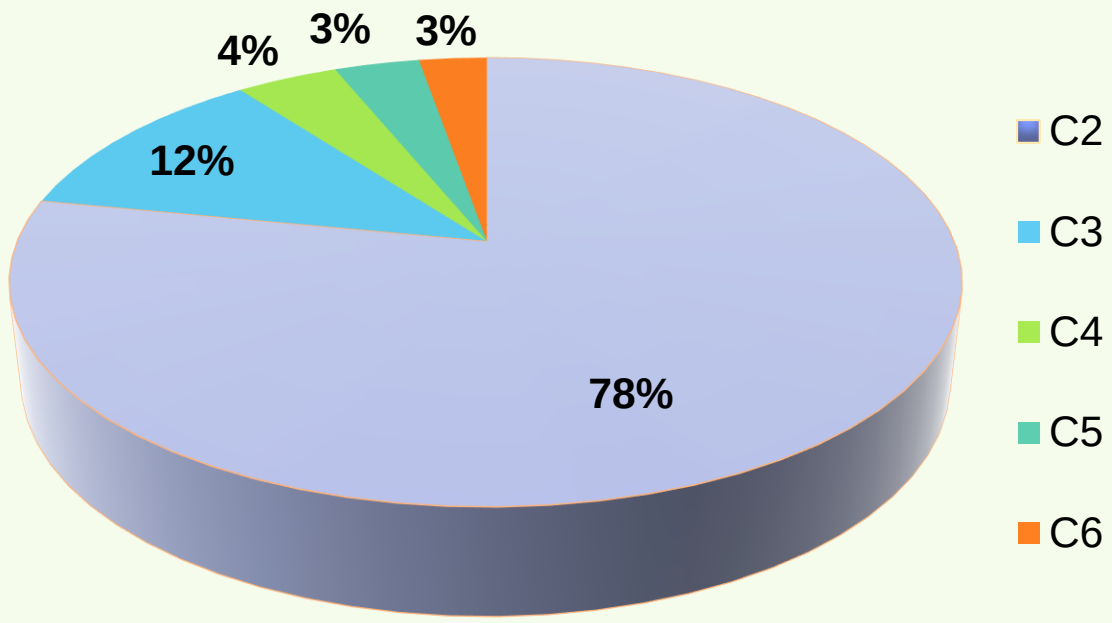
Female - 89%

Male - 11%

Average Age: 51 years old

Yanhee Vein Center Experience

Table comparing cases in Percentage



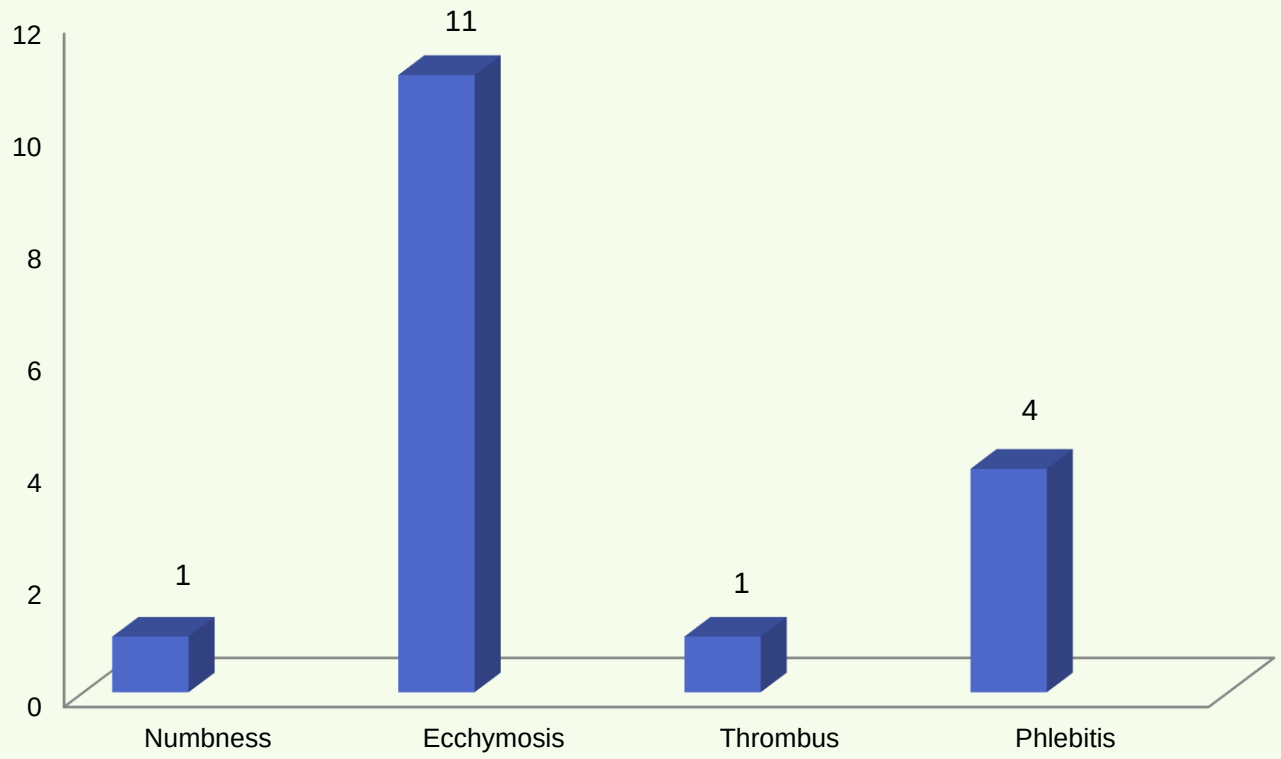
C2 – varicose vein
C3 – edema
C4 – hyperpigmentation
C5 – healed ulcer
C6 – ulcer

Yanhee Vein Center Experience

Occlusion rate

Follow up	Veins reopened	Occlusion rate
Immediate	0/251	100%
6 months	27/251	90%

Complications Year 2015-2019



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ClariVein® – Early results from a large single-centre series of mechanochemical endovenous ablation for varicose veins

TY Tang[1], JW Kam[2] and ME Gaunt[3]

Phlebology
2017, Vol. 32(1) 6–12

DOI: 10.1177/0268355516630154
journals.sagepub.com/home/phl
SAGE

ClariVein Mechanochemical Ablation: Background and Procedural Details

Richard L. Mueller, MD[1], and Jeffrey K. Raines, PhD, MME, RVT[2]

Vascular and Endovascular Surgery
47(3) 195-206

DOI: 10.1177/1538574413477216
ves.sagepub.com
SAGE

Mechanochemical ablation: status and results

S Elias*, Y L Lam† and C H A Wittens†‡

*Division of Cardiac, Thoracic and Vascular Surgery, Columbia University and Medical Center, NY, USA; †Maastricht University Medical Centre, Department of Vascular Surgery, The Netherlands; ‡Universitätsklinikum Aachen, Department of Vascular Surgery, Germany

Phlebology 2013;**28 Suppl 1**:10–14. DOI: 10.1177/0268355513477787

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Mechanochemical endovenous ablation of saphenous veins using the ClariVein: A systematic review

Marianne E. Witte[1], Clark J. Zeebregts[2], Gert Jan de Borst[3], Michel M.P.J. Reijnen[1] and Doeke Boersma[3,4]

Phlebology
2017, Vol. 32(10) 649–657

DOI: 10.1177/0268355517702068
journals.sagepub.com/home/phl
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Mechanochemical ablation as an alternative to venous ulcer healing compared with thermal ablation

Sung Yup Kim, MD, Scott R. Safir, MD, C. Y. Maximilian Png, BS, Peter L. Faries, MD, Windsor Ting, MD, Ageliki G. Vouyouka, MD, Michael L. Marin, MD, *and* Rami O. Tadros, MD, *New York, NY*

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Five-year outcomes of mechano-chemical ablation of primary great saphenous vein incompetence

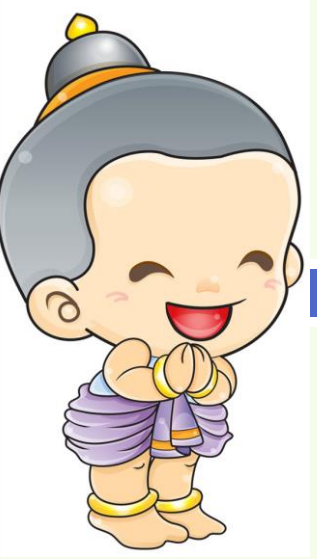
Phlebology
0(0) 1–7

DOI: 10.1177/0268355519861464
journals.sagepub.com/home/phl
SAGE

Naomi DE Thierens[1], Suzanne Holewijn[1],
Wynand HPM Vissers[2], Debbie AB Werson[3],
Jean Paul PM de Vries[4] and Michel MPJ Reijnen[1,5]

An update on the currently available nonthermal ablative options in the management of superficial venous disease

Nathan W. Kugler, MD, *and* Kellie R. Brown, MD, *Milwaukee, Wisc*



ขอบคุณครับ

THANK YOU!