

The logo for LINC (Lancet International Network for Catheter Interventions) features a stylized, colorful graphic of a catheter or vein with red and yellow segments, set against a blue background with white brushstrokes.

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CAVA trial: why catheter interventions will remain the CAVALry of DVT treatment?

Houman Jalaie, Mohamad Barbati, Chaer Rabih, Efthimios Avgerinos

Department of Vascular & Endovascular Surgery
University Hospital Aachen
European Venous Centre
Aachen-Maastricht
LINC 2020



Disclosure

I have the following potential conflicts of interest to report:

- Receipt of grants/research support

Medtronic, BD BARD, Cook, Ab medica, Bentley, Optimed, Boston Scientific

- Receipt of honoraria and travel support

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CAVA

- Inclusion: June 2010-November 2017
- Median follow Up: 12 months
- 75 patients in the standard treatment group
- 77 patients in the intervention group (UACDT + standard)
- Post-thrombotic syndrome occurred in 26 (35%) in control group
- Post-thrombotic syndrome occurred in 22 (29%) in interventional group (p=0.42)

Additional ultrasound-accelerated catheter-directed thrombolysis did not lower the risk of post-thrombotic syndrome in patients with acute iliofemoral deep-vein thrombosis

CAVA subgroup analysis

- Definition of successful treatment: > 90% DVT lysis
- Successful interventional recanalisation in 41 (53%) of patients
- post-thrombotic syndrome developed in 9 (22%) of successful treated patients
- Post-thrombotic syndrome developed in 13 (37%) of unsuccessful group (p=0.17)
- Post-thrombotic syndrome occurred in 26 (35%) of the patients from the control group (p=0.15)

Successful thrombolysis does result in benefits such as less severe symptoms and improved quality of life

TROMBOLYSIS SUCCESS RATE

1. GOOD	> 90 % patency (= completely open)
2. MODERATE	50 - 90 % patency
3. POOR	< 50 % patency
4. UNSUCCESSFUL	0 % patency (no change after 48 hours)

Participating centres

Centres randomizing patients

- 1: Maastricht University Medical Center, Maastricht
- 2: Zuyderland Medical Center, Heerlen-Sittard
- 3: Laurentius Hospital, Roermond
- 4: VleCuri Hospital, Venlo
- 5: St. Anna Hospital, Geldrop
- 6: Máxima Medical Center, Eindhoven-Veldhoven
- 7: Catharina Hospital, Eindhoven
- 8: Elkerliek Hospital, Helmond
- 9: Maasstad Hospital, Rotterdam*
- 10: St. Antonius Hospital, Nieuwegein
- 11: Haga Hospital, Den Haag*
- 12: Nij Smellinghe Hospital, Drachten*
- 13: St. Jans Gasthuis, Weert
- 14: Amsterdam University Medical Center, AMC, Amsterdam*
- 15: Amsterdam University Medical Center, VuMC, Amsterdam*

1.7 cases / centre / year



6 Centres performing Ultrasound-Accelerated Catheter-Directed Thrombolysis

Shortcomings

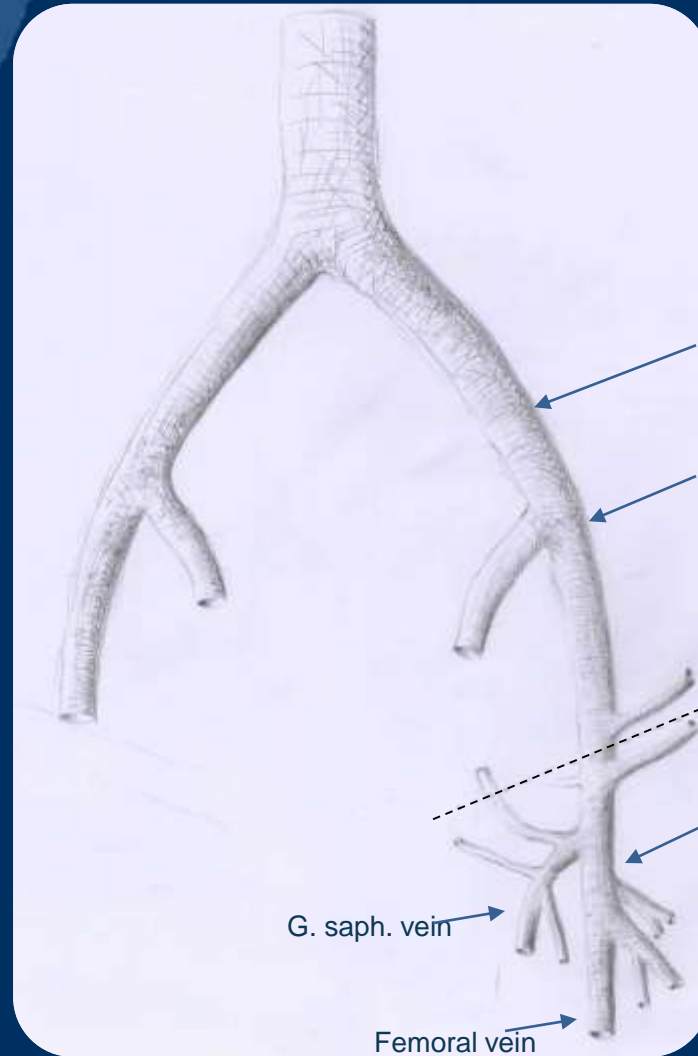
- The sample size was small, meaning that CAVA was underpowered to detect anything other than a large difference
- In a high percentage (30%) of patients thrombolysis was terminated early mainly because of no progress in thrombus resolution
- Only 53% of the patients received a successful intervention
- Only 45% (35/77) underwent venous stenting
- Venography alone was used to assess residual thrombus (no IVUS)
- Follow-up was limited to one year
- 6 centres performing UACDT which shows a low experience level of many centres (77 patients in 7,5 years)

Experience from Aachen University Hospital (Proximal DVT treated with EKOS)

Patients characteristics (n= 115)		
Age (y)	Mean ± SD	43 ± 18
Gender		
Female	N (%)	60 (52%)
Male	N (%)	55 (48%)
Risk factors		
Thrombophilia	N (%)	34 (30%)
May-Thurner syndrome	N (%)	49 (43%)
Oral contraceptiva	N (%)	12 (10.4%)
Prolonged immobilization	N (%)	25 (22%)
Reccurent DVT	N (%)	14 (12.7%)
Idiopathic	N (%)	16 (15%)
Affected leg		
Left	N (%)	74 (65%)
Right	N (%)	29 (26%)
Bilateral	N (%)	12 (9%)
Involvement of IVC	N (%)	21 (18.2%)

Patients aged 18–75 years with symptomatic proximal DVT involving the iliac or common femoral veins with symptom duration of ≤ 14 days and objectively confirmed by duplex sonography were included

Anatomy



Com. iliac vein

External iliac vein

Ing. lig

Com. fem. vein

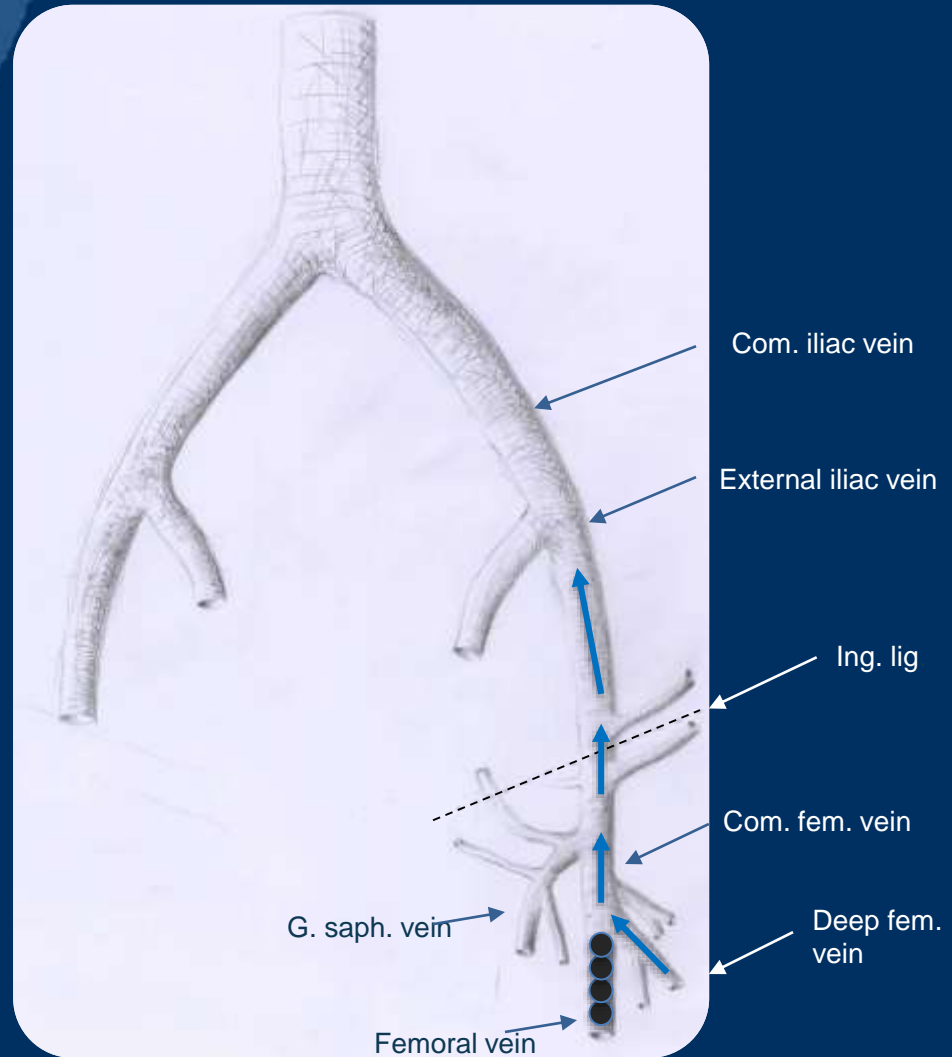
Deep fem. vein

G. saph. vein

Femoral vein

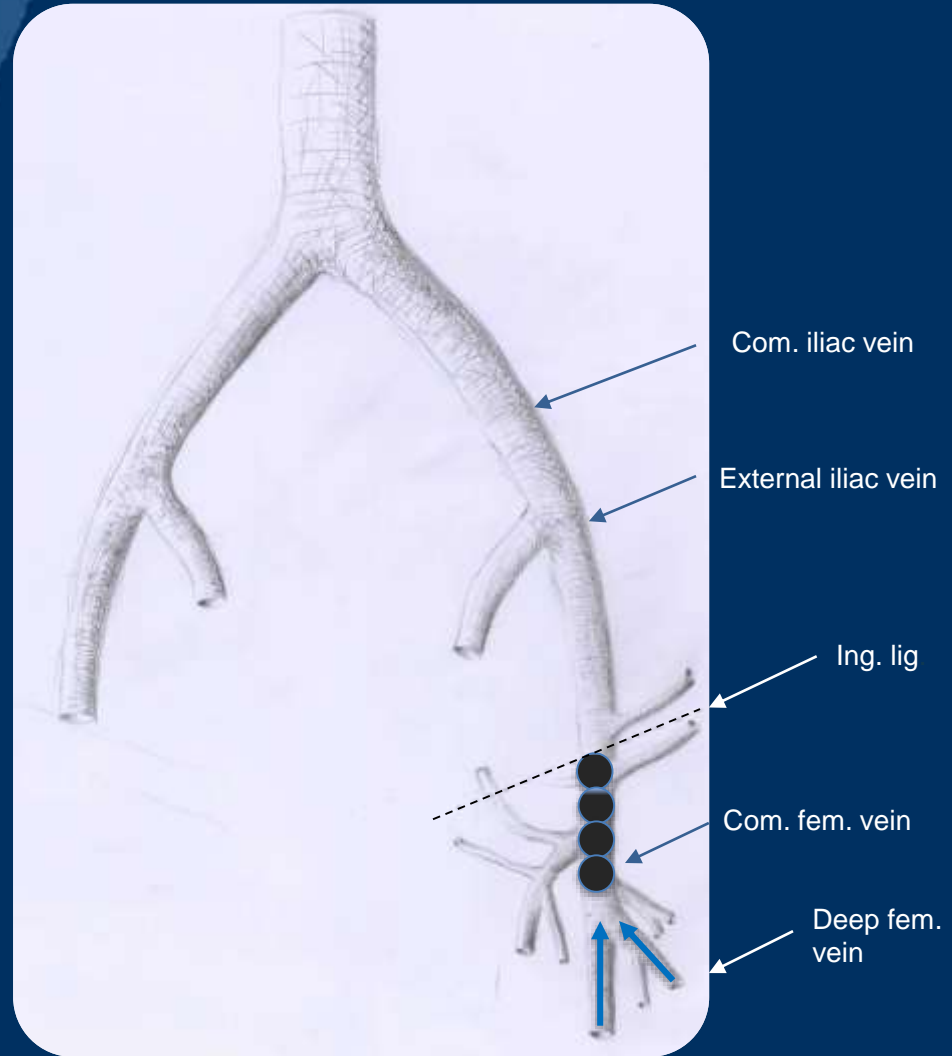
Anatomy

Our definition of distal DVT



Anatomy

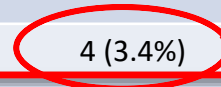
Our definition of proximal DVT



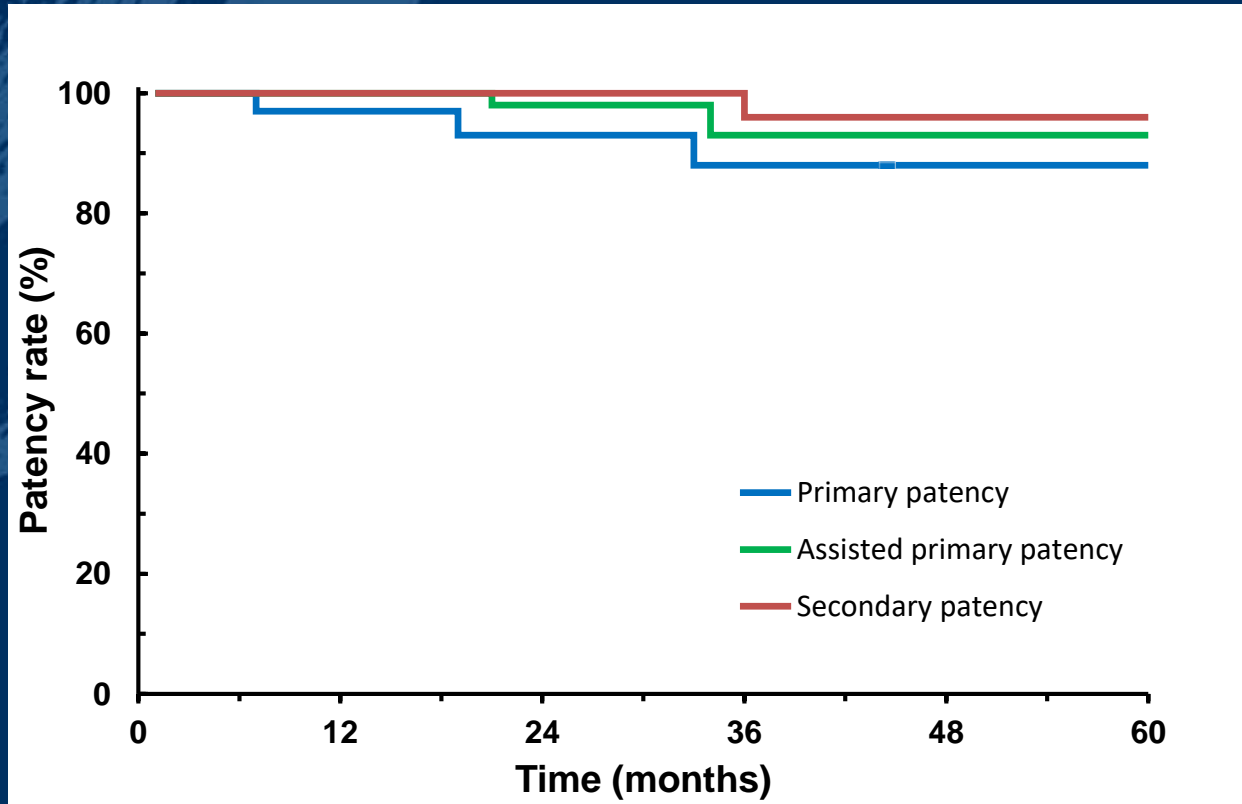
Experience from Aachen University Hospital

Treatment aspects		
Duration of lysis (h)	Mean ± SD	51 ± 14.6
Successful lysis (venography + IVUS)	N (%)	105 (92%)
Major bleeding	N (%)	4 (3.4%)
Patients stented	N (%)	101 (88.2%)
Stents per patient	N	1.3
Duration of follow up (m)	Mean ± SD	33.8 ± 15.7
Type of anticoagulation		
Vitamin K antagonist	N (%)	27 (23.6%)
Rivaroxaban	N (%)	78 (67.8%)
Apixaban	N (%)	5 (4.3%)
LMWH	N (%)	5 (4.3%)

1 pat. needed an intervention,
3 needed transfusion



Patency

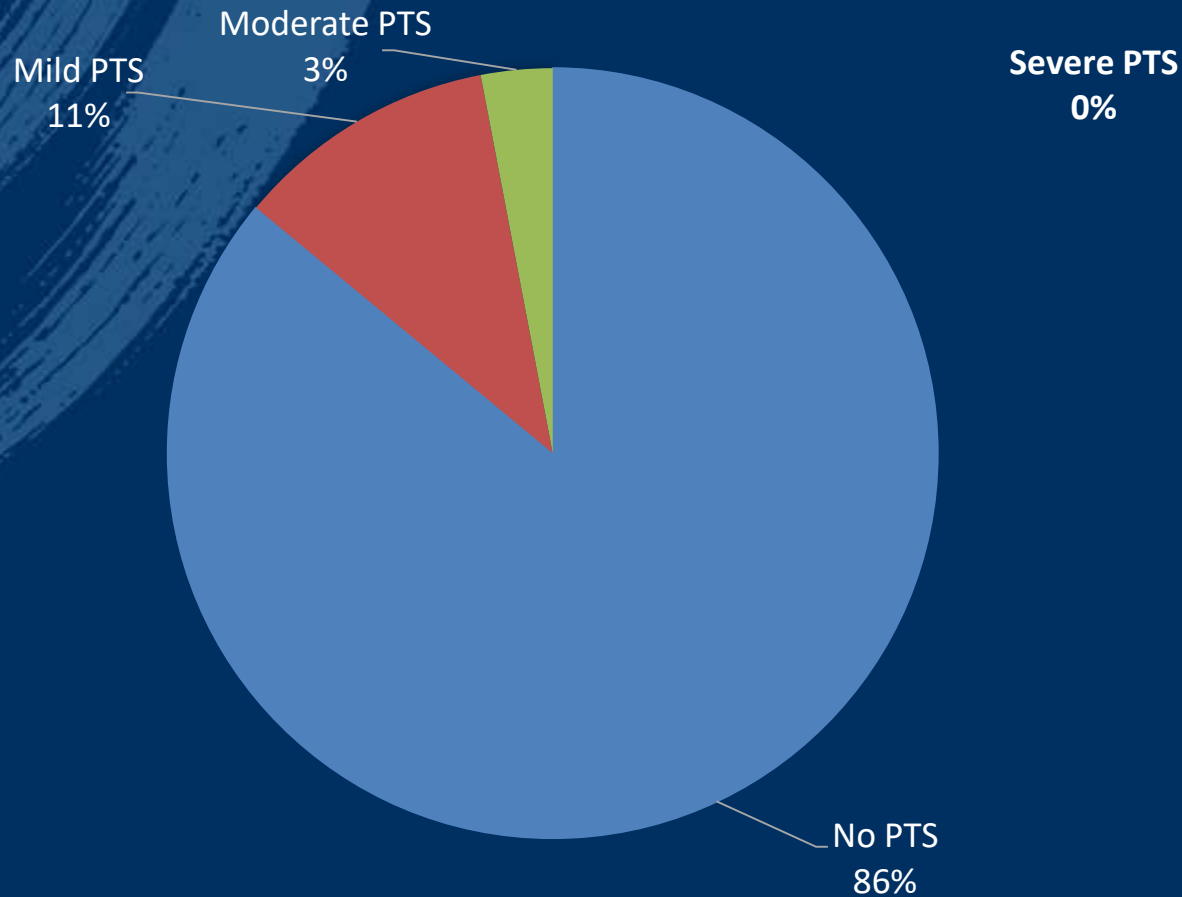


Patency rates		
	Primary patency	88%
	Ass. Primary patency	93%
	Secondary patency	96%

Outcome		
QoL		
SF-36		
	Mental health correlated scale	89.25 ± 25.9
	Physical health correlated scale	88.23 ± 36.2
EuroQOL-5D		
	Mobility	85.4%
	Self-sufficiency	77.2%
	Daily activity	81.4%
	Pain	74.8%
	Depression	43.6%
VEINES-QOL/Sym		50.3/50.4
Villalta score		
	No PTS	98 (86%)
	Mild	12 (11%)
	Moderate	5 (3%)
	Severe	0
VCSS		3.1 ± 2.4

- 0–4: No PTS
- 5–9: PTS
- 10–14: Moderate PTS
- 15–33: Severe PTS

Villalta score



UACDT does reduce the occurrence of PTS in patients with acute proximal DVT
UACDT does reduce the severity of PTS in patients with acute proximal DVT

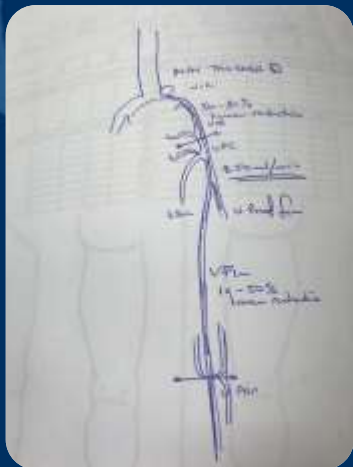
Recommendation

- Proper preop evaluation
 - Duplex, CTV / MRV
- Start asap and stop asap (age of Thrombus / bleeding)
- The cleaner the vein the better the outcome
- Treat the underlying disease sufficiently and use dedicated venous stents
- Strict post op follow up is mandatory
 - Duplex (2w, 6w, 3m, 6m, 12m.....)
 - Compression stocking 30-40 mm Hg
 - Anticoagulation

Conclusion

Rather than abandoning catheter interventions we should be focusing on how to identify better our patients, optimize our techniques and centralize care to high volume centers with appropriate expertise

As physicians we must continue to advance the field of venous intervention and not accept a 55% rate of PTS for our patients with acute proximal DVT



Thank you very much

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