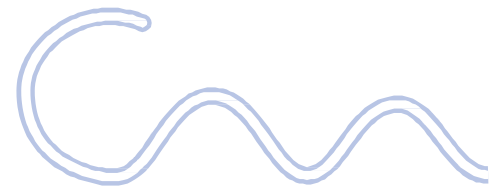


Iliofemoral DVT should be treated with  
thrombolysis/mechanical thrombectomy

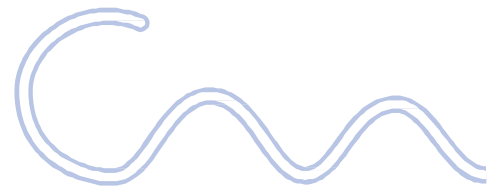
Em. prof. dr. Cees H.A. Wittens



# Previous trials

CaVenT <sup>1</sup>	ATTRACT <sup>2</sup>	CAVA <sup>3</sup>
<ul style="list-style-type: none"><li>• 209 patients<ul style="list-style-type: none"><li>○ All iliofemoral DVTs</li></ul></li><li>• Catheter-Directed Thrombolysis (rtPA + stenting) vs. Conventional Therapy</li></ul>	<ul style="list-style-type: none"><li>• 692 patients<ul style="list-style-type: none"><li>○ 391 iliofemoral DVTs</li></ul></li><li>• Pharmaco-mechanical Thrombolysis (rtPA + stenting) vs. Conventional Therapy</li></ul>	<ul style="list-style-type: none"><li>• 184 patients<ul style="list-style-type: none"><li>○ All iliofemoral DVTs</li></ul></li><li>• Ultrasound-Accelerated Catheter-Directed Thrombolysis (uPA + stenting) vs. Conventional Therapy</li></ul>
<ul style="list-style-type: none"><li>• PTS at 24 months</li></ul>	<ul style="list-style-type: none"><li>• PTS at 6-24 months</li></ul>	<ul style="list-style-type: none"><li>• PTS at 12 months</li></ul>
<p>➤ 41.1% vs. 55.6% <b>P = 0.047</b></p>	<p>➤ 47% vs. 48% <b>P = 0.56</b></p>	<p>➤ 29.3% vs. 35.1% <b>P = 0.45</b></p>

1, Enden T, et al. *Lancet*. 2012 Jan 7;379(9810):31-8.  
2. Vedantham S, et al. *N Engl J Med*. 2017 Dec 7;377(23):2240-2252.  
3. Notten, et al. *Lancet Hematology*



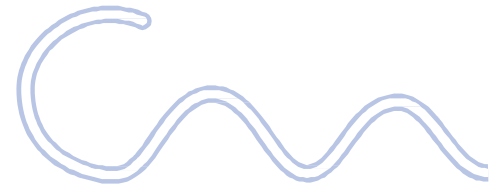
**Conclusion could be as defended by Peter Verhamme that:**

**Aggressive endovascular treatment for iliofemoral DVT does not prevention PTS**

**BUT**

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# CAVA<sup>1</sup> – Subanalysis



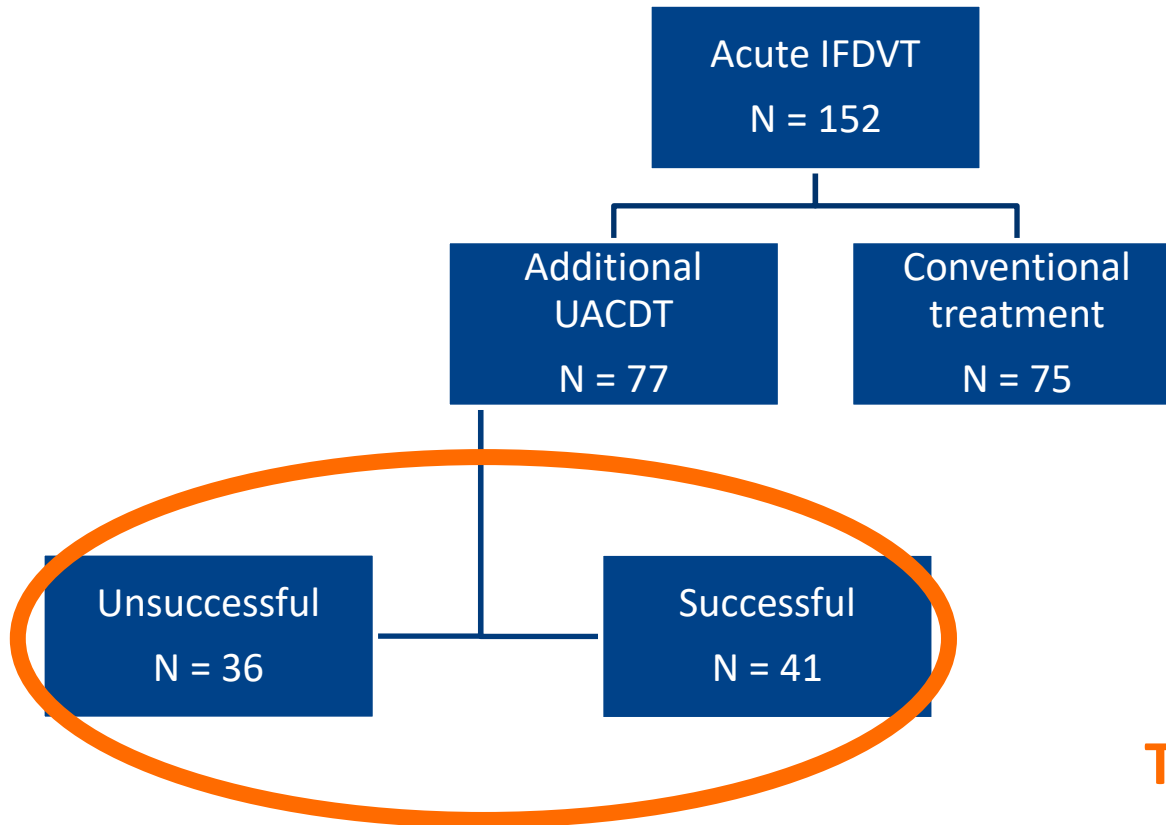
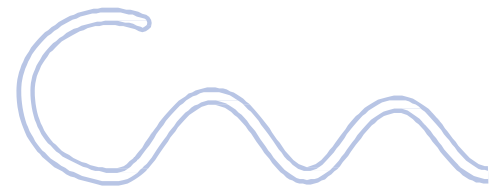
Does **successful thrombolysis**  
have a preventative effect on the development of PTS<sup>2</sup>?

Successful thrombolysis: **Restored patency of  $\geq 90\%$**

1. Notten, et al. *Lancet Hematology*.  
2. Villalta S, et al. *Haemostasis* 1994;24, 158a.

# CAVA<sup>1</sup> – Subanalysis

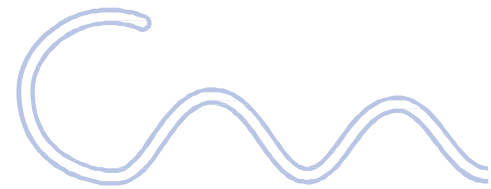
## Flow Chart



**Thrombolysis was  
successful in 53.2%**

# CAVA<sup>1</sup> – Subanalysis Thrombolysis

## Thrombus characteristics

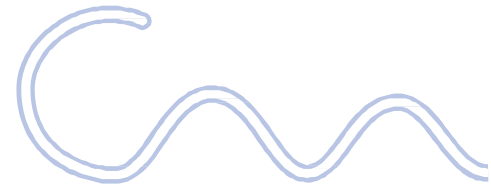


no. (%)		Additional Successful UACDT N = 41	Additional Unsuccessful UACDT N = 36	P-value
Vein Segments Affected, LET classification <sup>2</sup> – no. (%)				
LET IV		9 / 41 (22.0)	6 / 36 (16.7)	0.559
LET III		29 / 41 (70.7)	27 / 36 (75.0)	0.675
LET II		3 / 41 (7.3)	1 / 36 (2.8)	0.618

1. Notten, et al. *Lancet Hematology*  
 2. Strijkers, et al. *Phlebology*. 2015 Mar;30(1 Suppl):14-9.

# CAVA<sup>1</sup> – Subanalysis Thrombolysis

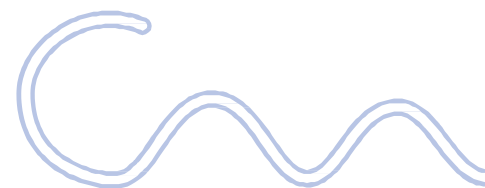
## Thrombolytic Success - Differences



<i>no. (%)</i>	Successful Additional UACDT	Unsuccessful Additional UACDT	P value
<b>Duration of symptoms at inclusion</b> 14-21 days	2 / 41 (4.9)	8 / 36 (22.2)	0.039

# CAVA<sup>1</sup> – Subanalysis Thrombolysis

## Complications

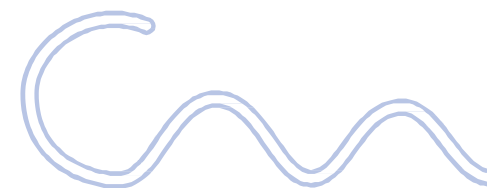


<i>no. (%)</i>	Successful Additional UACDT N = 41	Unsuccessful Additional UACDT N = 36	P-value
<b>Complications</b>			
Major bleeding	1 (2.4)	3 (8.4)	0.335
Minor bleeding	3 (7.3)	4 (11.1)	0.699
Low Fibrinogen	13 (31.7)	10 (27.8)	0.707
Procedural failure	4 (9.8)	1 (2.8)	0.364
Recurrent DVT	2 (4.9)	3 (8.3)	0.660
In-stent-thrombosis	6 (14.6)	4 (11.1)	0.742
Death	1 (2.4)	0	0.559



# CAVA<sup>1</sup> – Subanalysis Thrombolysis

## Outcomes at 12 months



<i>no. (%)</i>	Successful Additional UACDT N = 41	Unsuccessful Additional UACDT N = 36	
<b>Villalta score: Total score, mean ± SD</b>	<b>3.35 ± 3.10</b>	<b>4.72 ± 3.19</b>	<b>P = 0.045</b>
Objective score, mean ± SD	1.32 ± 1.77	1.97 ± 1.93	
Subjective score, mean ± SD	2.03 ± 2.17	2.75 ± 2.41	
<b>Post-Thrombotic Syndrome, Definition by Villalta<sup>2</sup></b>	<b>9 (22.0)</b>	<b>13 (36.1)</b>	
None (0-4)	32 (78,1)	23 (63.9)	
Mild (5-9)	6 (14.6)	4 (11.1)	
Moderate (10-14)	2 (4.9)	9 (25.0)	
Severe (≥ 15)	1 (2.4)	0	
<b>Moderate/Severe (≥ 10)</b>	<b>3 (7.3)</b>	<b>9 (25.0)</b>	<b>P = 0.020</b>
<b>VCSS at 12 months, mean ± SD</b>	<b>3.50 ± 2.57</b>	<b>4.88 ± 2.25</b>	<b>P = 0.025</b>

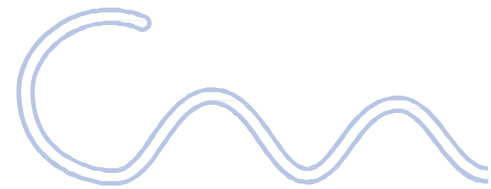
1. Notten, et al. *Under review*.

2. Villalta S, et al. *Haemostasis* 1994;24, 158a.

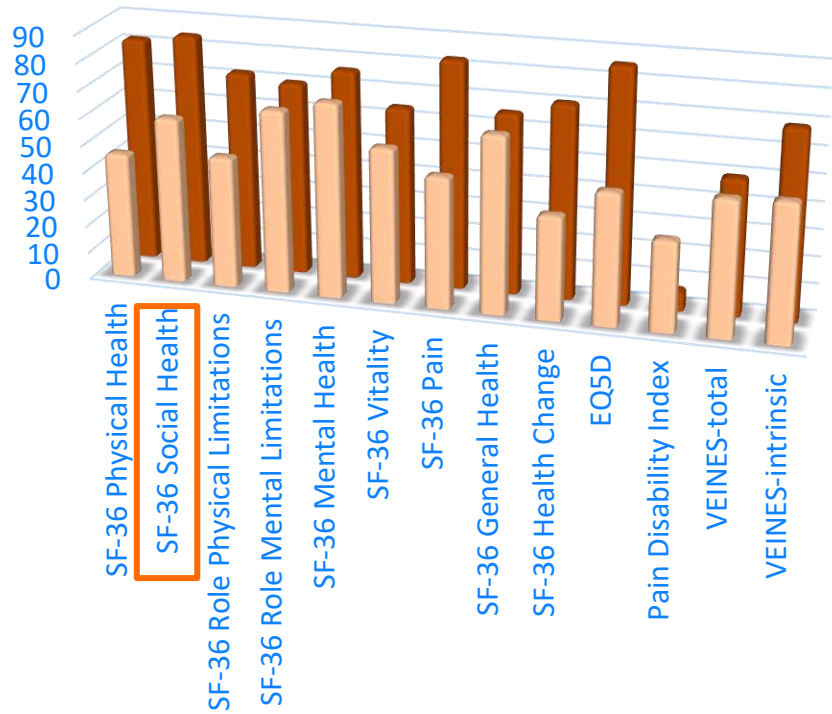
3. Kahn SR, et al. *J Thromb Haemost.* 2009 May;7(5):879-83.

# CAVA<sup>1</sup> – Subanalysis Thrombolysis

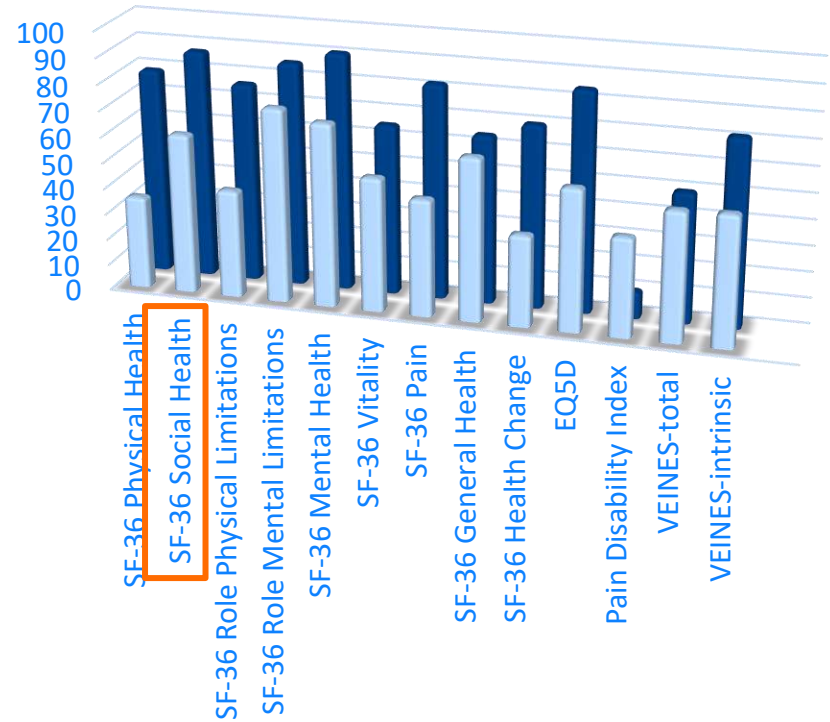
## Quality of Life



### Successful UACDT



### Unsuccessful UACDT



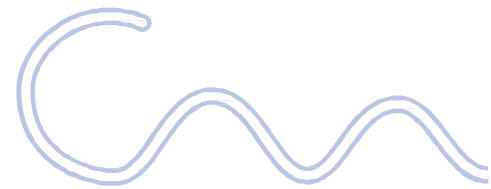
**P = 0.011**

■ Inclusion ■ 12 months

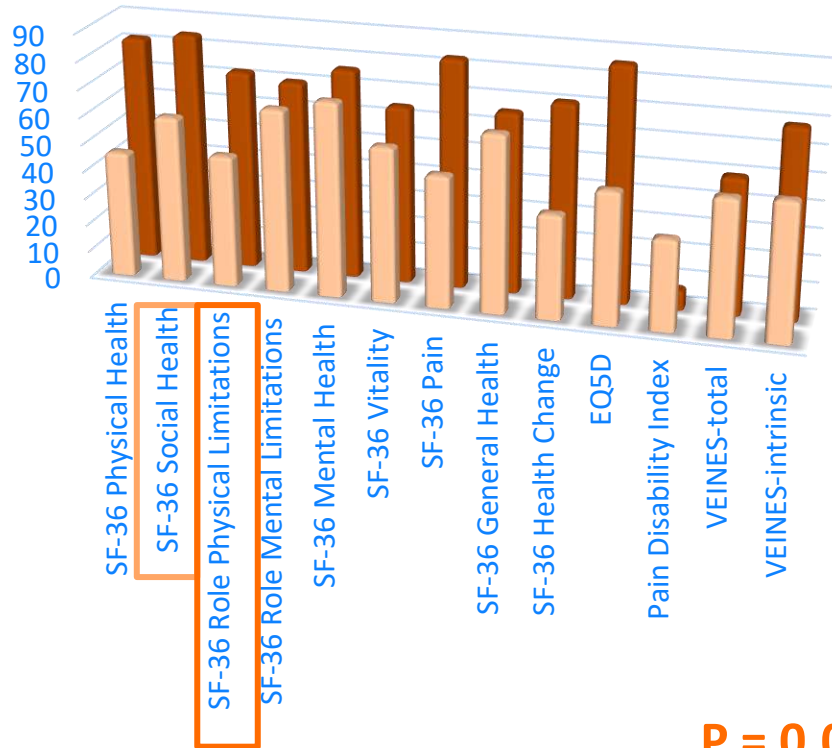
■ Inclusion ■ 12 months

# CAVA<sup>1</sup> – Subanalysis Thrombolysis

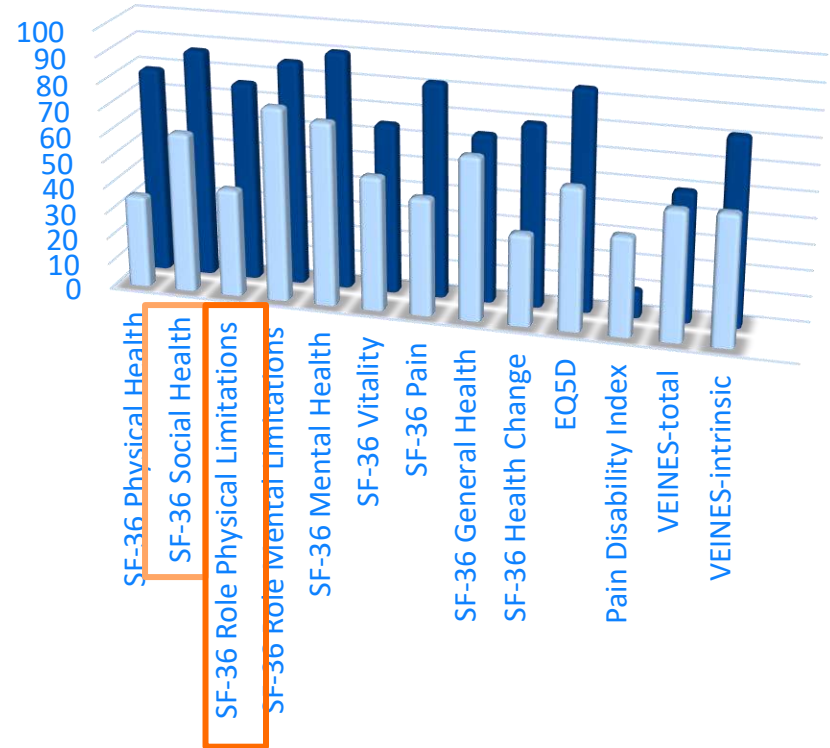
## Quality of Life



### Successful UACDT



### Unsuccessful UACDT



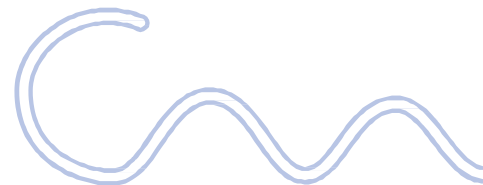
**P = 0.015**

■ Inclusion ■ 12 months

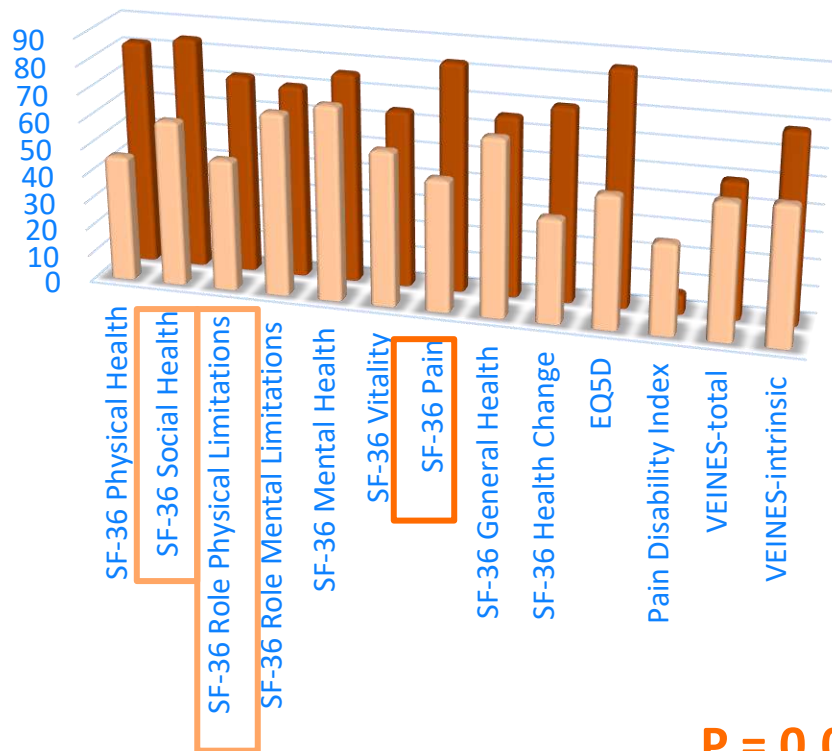
■ Inclusion ■ 12 months

# CAVA<sup>1</sup> – Subanalysis Thrombolysis

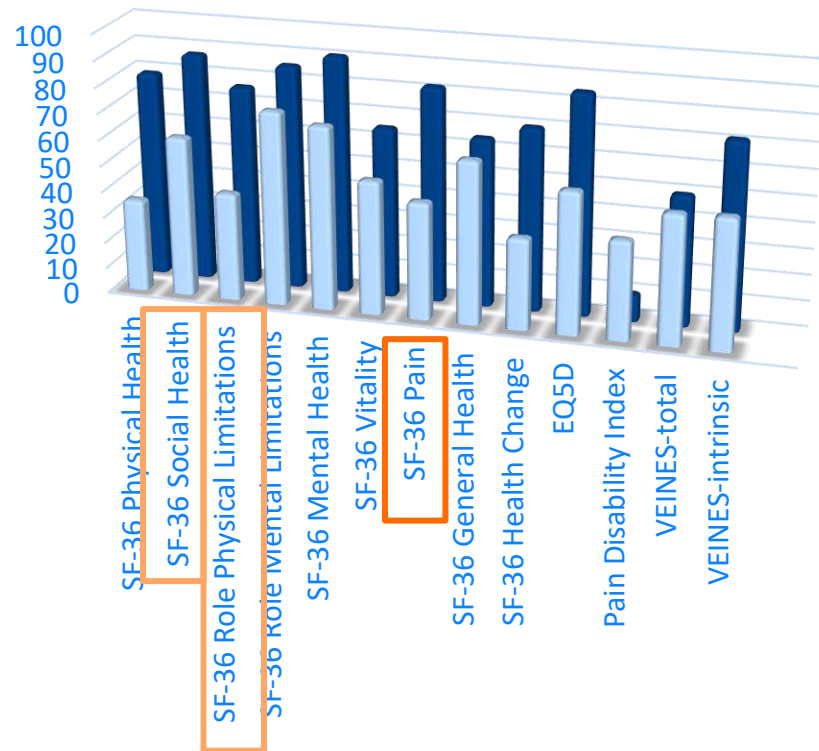
## Quality of Life



### Successful UACDT



### Unsuccessful UACDT



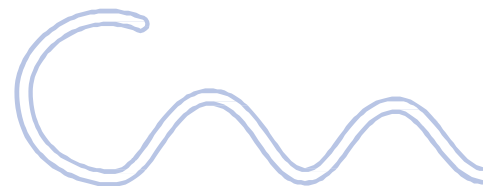
**P = 0.012**

■ Inclusion ■ 12 months

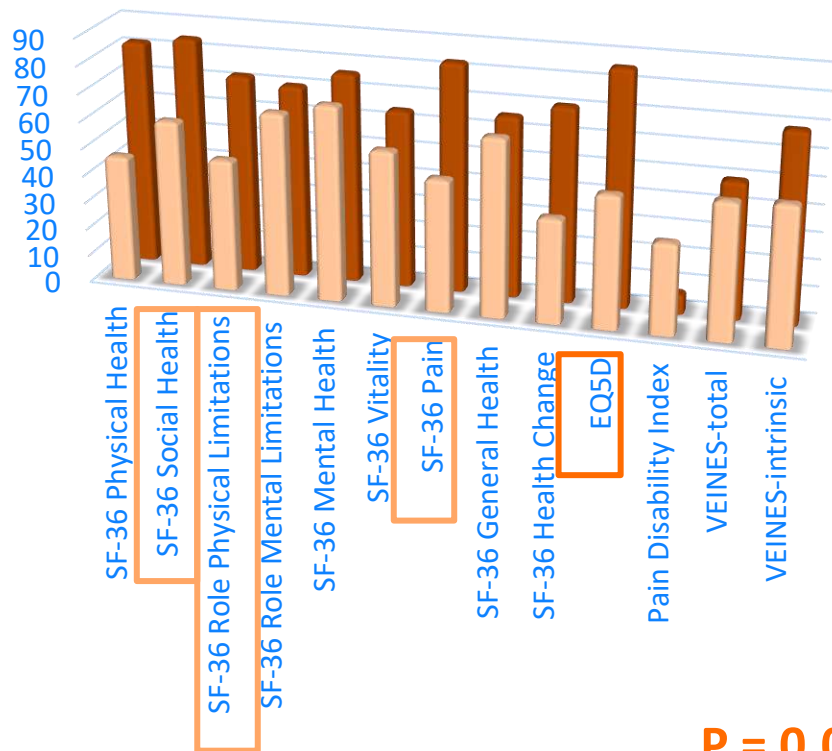
■ Inclusion ■ 12 months

# CAVA<sup>1</sup> – Subanalysis Thrombolysis

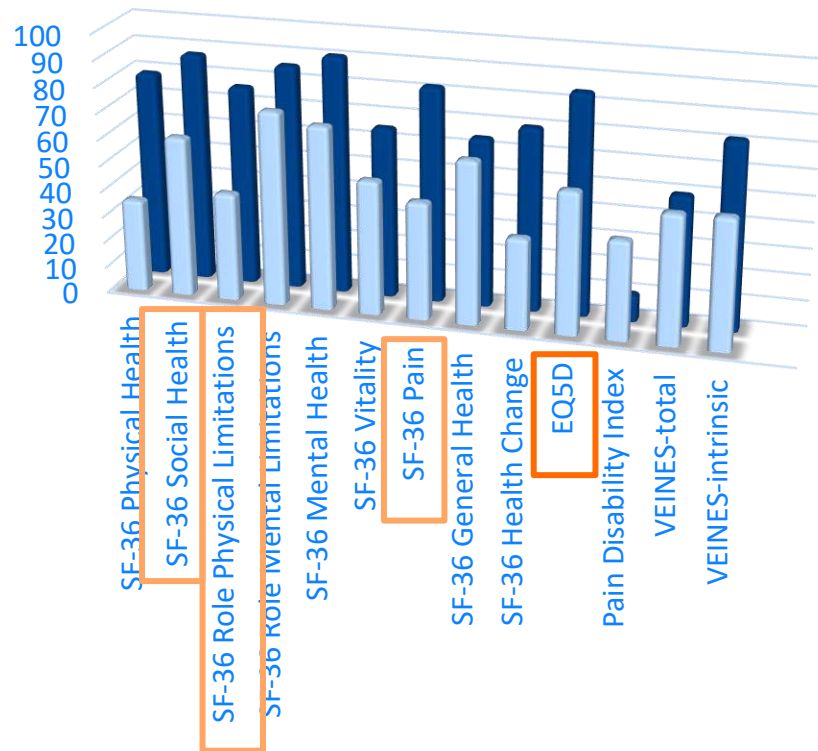
## Quality of Life



### Successful UACDT



### Unsuccessful UACDT



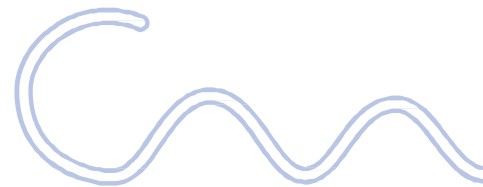
**P = 0.001**

■ Inclusion ■ 12 months

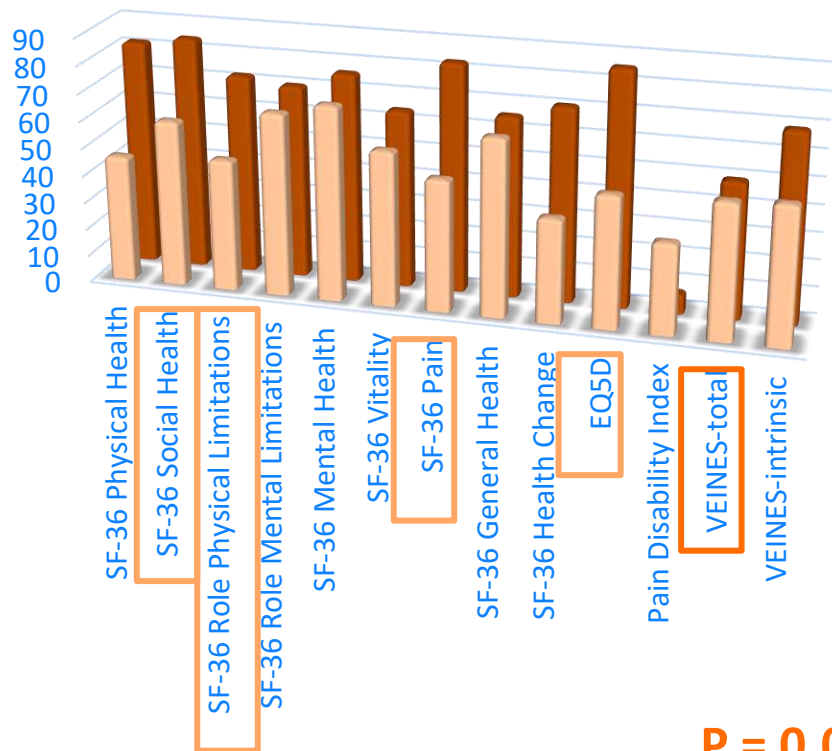
■ Inclusion ■ 12 months

# CAVA<sup>1</sup> – Subanalysis Thrombolysis

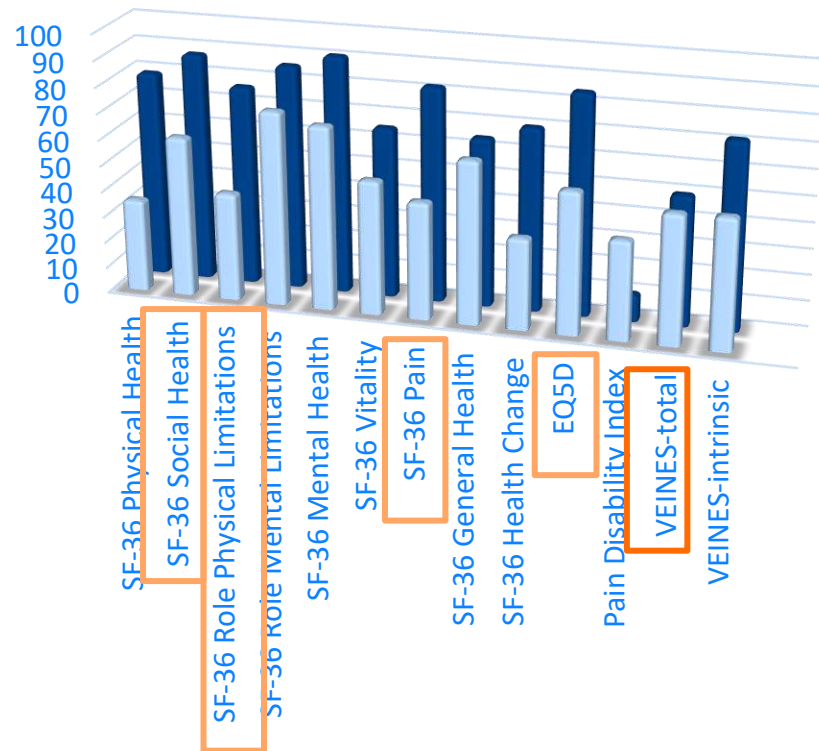
## Quality of Life



### Successful UACDT



### Unsuccessful UACDT



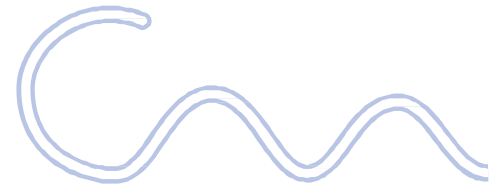
**P = 0.045**

■ Inclusion ■ 12 months

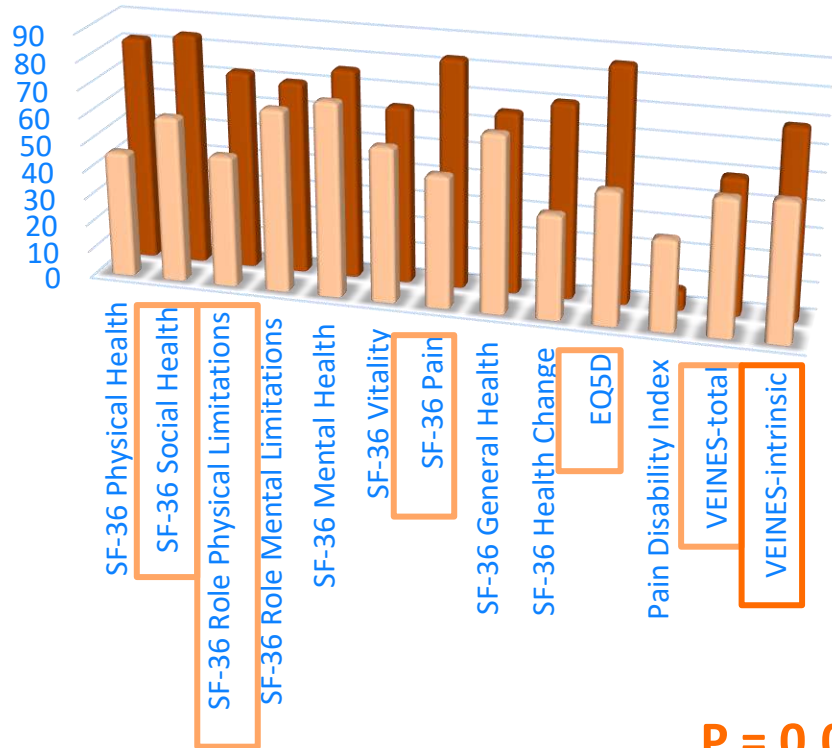
■ Inclusion ■ 12 months

# CAVA<sup>1</sup> – Subanalysis Thrombolysis

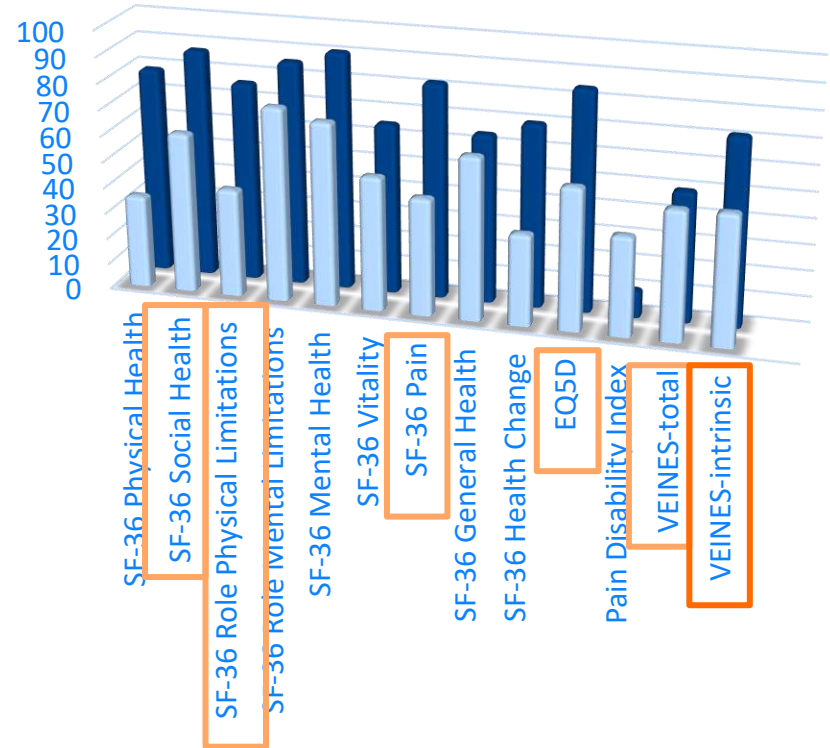
## Quality of Life



### Successful UACDT



### Unsuccessful UACDT

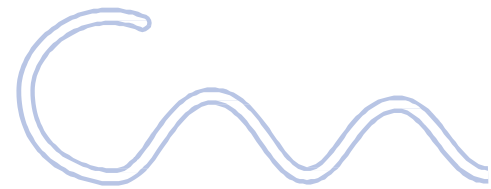


**P = 0.002**

■ Inclusion ■ 12 months

■ Inclusion ■ 12 months

# Longterm follow-up CAVA trial:



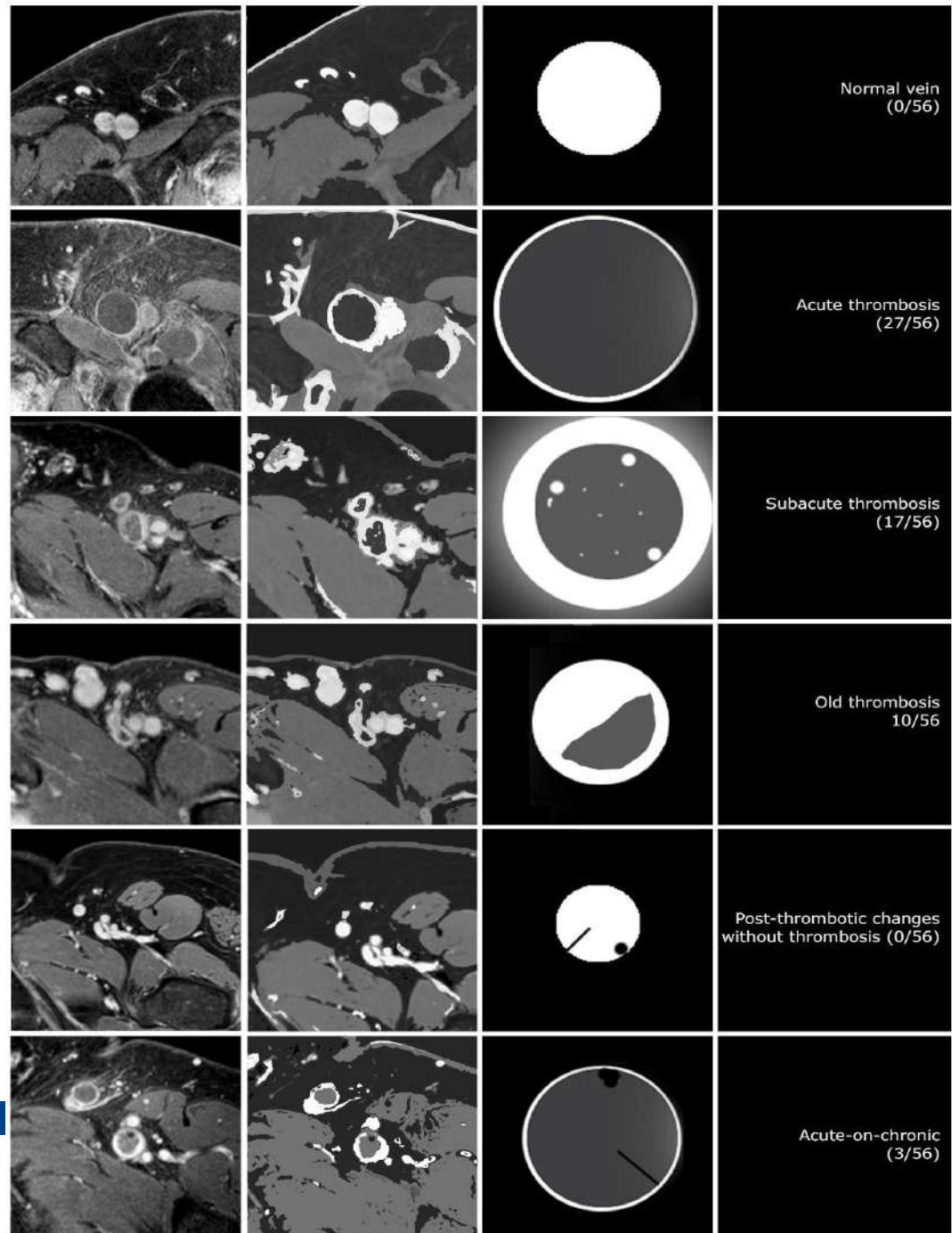
Long-Term Follow-Up 39.0 months (23.3–63.8)		
	Additional Thrombolysis	Standard Treatment
	(n=62)	(n=58)
PTS at final follow-up visit assessed by Villalta criteria	19 (30.6)	26 (44.8)
PTS diagnosed at final follow-up visit	3 (4.8)	5 (8.6)
None (<5)	43 (69.4)	32 (55.2)
Mild (5–9)	5 (8.1)	12 (20.7)
Moderate (10–14)	13 (21.0)	10 (17.2)
Severe (≥15)	1 (1.6)	4 (6.9)
PTS at final follow-up visit according to the ISTH score	29 (46.8)	40 (69.0)
PTS diagnosed at final follow-up visit	5 (8.1)‡	13 (22.4)
None (<5)	33 (53.2)†	18 (31.0)
Mild (5–9)	12 (19.4)†	24 (41.4)
Moderate (10–14)	15 (24.2)	12 (20.7)
Severe (≥15)	2 (3.2)	4 (6.9)
Mean venous clinical severity score at final follow-up visit	2.82±2.36	3.48±2.34

**P < 0,05**

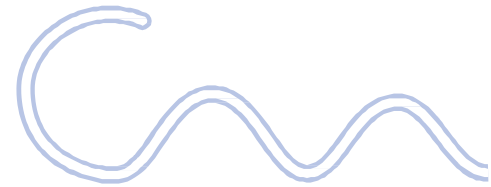


# MRV value:

- MRV:
  - Normal
  - Acute
  - Subacute
  - Old
  - PTS
  - Acute on chronic

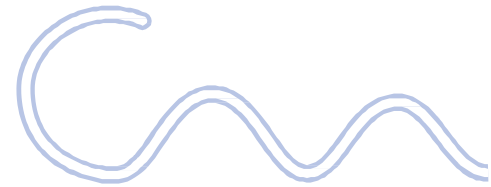


# MRV value:



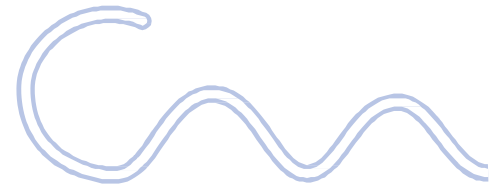
	<b>Acute</b> N = 27	<b>Subacute</b> N = 17	<b>Old</b> N = 12
Hypointense signal intensity vein lumen	27 (100.0%)	17 (100.0%)	12 (100.0%)
Dilated vein *	27 (100.0%)	16 (94.1%)	3 (25.0%)
Signs of recanalization *	2 (7.4%)	17 (100.0%)	9 (75.0%)
Thickened vein wall with halo sign around vein *	0	17 (100.0%)	4 (33.3%)
Partial very hypointense vein lumen *	0	0	10 (83.3%)
Post-thrombotic scarring †	0	1 (5.9%)	4 (33.3%)

# MRV value:



	Acute (N=27)	Subacute (N=17)	Old (N=12)
Duration of complaints at start			
- 0-7 days	9 (33.3%)	2 (11.8%)	0
- 7-14 days	12 (44.4%)	9 (52.9%)	4 (33.3%)
- 14-21 days <sup>¶</sup>	4 (14.8%)	6 (35.3%)	7 (58.3%)
- >21 days	1 (3.7%)	0	1 (8.3%)
- Unknown	1 (3.7%) 0	0	1 (1.8%)
Successful thrombolysis <sup>§</sup>	19 (70.4%)	11 (64.7%)	2 (16.7%)
Total time of thrombolysis, hours –	23.3 ± 7.4	47.9 ± 19.3	85.3 ± 16.3

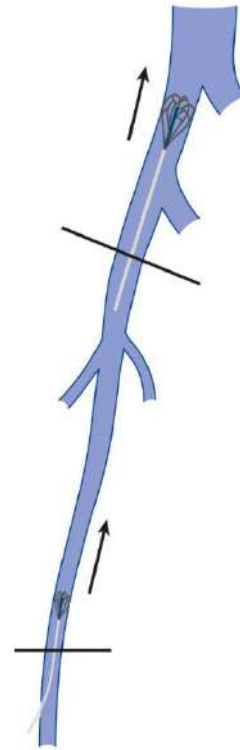
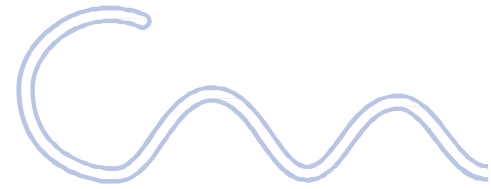
# Conclusions:

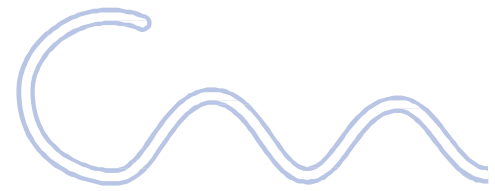


- **Low percentage of successful treatment with all available techniques**
  - CaVenT ?
  - CAVA 53,2 %
  - ATTRACT 50 % (subgroup analyses)
  
- **If thrombus removal is successful (patency restored to  $\geq 90\%$ ),**
  - It **does** lower the incidence moderate and severe PTS;
  - It **does** have a positive effect on:
    - Generic QoL
    - Disease specific QoL
    - Villalta
    - VCSS
  
- **The success is mainly determined by**
  - Thrombus age detected with MRV (duration of symptoms )
  - technical issues
    - Material
    - Experience

# Conclusions:

- Faster referral
  - Awareness
- Better preop workup
  - MRV **(do not treat when the thrombus is old on the MRV!!)**
- Better tools
  - Mechanical thrombectomy devices **(Improve succesrate!!)**
    - Costs ↓
    - Bleeding complications ↓
    - Indications
      - Postop cancer ↑
- Better scoring system
  - No Villalta
  - Adjusted VCSS
  - Venous claudication
  - QoL





## **Conclusion for the Debate:**

**YES:**

**Successful aggressive endovascular treatment for iliofemoral DVT does prevent PTS ?**