

## JET2019 1<sup>st</sup> Prize of Presentation Award

### Dr. Yu Morishita

Prevalence of Deep Vein Thrombosis of Screening by Duplex Ultrasound

#### Q1:自己紹介をお願いします

大阪南医療センター循環器科(発表時 岸和田徳洲会病院 循環器科)  
森下優と申します。

#### Q2:受賞された予選、決勝の感想は？

挑戦者ですので、とりあえず全部出し切ろうという思いで臨みました。  
最終日に発表できるという電話をいただいたときは“まさか”という気持ちでした。

#### Q3:勝ち抜くためのTipsをいくつか教えてください

- 発表のテーマ選択については、データベース作成から始めました。カルテを遡っていると思わぬところで疑問点や興味深いポイントが新たに見つかり、そこを掘り下げて今回のメインテーマに至りました。日常診療で疑問点や引っかかる点に目を光らせておくことが重要と思います。
- スライド作成については、枚数制限があるので、1枚のスライドの情報量が多く、それでいて見にくくならないようなスライド作りを心掛けました。最終的には上司の藤原先生にかなり修正してもらいました。
- 英語には苦手意識がありましたので、発表内容の邪魔をしないように時間を割いて練習しました。あまり良い策とはいえませんが原稿の丸暗記です。発音は某英会話教室でネイティブに直してもらいました。

#### Q4:発表された内容、論文化されましたか？

発表の少し前から、論文化にとりかかり、先日アクセプトされました。  
Heart Vessels. 2019 Sep 4. doi:10.1007/s00380-019-01488-w.



# Prevalence of Deep Vein Thrombosis of Screening by Duplex Ultrasound

*From Real World data focused on Venous disease*

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# COI Disclosure

Speaker name :

***Yu Morishita, MD***

I have the following potential conflicts of interest to report:

- Consulting
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Other(s)
- I do not have any potential conflict of interest

# Background

- The incidence of **DVT** in the world population is increasing<sup>1)</sup>
- **PTS** is one of the common complications of DVT, and it can force quality-of-life limitations<sup>2)</sup>.
- In the global, endovascular approach for DVT is becoming standard therapy as well as anticoagulation.
- On the contrary, most of the endovascular therapy is not reimbursement in Japan.
- There is no reliable data of incidence of DVT, treatment strategy and result in PTS in real-world Japanese data.

1) Huang W, et al. *Am J Med*, 2014

2) Kahn SR, et al. *J Tromb Haemost*, 2008

**DVT: deep vein thrombosis**

**PTS: post thrombotic syndrome**

# Study Material and Method

## Study Design

A single center retrospective investigation

## Aim

To clarify the real Japanese world data relevant to DVT

## Patients

Suspicion of venous disease patients screening by venous ultrasonography at Kishiwada Tokushukai Hospital in 2015

**Leg swelling, edema, pain, skin disease, Pulmonary Embolization, Varix, Perioperative screening**

## Outcomes

1. The incidence of DVT and predictive factors
2. Treatment Strategy
3. Result in PTS

# Study Flow Chart

**1137 patients**

Screening for venous disease by Duplex ultrasonography at Kishiwada Tokushukai Hospital (2015)

→ **122 cases** were excluded from the repeated study

**1015 patients**

→ **52 cases** were excluded from the follow-up study of the previous diagnosis of DVT

**963 patients Primary Analysis**

**Non DVT**

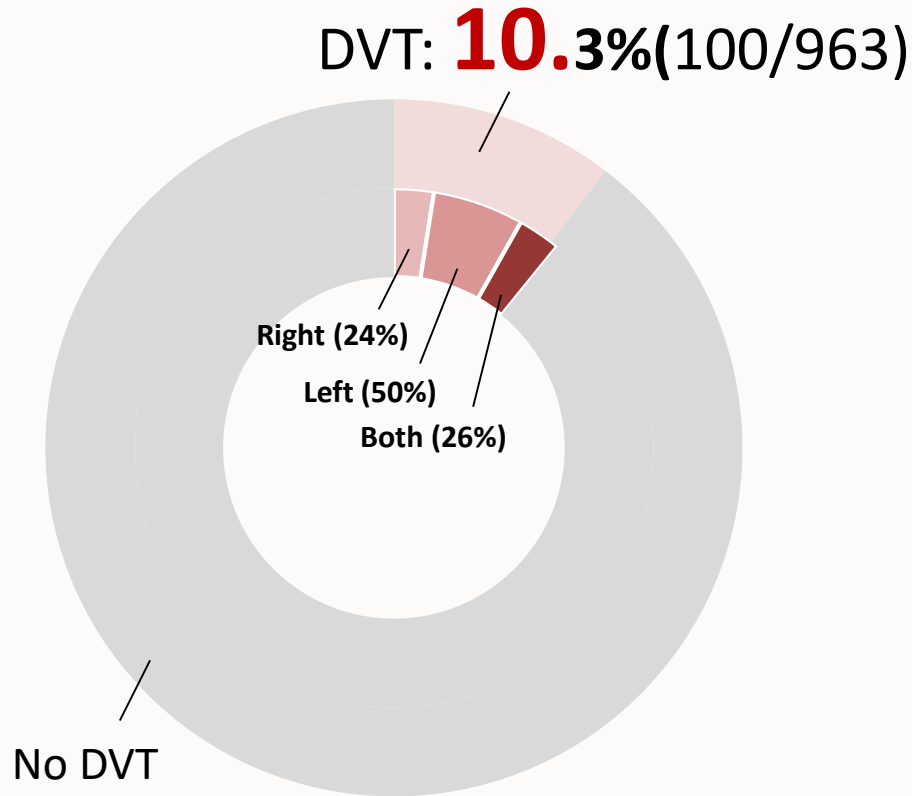
**DVT**

- Treatment Strategy
- Result in PTS during follow Up period

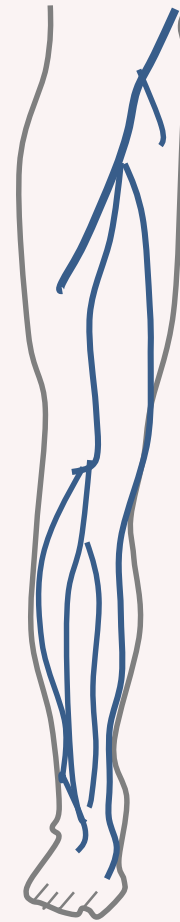
# Baseline Patient Characteristics

			N=963
Age (years old)	68.4 ± 15.2	Mental illnesses (%)	17 (2)
Female (%)	554 (58)	Hospitalized patient (%)	134 (14)
Hypertension(%)	553 (57)	Outpatient (%)	829 (86)
Diabetes (%)	177 (18)	Ambulatory status (%)	929 (96)
Dyslipidemia (%)	342 (35)	Wheel chair status (%)	14 (1)
Current Smoking (%)	84 (9)	Bedridden (%)	20 (2)
Obesity (%) BMI>25	196 (25)	Atrial fibrillation (%)	83 (9)
CKD (%) <60ml/min	360 (41)	BNP (mg/dl)	162 ± 321
Hemodialysis (%)	24 (2)	D-dimer (mg/dl)	22.9 ± 61
Pulmonary Embolism (%)	24 (2)	CRP (mg/dl)	1.7 ± 3.8
Malignancy (%)	271 (28)	Anticoagulants (%)	96 (13)
Peri-operative Orthopedic surgery (%)	211 (22)	Anti-platelet medicine (%)	208 (28)

# Incidence of Deep Vein Thrombosis



The prevalence of DVT and localization



◀ Iliac Vein **3.6%** (N=35)

Iliac and Femoral 26 patients 2.7%

◀ Femoral Vein **4.4%** (N=43)

Iliac, Femoral and BTK 19 patients 1.9%

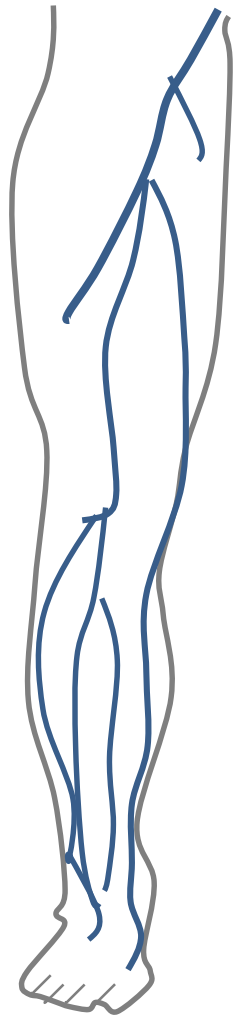
◀ Calf Vein **8.2%** (N=79)



# Predictive Factors of DVT from baseline characteristics

	Non DVT	DVT	Uni-	Multivariate		
Valuable	N=863	N=100	P value	OR	95%CI	P Value
Female	494 (57)	60 (60)	.59	<b>1.36</b>	<b>0.7-2.5</b>	<b>.32</b>
Age	67.9	72.4	.0048*	<b>0.99</b>	<b>0.9-1.0</b>	<b>.43</b>
Hospitalization	104 (12)	30 (30)	<.001*	<b>2.9</b>	<b>1.5-5.6</b>	<b>.003*</b>
Non ambulatory	25(3)	9(9)	.007*	<b>4.2</b>	<b>1.3-12.6</b>	<b>.018*</b>
Edema, Swelling	217 (25)	45 (45)	<.0001*	<b>4.6</b>	<b>2.3-9.1</b>	<b>&lt;.0001*</b>
Pulmonary Embolization	1(1)	14(14)	<.0001*	<b>25</b>	<b>8.7-79.5</b>	<b>&lt;.0001*</b>
Malignancy	243 (28)	28 (28)	.975	<b>1.3</b>	<b>0.6-2.5</b>	<b>.50</b>
Peri-operative Orthopedic surgery	188 (22)	23(23)	.782	<b>1.4</b>	<b>0.7-2.8</b>	<b>.37</b>
Mental illness	14(2)	3(3)	.36	-	<b>0-0.74</b>	<b>.03*</b>
Diabetes	161(19)	16(16)	.50	<b>0.7</b>	<b>0.3-1.6</b>	<b>.51</b>
Obesity	180(26)	16(20)	.26	<b>0.5</b>	<b>0.2-1.0</b>	<b>.05</b>
Chronic Kidney Disease	317 (41)	43 (45)	.42	<b>0.6</b>	<b>0.3-1.2</b>	<b>.18</b>
Atrial fibrillation	74 (9)	9 (9)	.88	<b>0.4</b>	<b>0.1-1.3</b>	<b>.14</b>
Anticoagulants	80 (12)	16 (20)	.008	<b>1.9</b>	<b>0.8-5.1</b>	<b>0.16</b>

# Treatment Strategy for DVT



Iliac Vein N=35	{	Acute	8(23%)
		Subacute	7(20%)
		Chronic	12 (34%)
		Unknown	8 (23%)

Femoral Vein N=43	{	Acute	11 (26%)
		Subacute	14 (33%)
		Chronic	13 (30%)
		Unknown	5 (12%)

Calf Vein N=79	{	Acute	15 (19%)
		Subacute	18 (23%)
		Chronic	21 (27%)
		Unknown	25 (32%)

## Treatment

**49% (N=49)**

- 33 DOAC
- 12 Warfarin
- 2 IVC filter
- 2 Surgical

Non treatment  
N=51(51%)

**Treatment 27 (77%)**

- Medical 35(100%)
- IVC filter 2 (7%)
- Surgical 1 (4%)

**Treatment 36 (83%)**

- Medical 36(100%)
- IVC filter 2 (6%)
- Surgical 2 (6%)

**Treatment 37 (47%)**

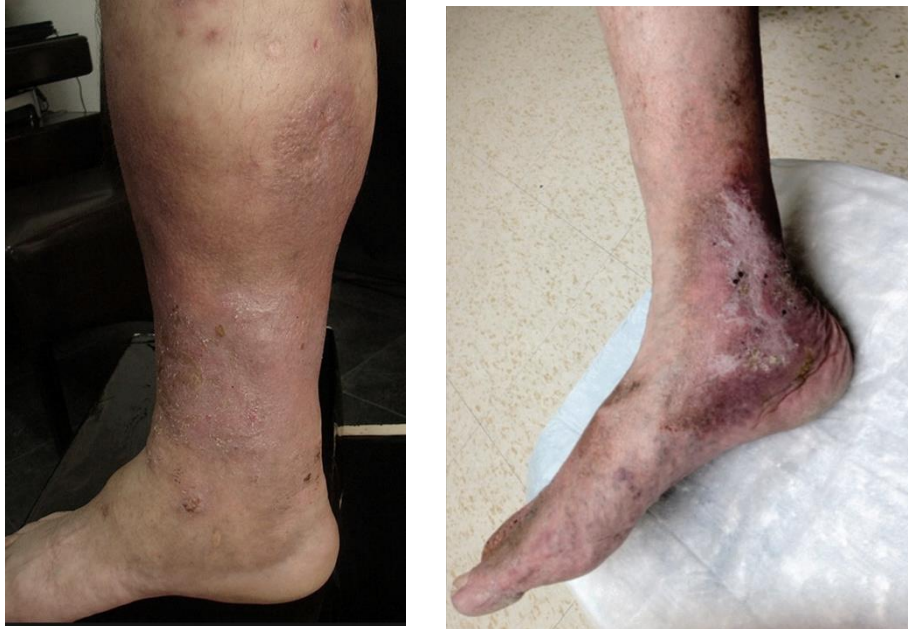
- Medical 37(100%)
- Surgical 1 (3%)

\*Acute≤2weeks, Subacute >2w≤6m, Chronic>6m

DOAC; direct oral anticoagulants

# Result in Post Thrombotic Syndrome (PTS)

Villalta PTS scale<sup>3)</sup>



## 5 symptoms by patient self report

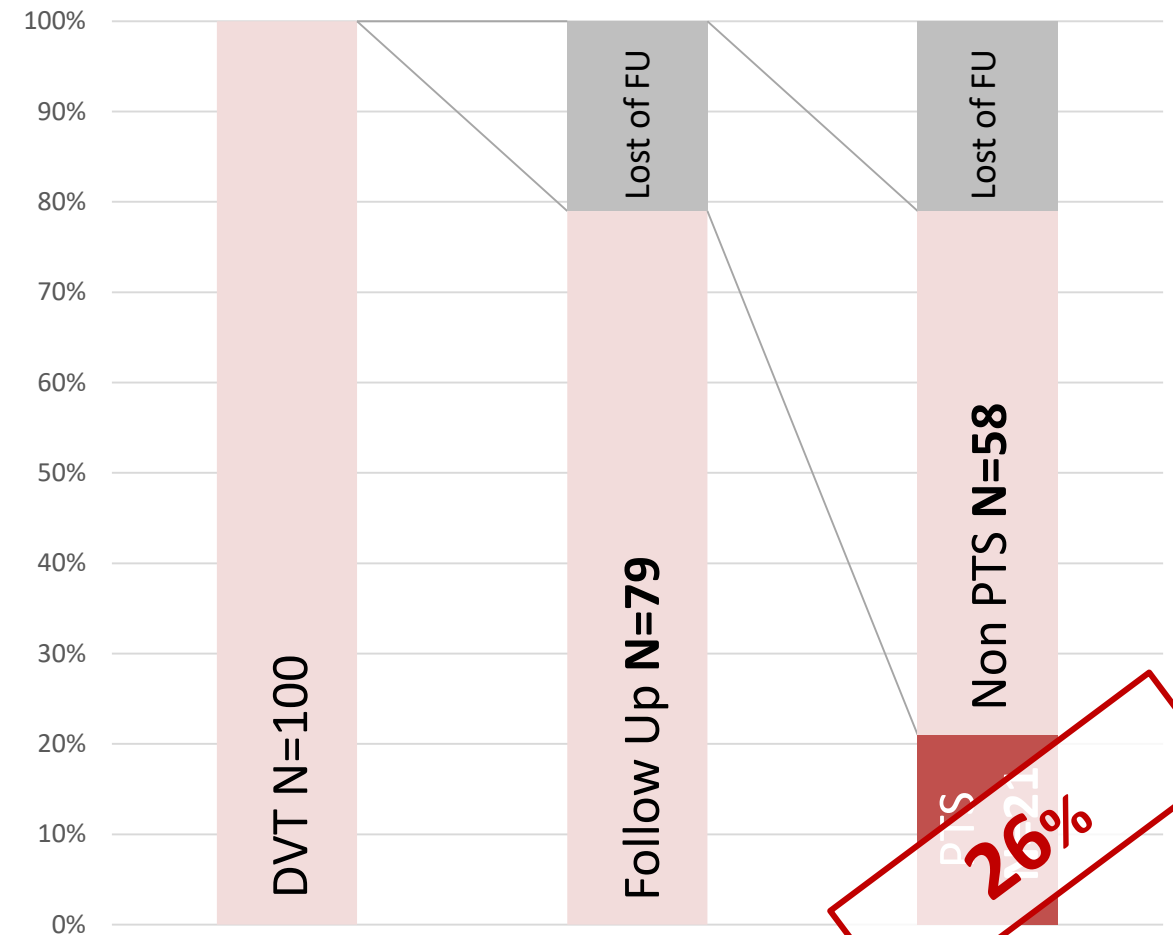
(pain, cramps, heaviness, pruritus, paresthesia)

## 6 signs by clinician assessment

(edema, skin induration, hyperpigmentation, venous ectasia, redness, pain during calf compression)

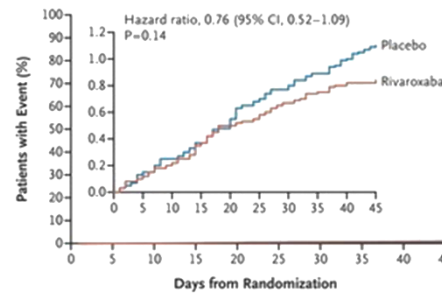
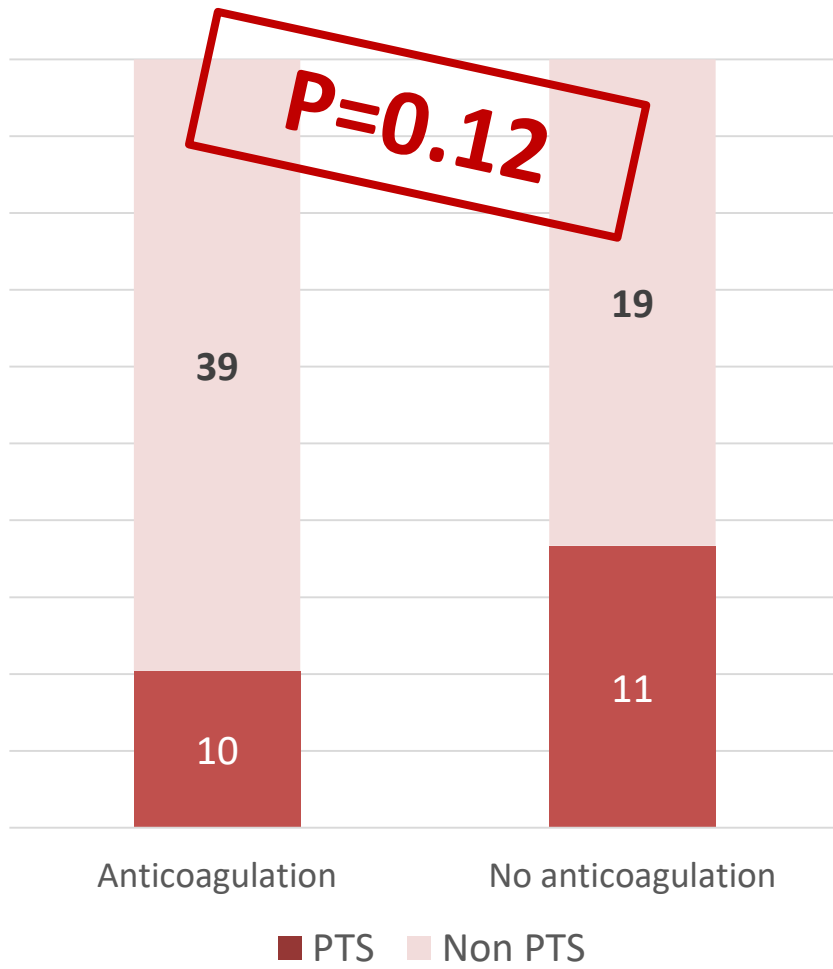
<b>0-4</b>	No PTS	<b>5-9</b>	Mild PTS
<b>10-14</b>	Moderate PTS	<b>≥15 or ulcer</b>	Severe PTS

Result in PTS during FU period



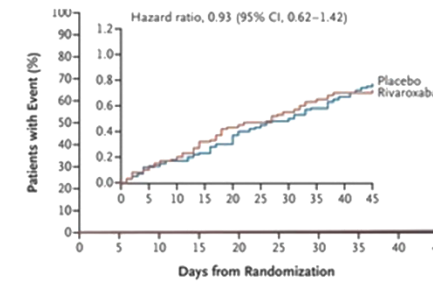
3) Kahn SR, et al. *J Tromb Haemost*, 2009

# Is anticoagulation therapy enough for preventing PTS?



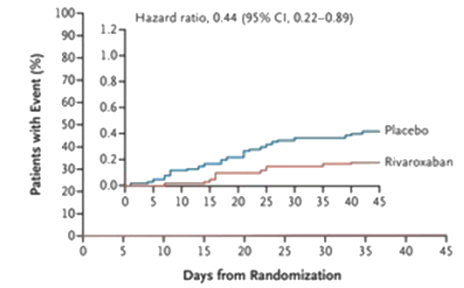
No. at Risk		6012	5989	5970	5959	5943	5922	5910	5902	5890	0
Placebo		6012	5989	5970	5959	5943	5922	5910	5902	5890	0
Rivaroxaban		6007	5989	5972	5962	5948	5934	5927	5919	5913	0

Symptomatic VTE  
or VTE related Death



No. at Risk		6012	5993	5984	5976	5961	5949	5942	5934	5923	0
Placebo		6012	5993	5984	5976	5961	5949	5942	5934	5923	0
Rivaroxaban		6007	5991	5980	5971	5957	5950	5943	5930	5925	0

VTE related Death



No. at Risk		6012	5988	5962	5952	5939	5909	5898	5895	5886	0
Placebo		6012	5988	5962	5952	5939	5909	5898	5895	5886	0
Rivaroxaban		6007	5989	5966	5960	5947	5927	5921	5916	5913	0

Symptomatic VTE

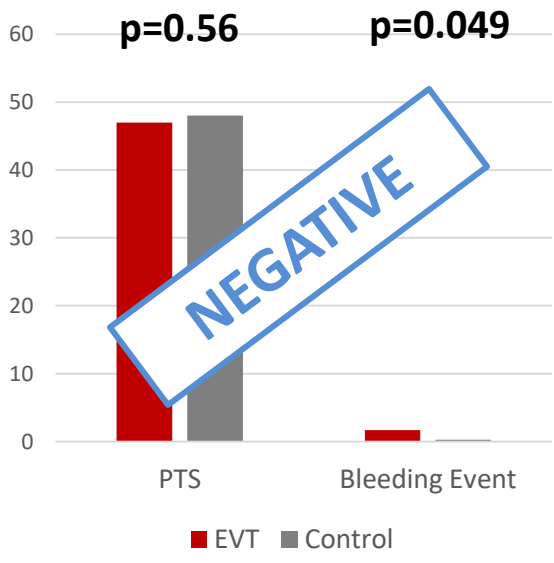
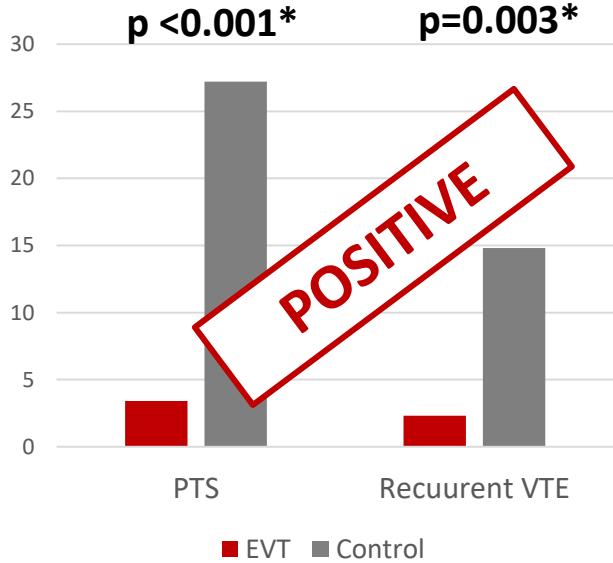
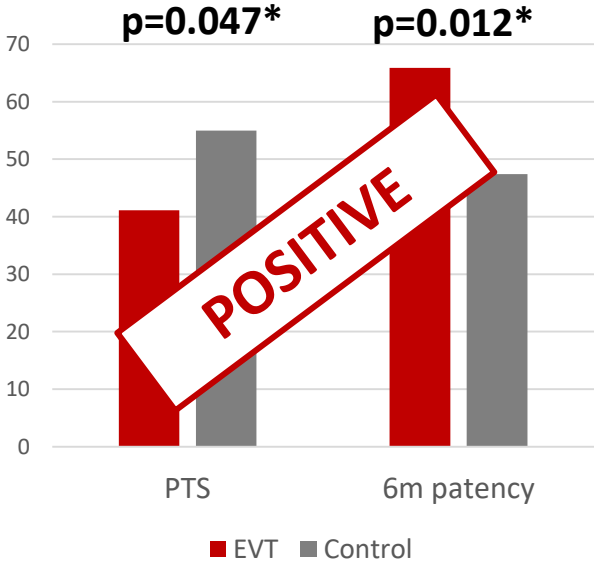
**Rivaroxaban was not associated with a significantly lower risk of symptomatic DVT for 45 days after discharge**

Spyropoulos AC, et al N Engl J Med. 2018

# Endo-venous therapy for DVT is still controversial

Study	CaVenT	TORPEDO	ATTRACT
Journal	Enden T. Lancet. 2012	Sharifi M. JEVT 2012	Vedantham S. NEJM 2017
Type	RCT (n=209)	RCT (n=183)	RCT(n=692)
Indication	Iliofemoral DVT within 21days	Symptomatic proximal DVT	Acute proximal DVT
Intervention	<b>CDT</b>	<b>PEVI+ Anticoagulation</b>	<b>PCDT+ Anticoagulation</b>
Control	Anticoagulation	Anticoagulation alone	Anticoagulation alone

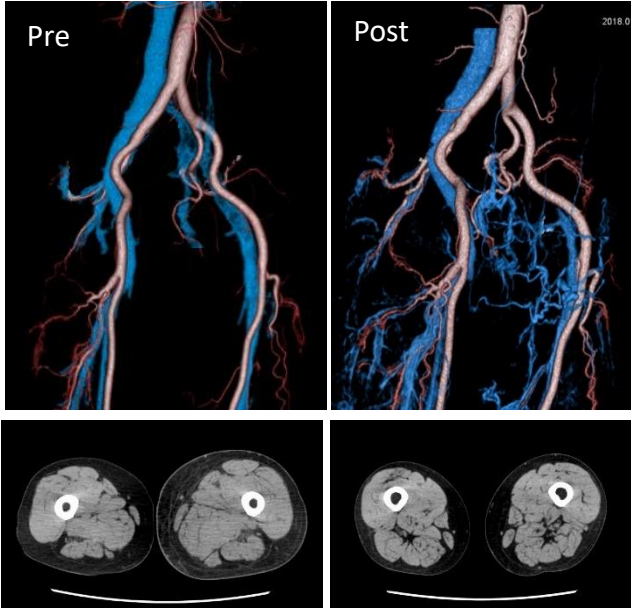
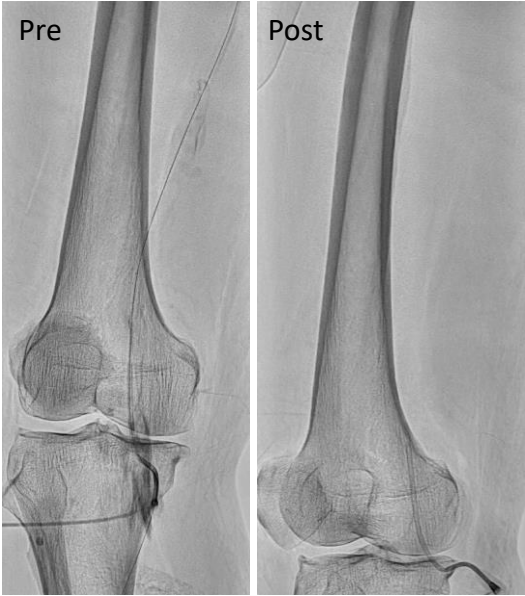
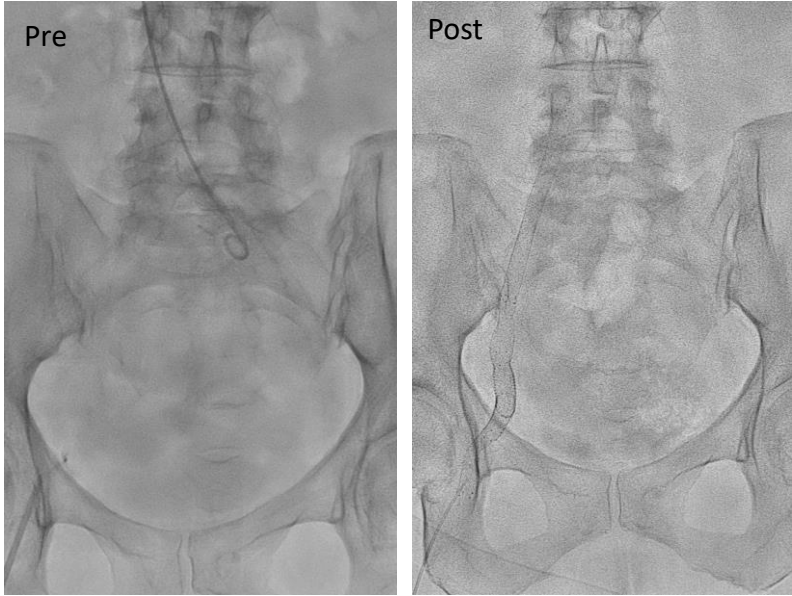
**Result**



CDT=catheter-directed thrombolysis PEVI=percutaneous endovenous intervention PCDI=pharmacochemical -CDI



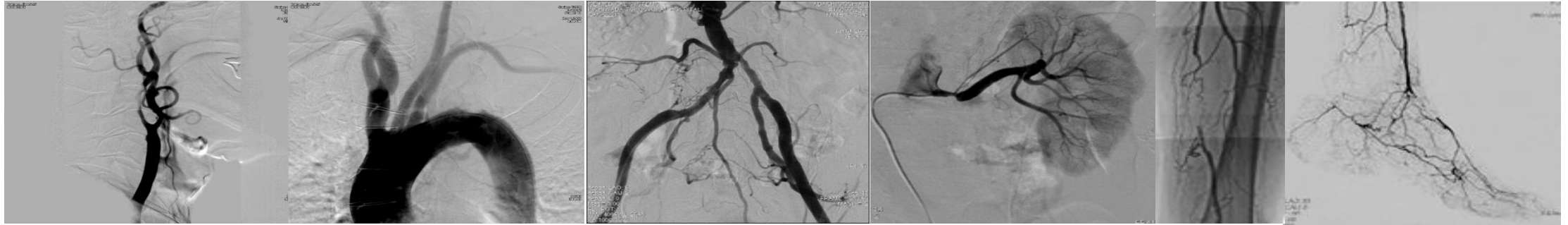
# Intervention or not?

	Case 1	Case 2	Case 3
Phase	Acute	Acute	Chronic + PTS
Age/Sex	70`s Female	50`s Male	70`s Female
Localization	Iliac Vein	Iliofemoral Vein	Iliac Vein
Therapy	<b>Anticoagulation</b>	<b>CDT/Anticoagulation</b>	<b>Stent/Anticoagulation</b>
	<b>Anticoagulation only</b>	<b>UK 0.72 million units</b>	<b>BNS 10x80 10x80 8x80mm</b>
Detail			
Patency	<b>Occlude</b>	<b>Re Occlude within 3d</b>	<b>Patent</b>
Progress	<b>No swelling, No PTS</b>	<b>Continuous Swelling PTS</b>	<b>No swelling, no PTS</b>



# Conclusion

- In our study, 10.3% of patients showed DVT
- Hospitalization, Non-ambulatory, Leg swelling, and concomitant pulmonary embolization was related to the incidence of DVT
- The treatment strategy was mainly medication therapy, otherwise, the rate was somewhat low
- Result in PTS after DVT was 26% within two years.
- Anticoagulation therapy was not enough for better clinical outcomes
- In some cases, endo-venous treatment interventional strategy will be needed



**Thank you for your attention**

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