Criteria To Predict Mid-Term Outcome After Stenting Of Chronic Iliac Vein Obstructions (PROMISE Trial)

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Disclosures

None

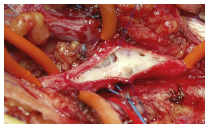
Background

Endovenous stenting

- 1st line therapy for post-thrombotic iliofemoral vein obstruction (PTS)
- **inflow vessel disease** associated with increased risk of loss primary patency

Need to better define inflow vessel disease

avoiding stenting with the potential of clinical deterioration a/o possibly driving the decision towards hybrid interventions



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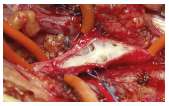
Predictive factors for patency after endovenous stenting

retrospective, monocentric study

prospectively collected, consecutive patients (2008 – 2020)

N=452

211 chronic iliofemoral vein obstruction



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108 patients fulfilled inclusion criteria

readable duplex ultrasound and ascending contrast phlebography, magnetic resonance venography (MRV) or computer tomographic venography (CTV) at baseline

Hypothesis

inguinal iliac vein inflow defined at the level of the femoral bifurcation before stenting is a crucial factor for **expected** patency

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Stent Extension Below Inguinal Ligament

consecutive pts with stenting across inguinal ligament (2018 – 2022)
63 patients (mean age, 48.1 ± 15.5 years; female 62%)

	Univariate			Multivariate		
	OR	95% CI	*P* value	OR	95% CI	*P* value
Smoke	1.05	−0.22 to 0.30	.029	–	–	ns
Thrombophilia	1.41	−0.54 to 2.32	.041	–	–	ns
Trabeculation into FV	0.95	0.28-4.11	.031	–	–	ns
Trabeculation into FV and DFV	2.34	0.84-8.23	.001	2.41	0.56-7.12	.037
Villata >15	1.78	0.19-5.23	.001	1.89	0.15-6.11	.043

CI, Confidence interval. *DFV*, deep femoral vein. *FV*, femoral vein. *OR*, odds ratio.

Do not leave in-flow problem, if DFV good and fem-pop diseased go for the DFV

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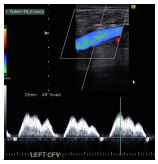
Study design

venous inflow defined by DUS as

a. mid-respiratory, **peak flow velocity in cm/s** in CFV at the level of inguinal ligament and 2 cm below femoral vein confluence (DFV and FV, respectively)
b. **Postthrombotic changes** in the CFV, DFV and FV

→ differences between stent patency (occluded/opened)



Statistics

- T test, Mann Whitney U test, Chi-squared or Fisher's exact test
- skewed variables (US velocity of CFV, DFV and FV) log transformed
- Kaplan-Meier survival curves and log-rank tests
- multivariate logistic regression models to investigate proportional contribution of flow velocity and postthrombotic lesions of the inflow veins (CFV, DFV and FV) to development of stent occlusion.
- receiver operating characteristic (ROC) curve used to analyze critical values of US velocity before stenting for occlusion, and sensitivity and specificity were obtained.

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Baseline

Study population

- left side 64,8%, mean age: 47.4 ± 15.4 years, 46.3% women
- inferior vena cava (IVC) involved in 34.3%
- 90 (83,3%) postthrombotic syndrome (PTS); 18 (16.7%) non-thrombotic (NIVL)

mean follow-up: 41 ± 26 months

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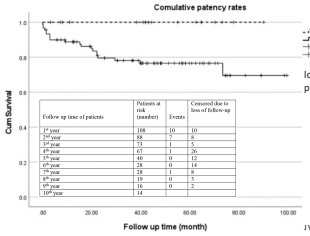
Results

Kaplan-Meier curves of univariate cumulative patency rates



loss of patency in 20 (18.5%) patients (PTS)

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Results

Baseline patient characteristics and comorbidities

Demographics	Total (n = 108)	Occluded (n = 20)	Open (n = 88)	*P* value
Etiology				**.022***
NIVLs	18 (16.7)	0	18 (20.5)	
PTO	90 (83.3)	20 (100)	70 (79.5)	
Anticoagulation at last F/U, yes	80 (74.1)	18 (90)	62 (70.5)	.072
Antiplatelet agents at last F/U, yes	9 (8.3)	4 (20)	5 (5.7)	.059*
Stents (number)	2 (1-2)	2 (2-3)	2 (1-2)	**<.001**
Stent localization				
CIV and EIV	34 (31.5)	0	34 (38.6)	**<.001**
Additional stent in CFV	66 (61.1)	14 (70)	52 (59.1)	
Additional stent in DFV and FV	8 (7.4)	6 (30)	2 (2.3)	
US velocity, CFV, cm/s	20 (10-30)	7 (0-20)	20 (10-30)	**.001**
US velocity, DFV, cm/s	11 (8-20)	10 (5.75-15)	12 (10-20)	.177
US velocity, FV, cm/s	10 (5-15)	8 (5-10)	10 (8-15)	**.001**
US post-thrombotic signs, CFV	73 (67.6)	20 (100)	53 (60.2)	**.001**
US post-thrombotic signs, DFV	25 (23.1)	10 (50)	15 (17)	**.003***
US post-thrombotic signs, FV	61 (56.5)	16 (80)	45 (51.1)	**.019**

Predictive factors for stent occlusion

Odds ratios (OR) for stent occlusion defined for logarithmic ultrasound velocity measurements and post- thrombotic signs defined for inflow veins in the groin

	Model 1		Model 2	
	P value	OR (95% CI)	*P* value	OR (95% CI)
Log US velocity, CFV, cm/s	<.001	7.52 (2.54, 22.28)	<.001	9.49 (2.74, 32.83)
Log US velocity, DFV, cm/s	.081	6.79 (0.79, 58.20)	.097	6.22 (0.72, 54.06)
Log US velocity, FV, cm/s	.005	10.75 (2.07, 55.82)	.012	10.23 (1.68, 62.32)
US post-thrombotic signs, DFV	.006	4.51 (1.53, 13.25)	.008	5.02 (1.53, 16.42)
US post-thrombotic signs, FV	.033	3.62 (1.11, 11.84)	.042	3.64 (1.05, 12.70)

CFV, Common femoral vein; *CI*, confidence interval; *DFV*, deep femoral vein; *FV*, femoral vein; *US*, ultrasound.
Model 1: adjusted for age and sex.
Model 2: adjusted for age and sex smoking, comorbidities (renal failure, vascular diseases, hypertension, obesity, thrombophilia).
Log transformation was performed for US velocities due to skewed distribution.

ROC curve analysis
Mid-respiratory peak velocity in CFV of 6.5 cm/s: sensitivity of 92%, specificity of 50% to predict stent occlusion

Conclusion

Inflow disease as assessed by low peak velocities in the CFV as well as post-thrombotic findings in the DFV represent risk predictors for stent occlusions

after multivariate analysis including stent location as well, mid-respiratory low peak velocity in the CFV remained as a single highly significant, independent predictor for stent occlusion

DUS useful pre-interventional predictor considered for decision making process

➞ listen to your DUS technician

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Thank You