Venous thrombus removal: limits and contraindications

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Disclosure

- ☒ I have the following potential conflicts of interest to report:
- ☒ Consulting: Servier, Boston SC
- ☐ Employment in industry
- ☐ Shareholder in a healthcare company
- ☐ Owner of a healthcare company
- ☐ Other(s)
- ☐ I do not have any potential conflict of interest

2 RCT´s with CDT and PMT vs AC

Post-thrombotic syndrome after catheter-directed thrombolysis for deep vein thrombosis (CaVenT): 5-year follow-up results of an o

Ylva Haig, Tone Enden, Ole Grøtta, Nils-Einar Kløw, Carl-E
Lars Olaf Holmen, Anne Mette Njaastad, Gunnar Sandb

Summary

Background Post-thrombotic syndrome is a co
and is associated with reduced quality of life a
additional catheter-directed thrombolysis red
conventional therapy, but did not affect quality
assess whether findings for post-thrombotic sy

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Pharmacomechanical Catheter-Directed Thrombolysis for Deep-Vein Thrombosis

S. Vedantham, S.Z. Goldhaber, J.A. Julian, S.R. Kahn, M.R. Jaff, D.J. Cohen, E. Magnuson, M.K. Razavi, A.J. Comerota, H.L. Gornik, T.P. Murphy, L. Lewis, J.R. Duncan, P. Nieters, M.C. Derfler, M. Filion, C.-S. Gu, S. Kee, J. Schneider, N. Saad, M. Blinder, S. Moll, D. Sacks, J. Lin, J. Rundback, M. Garcia, R. Razdan, E. VanderWoude, V. Marques, and C. Kearon, for the ATTRACT Trial Investigators*

ABSTRACT

BACKGROUND

The post-thrombotic syndrome frequently develops in patients with proximal deep-vein thrombosis despite treatment with anticoagulant therapy. Pharmacomechanical catheter-directed thrombolysis (hereafter "pharmacomechanical thrombolysis") rapidly removes thrombus and is hypothesized to reduce the risk of the post-thrombotic syndrome.

The CaVenT and ATTRACT data:

- Results
  - Iliofemoral DVT [½ including com fem/iliac vein]

CaVenT
N= 90 CDT
N= 99 AC
4 clinics

PTS: 5 years

- CDT+ AC **43%** (37/87)
- AC 71% (63/89)

P<0.0001

ATTRACT
N= 337 PMT
N= 355 AC
56 clinics

PTS, moderate/severe: 2 years

- PMT+ AC **18%** (60/336)
- AC 24% (84/355)

P= 0.04

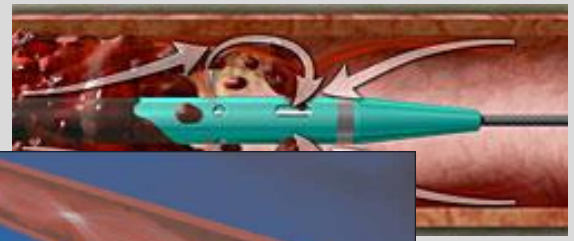
Copenhagen: N=109 CDT **PTS** **16 %** (18/109)
Median follow-up 71 months)

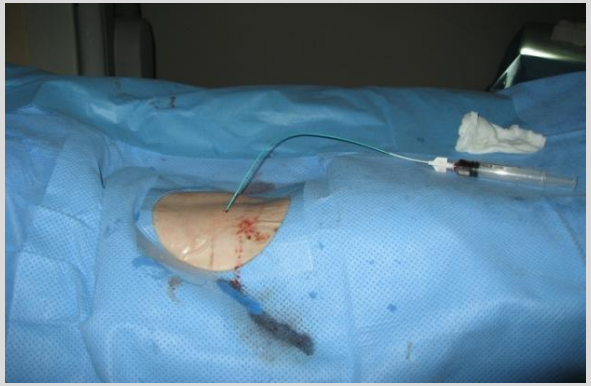
Broholm et al, EJVES 2011
Haig et al, Lancet Haematol 2016
Vedantham et al, N Engl J Med 2017

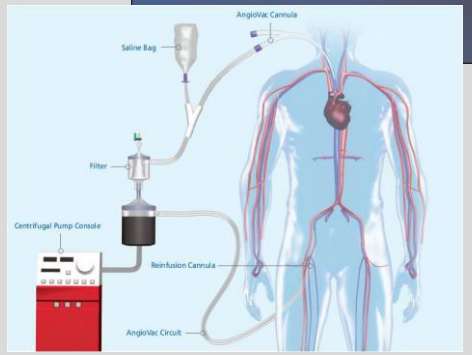
Methods for thrombus removal

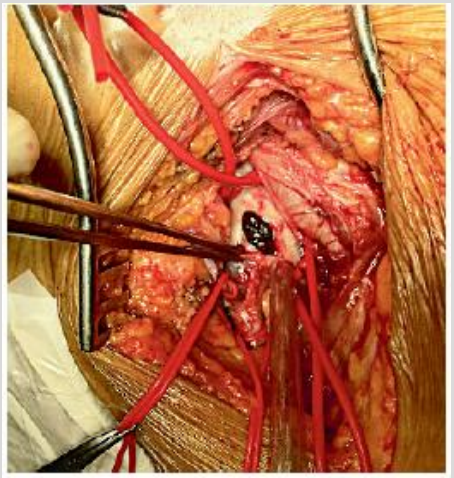
- **Endovenous treatment/percutaneous techniques**
  - Using lysis
    - CDT
    - PMT
  - Thrombectomy (+ lysis)
  - Aspiration

- **Surgical thrombectomy**









Using lysis: Contraindications

- Recent cerebral/spinal event (<3 mo)
- Uncontrolled hypertension >180/110
- Renal/hepatic insufficiency
- Bleeding disorders
- INR > 2
- Antiplatelet treatment
- Surgery/delivery within 7-10 days
- Active cancer
- Pregnancy

Minimize bleeding

Major bleeding:

ATTRACT:	1.7% vs. 0.3%, P = 0.049
CaVenT:	3.3% vs. 0.0%, P < 0.05
Copenhagen	2.2 %

Few papers: be careful here!

Major bleeding: stop of infusion, blood transfusion, intervention

Enden et al, Lancet 2012
Vedantham et al, BMJ 2017
Baekgaard et al, Phlebology 2012

Limitations for CDT

Eur J Vasc Endovasc Surg (2017) 53, 419–424

Editor's Choice – Factors Associated with Long-Term Outcome in 191 Patients with Ilio-Femoral DVT Treated With Catheter-Directed Thrombolysis

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[d] Dept. of Clinical Physiology and Nuclear Medicine, Bispebjerg Hospital, University of Copenhagen, Denmark

WHAT THIS PAPER ADDS

The present study demonstrates, for the first time, that outcome in terms of competent veins after catheter-directed thrombolysis in ilio-femoral deep venous thrombosis is better in patients with symptom duration <14 days compared with patients with longer symptom duration.

Comparison of univariate and multivariate model: Based on competent iliofemoral veins

11 covariates of 50 pre-treatment defined variables	Better	Univariate (Chi^2) p	Multivariate (Cox) p
Gender	woman	**0.025**	0.28
Age (<50 vs. >50 y)	< 50 y	0.27	0.13
Side (left-right)	left	0.44	0.77
Stent (yes/no)	stent	**0.033**	0.45
Cava-atresia (yes/no)	no atresia	0.44	0.61
Duration of lysis (<48 vs. >48h)	< 48 h	**0.033**	0.67
Type of adm., (infusion/pulse)	pulse	**0.008**	**0.001**
Duration of symptoms (≤14 vs. >14 days)	≤ 14 days	**0.005**	**0.024**
Chronic DVT (yes/no)	no DVT	**< 0.0001**	**< 0.0001**
Coagulation defect (yes/no)	no coag defect	0.91	0.11
Anticoagulation, (LMWH vs. Heparine	LMWH	0.35	0.11

Predictors for poor PTS outcome:

- **3 studies**
  - Total 246 patients

  - **Residual thrombus**
  - **Lysis /thrombus clearance < 50 %**

- **Predictive for PTS and DVT recurrence**
- **Thus a limitation not to remove ”all thrombus”**

Comerota et al, JVS 2012
Haig et al, JVS V+L 2014
Avgerinos et al, JVS V+L

If contraindication for lysis: Aspiration (PAT) versus AC

Use of Percutaneous Aspiration Thrombectomy vs. Anticoagulation Therapy to Treat Acute Iliofemoral Venous Thrombosis: 1-year Follow-up Results of a Randomised, Clinical Trial

Volkan Cakir · Aytac Gulcu · Emrah Akay · Ahmet E. Capar · Tugra Gencpinar · Banu Kucuk · Ozalp Karabay · A. Yigit Goktay

Results

- **42 patients with iliofemoral DVT**
- **21 patients PAT**
- **21 patients AC**

- Follow-up 12 months
- Complete, partial patency in favor of **PAT**, p<0.001

- Modified Villalta score:
- Mean 0.81 **PAT** vs 2.43 **AC,** p<0.001

Cakir et al, Cardiovasc Intervent Radiol 2014

148 limbs with acute/subacute iliofemoral DVT
Mean treatment time 60 min
Stent rate 67 %
Patency 80 % at 3 years
Thrombolysis used in 27 %
Oguzkurt et al, Interv Rad 2012

Venous thrombectomy 1997 and 2017

Venous Thrombectomy for Iliofemoral Vein Thrombosis – 10-year Results of a Prospective Randomised Study

G. Plate*[1], B. Eklöf[1], L. Norgren[3], P. Ohlin[2] and J. A. Dahlström[2]

[1]Department of Surge

Objectives: To study if ven
improves venous physiology
Design: Prospective randomi
Material: Thirty patients re
with conventional anticoagul
arteriovenous fistula and anti
ultrasound and venous physi

Hybrid operative thrombectomy is noninferior to percutaneous techniques for the treatment of acute iliofemoral deep venous thrombosis

Limael E. Rodríguez, MD,[a] Aihab Aboukheir-Aboukheir, MPH,[a] Ricardo Figueroa-Vicente, MD,[a] Hiram Soler-Bernardini, MD, FACS,[a] Guillermo Bolanos-Avila, MD, FACS,[a] Luis J. Torruella-Bartolomei, MD, FACS,[a] Anthony J. Comerota, MD, FACS,[b] *and* Jorge L. Martinez-Trabal, MD, FACS,[a] *Ponce, Puerto Rico; and Toledo, Ohio*

ABSTRACT

Objective: Hybrid operative thrombectomy (HOT) is a novel technique for the treatment of acute iliofemoral deep venous thrombosis (IFDVT) and is an alternative to percutaneous techniques (PTs) that use thrombolytics. In this study, we compare perioperative and intermediate outcomes of HOT vs PT as interventions for early thrombus removal.

Methods: From July 2008 to May 2015, there were 71 consecutive patients who were treated with either PT (n = 31) or HOT (n = 40) for acute or subacute single-limb IFDVT. HOT consisted of surgical thrombectomy with balloon angioplasty with or without stenting by a single incision and fluoroscopically guided retrograde valve manipulation to extract the thrombus. PT included catheter-directed thrombolysis with or without pharmacomechanical thrombectomy using the

Venous thrombectomy data:

- Results
  - Iliofemoral DVT

Plate
N= 13 VT
N= 17 AC

Patency: 10 years

- **VT + av fistula** **17%**
- AC **59%**
- RR 28 %

P<0.05

Rodriguez
N= 40 VT
N= 31 PMT

PTS: 2 years

- **VT + stenting** **15%**
- PMT **13%**

P= 0.79

Plate et al, EJVES 1997
Rodriques et al, JVS V+L 2017

Difficulties to compare studies

- **ALTERNATING:**
  - DVT levels
  - Symptom duration/thrombus age
  - Previous DVT
  - rt-PA dosis
  - Duration of treatment
  - Stent rate
  - Monitoring
  - Etc.Etc.

- **OFTEN COMBINATION of METHODS**

Conclusions

- **CDT/PMT** can be used for iliofemoral DVT in patients
  - Without known risk for bleeding
  - Without previous ipsilateral DVT
  - Without thrombus age > 14 days
  - Patient has to cooperate (age not a limitation)

- **Thrombus aspiration** can be used for iliofemoral DVT in patients
  - With contraindications to CDT/PMT

- **Surgical thrombectomy** can be used for iliofemoral DVT in patients
  - With contraindications to CDT/PMT
  - Pregnancy
  - Threatened extremity (”cerulea condition”)