

Mechanical Thromectomy Techniques for
Ilio-Femoral DVT
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My ground rules before considering MT/PMT

- Acute DVT- <3/52
- Popliteal vein open if you want to do it all in 2 hours- “Single Session”
- Patient can hold still
- Can use iodinated contrast
- Traditional contra-indications to CDT do not apply



What does single session therapy mean?

- Removal of thrombus and all ancillary steps within 3 hours
- Not transfer to a step down unit
- Not the start of catheter directed thrombolysis



Single session: ideal patient

- Age irrelevant if they can hold still for 2-3h
- Popliteal vein open
- Not short of breath
- Negative CTPA
- IVC normal
- No contra-indications to thrombolysis
- Leg was “normal” beforehand



Single-Session: time pressure

- If thrombolysis contra-indicated (Intracerebral bleed)
- If leg seriously threatened



Time pressure: severe painful phlegmasia- blisters developing



Factors to ignore

- Sheath size- venous- forget it
- Valvular damage (DVT destroys valves far more efficiently than you ever could)
- Cost- if less than the cost of 1 day in ICU then you are saving a lot of money.
- Risk of PE- if you get a PE it will only harm the patient if underlying RV dilatation/Pul Arterial Hypertension- nonetheless consider an IVC filter early in your experience



Devices

- Combination pulse spray thrombolysis plus negative pressure vortex aspiration
 - AngioJet/BSCI
- Manual “Squeezer- Retriever”
 - Inari Flow-triever/Clot-triever
- Aspiration
 - Small Bore
 - Lightning 12/Penumbra
 - JETI/Walk Vascular
 - Large Bore
 - AngioVac/AngioDynamics
- Rotational:Trerotola-
 - Arrow/PTD
 - Thrombolex/Bashir
- Protected rotational –
 - Straub Aspirex
 - VETEX Revene





<<< Puncture site right Pop V

Image taken at 24 hours; back to work in one week



Whichever device you use, in my experience; the effect is ALWAYS improved with an aspiration catheter



If calf veins involved: posterior tibial vein access



Or criss cross technique- catheters going north and south



Post thrombus removal ESSENTIALS!!!!

- Overnight pneumatic compression boots
- Class II thigh high compression stockings
- Anticoagulation for 3 months
- Aim INR 2.5-3.5
- Colour Doppler US day one post op- ALWAYS! If CDUS is patent then boots off , stockings stay on; YOU walk patient to ward
- US at 30/90/180 days (ideally)



Contra-indications to CDT probably do not apply to PMT.....

So we will treat patients with:
Cancer
Recent Surgery
Recent Trauma etc etc

Pharmacomechanical Thrombectomy of Acute Deep Vein Thrombosis with the Trellis-8 Isolated Thrombolysis Catheter

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PURPOSE: To evaluate the performance of the Trellis-8 isolated thrombolysis catheter during single-session pharmacomechanical thrombectomy (PMT) combined with low-dose thrombolysis with tissue plasminogen activator (TPA) in the treatment of patients with acute deep vein thrombosis (DVT) and multiple comorbidities.

MATERIALS AND METHODS: Retrospective analysis was performed of 19 consecutive patients with acute above-knee DVT treated by PMT with the Trellis device followed by venous angioplasty and stent placement. Isolated thrombolysis with low-dose TPA was used with all patients. Concurrent therapies included retrievable inferior vena cava filter insertion ($n = 4$). The primary endpoint was restoration of rapid inline venous flow; the secondary endpoint was thrombus clearance.

RESULTS: Restoration of rapid inline venous flow was achieved in all cases; thrombus removal was less than 50% in one case (4%), 50%–95% in 18 cases (82%), and at least 95% in three cases (14%). The median administered dose of TPA was 13.4 mg per patient. The mean treatment time was 91 minutes per limb (range, 61–129 min), with a mean of 21 minutes per thrombosed segment (range, 8–31 min). There were no major complications. Primary patency rate of the treated venous segments at 2 days was 86% ($n = 19$) and the primary assisted patency rate was 100% at 30 days. Two patients died of advanced malignancy at 17 and 24 days.

CONCLUSIONS: The Trellis system was an effective method for the treatment of acute DVT. Based on the present data, the Trellis system could prove to be a safe and feasible single-session PMT method for the treatment of acute DVT in a broader patient population and warrants further investigation in a large-scale study.

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Abbreviations: CDT = catheter-directed thrombolysis, DVT = deep vein thrombosis, IVC = inferior vena cava, PMT = pharmacomechanical thrombectomy, TPA = tissue plasminogen activator

CONSEQUENCES of deep vein thrombosis (DVT) include pulmonary embolism and venous insufficiency (1–3).

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Early thrombolysis is attractive because it offers early resolution of acute symptoms and may decrease the risks of valvular insufficiency and postthrombotic syndrome (4,5). Early thrombolysis also has been shown to improve patients' quality of life (6).

During the past decade, considerable interest has developed in the treatment of DVT with catheter-directed thrombolysis (CDT) as an alternative to more standard, conservative regimens involving anticoagulation (7–13). This has important implications for cost containment, patient safety, and bed use in the future treatment of this condition. However, thrombolytic

therapy has inherent risks of hemorrhage and is therefore contraindicated in some instances per guidelines from the National Institutes of Health (3). In addition, the average treatment duration for CDT is 40 hours (8). This prolonged therapy typically requires access to a monitored bed, multiple trips to the interventional radiology suite to assess progress, prolonged bed rest, patient discomfort and confinement, and multiple laboratory evaluations including fibrinogen and activated partial thromboplastin time.

More recently, several studies have described the use of mechanical thrombectomy to treat venous thrombosis. Most of these treatments have be-



The Role of Interventional Radiology in the Management of Deep Venous Thrombosis: Advanced Therapy

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Abstract Deep vein thrombosis (DVT) is often managed with a health care pathway that funnels patients to anticoagulation therapy alone. This "usual treatment" is designed to stop propagation and embolisation of venous thrombus but not remove it. Surgical thrombectomy was once the only option in severe cases in which limbs were threatened, but thrombus removal is no longer restricted to emergency cases. Interventional radiologists are now using advanced endovascular techniques to achieve thrombus removal in a minimally invasive manner in a very short treatment time, thereby quickly restoring patency, relieving acute symptoms, and potentially limiting the subsequent development of postthrombotic syndrome when followed with anticoagulation and compression regimens. This article provides an overview of the interventions available for treating DVT. One of the newer "single-session" techniques is isolated pharmacomechanical thrombolysis, which is described here in detail with supporting cases.

Keywords Deep vein thrombosis · Thrombus · Isolated pharmacomechanical thrombolysis · Interventional radiology · Endovascular

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Introduction

Vein thrombosis has the potential to escalate from a transient annoyance to a serious condition requiring intense medical attention when the normal fibrinolytic mechanism fails to regulate dissolution of fibrin thrombi in a thrombosed vein. Deep vein thrombosis (DVT) occurring in the thigh or groin has the acute potential to cause swelling, pain, and limb death [1–3], while chronic DVT and venous insufficiency can radically diminish a person's quality of life and ability to function socioeconomically [1]. Untreated or undertreated DVT increases the risks for life-threatening pulmonary embolism (PE) [4].

A recent article by Pianta and Thoesson [5] provides an excellent review of the rationale, methods, safety, and efficacy of acute interventional treatment of above-the-knee DVT. This current article provides an overview of specific interventional techniques for acute DVT, with a detailed focus on isolated pharmacomechanical thrombolysis.

Triaging Patients With Suspected DVT

Patients with acute DVT commonly are seen first by emergency department, primary care, or internal medicine physicians. These disciplines use different criteria than endovascular specialists use to assign clinical significance to venous thrombi and have different approaches to treatment [6–8]. A gatekeeper approach to "usual care" may actively discourage referral to endovascular specialists and seek to discharge patients without addressing thrombus removal [8–10]. If the same pathway were to be employed with arterial disease, only those with severe ischemia would ever see a vascular specialist, with poorer outcomes over the long term.

Applying these ground rules, and using these techniques, we can safely treat over 90% of IF DVTs in less than 2 hours skin to skin



Conclusions

- Single-Session Devices are here to stay
- Find one (or three) and become comfortable with each
- I prefer Mechanical Thrombectomy (MT) or Pharmaco-Mechanical Thrombectomy (PMT) unless there is extensive below knee DVT and/or extensive PE in which case CDT is better
- I always use an aspiration catheter after the MT device
- I personally do not treat DVT between 4/52 and 6/12
- After waiting 6/12 go straight to iliac venous stenting

