



### Management of Acute Deep Vein Thrombosis - Anticoagulation and Beyond

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#### Abstract

**Introduction:** Deep vein thrombosis though being a common disorder in vascular practice, up to 50% of these patients are symptomatic presenting varying range of symptoms, edema being most common symptom, tenderness in 75%, leg pain present in 50% of the patients. Symptoms of pulmonary edema present in significant number of patients

**Objectives:** to emphasize on the different interventional modalities available for the treatment of symptomatic DVT and the need for appropriate selection of different modalities to achieve best outcomes in terms of limb salvage and preventing life loss.

**Materials and methods:** All Inpatients with proven DVT admitted in our institute, with symptoms of moderate to severe pain, unresolving or worsening pain, phlegmasia, distal vascular compromise, symptoms of pulmonary embolism, contraindication to anticoagulation, were included in our study. The multi modal intervention included

1. Catheter directed thrombolysis
2. Open venous thrombectomy
3. Systemic thrombolysis
4. IVC filter placement

**Results:** Total of 21 patients were considered for non pharmacologic treatment for various indications and subjected to appropriate intervention. 10 patients were

managed with IVC filter placement, 8 patients had Catheter directed thrombolysis. 1 patient had open venous thrombectomy and Systemic thrombolysis was administered in 2 patients. 100% limb salvage was achieved in intervention group.

**Conclusion:** Though anticoagulation has been the prime modality directed towards management of deep vein thrombosis, some special situations warrant additional surgical or mechanical techniques for various indications. these treatment improved limb salvage rates in patients with impending gangrene.

**Keywords:** thrombectomy, gangrene, CDT.

#### Introduction

Anticoagulation has been the safe and effective treatment modality in most patients. Conventional management of acute DVT is based upon trials from 1960. This consists of immediate anticoagulation with heparin or, more recently, low-molecular-weight heparin (LMWH) followed by 3 months of oral anticoagulation. There has not been clear guide line regarding management of patients with DVT in symptomatic or life or limb threatening symptoms. Aggressive methods have to be considered in patients who presenting with these symptoms in order to prevent life or limb threatening complications

## Materials and Method

Patients who were admitted in our hospital with symptoms of dvt were investigated with compression ultrasonography and were treated with initial anticoagulation. They were evaluated for pulmonary embolism with echocardiogram, echo cardiogram, and ct pulmonary angiogram if necessary, those patients with severe symptoms like dyspnea, intractable pain and distal vascular insufficiency were screened only with compression usg and treatment was initiated

## Inclusion Criteria

Patients who were admitted as in patient in our hospital with proven DVT with additional symptoms like unresolving pain, distal vascular insufficiency, phlegmasia, signs and symptoms of pulmonary embolism, contra indication for anticoagulation,

## Exclusion Criteria

Patients with asymptomatic DVT or with resolving pain edema, and with normal distal pulsations, with no clinical signs of pulmonary embolism were excluded from the study. Pregnant, postpartum patients, pediatric patients were also excluded from the study.

## The Interventional Strategies Included

1. Catheter directed thrombolysis
2. Open venous thrombectomy
3. Systemic thrombolysis
4. IVC filter placement

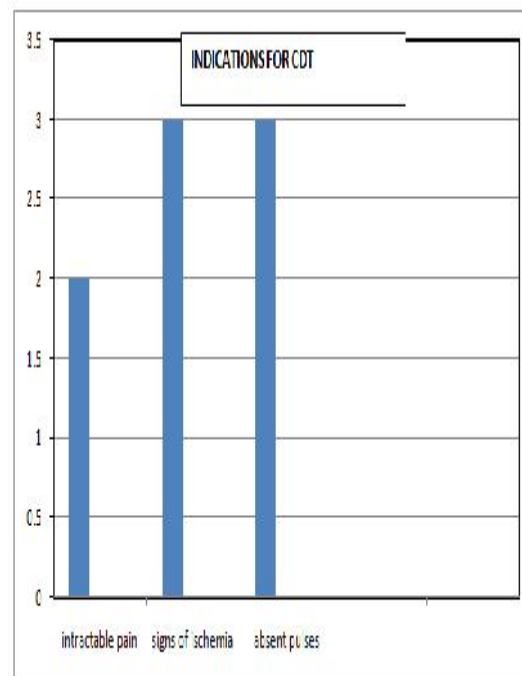
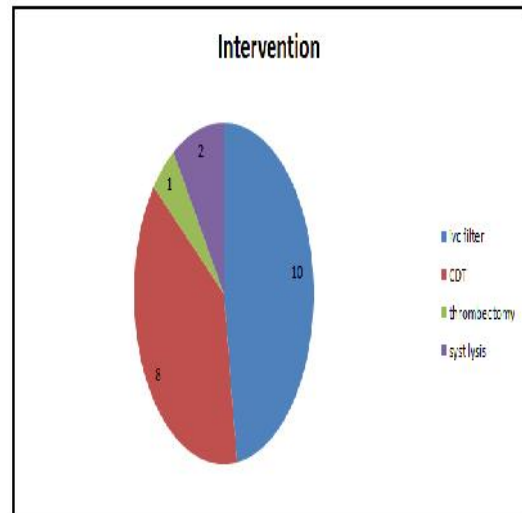
patients were evaluated with basic coagulation profile and assessed for presence of contraindication for anticoagulation or for thrombolysis.

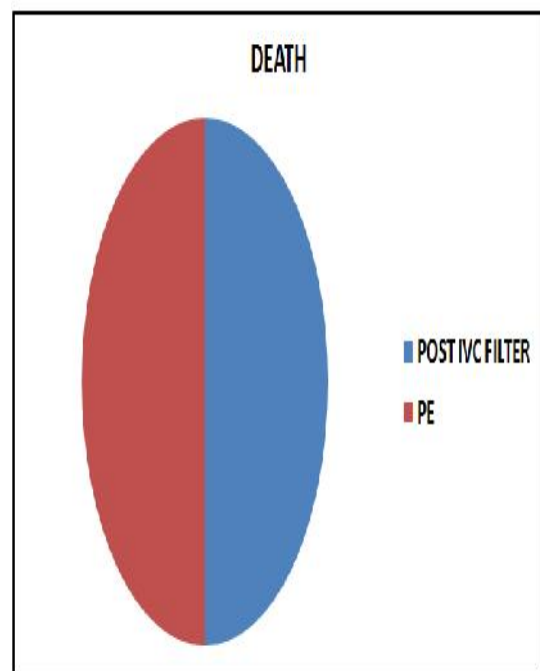
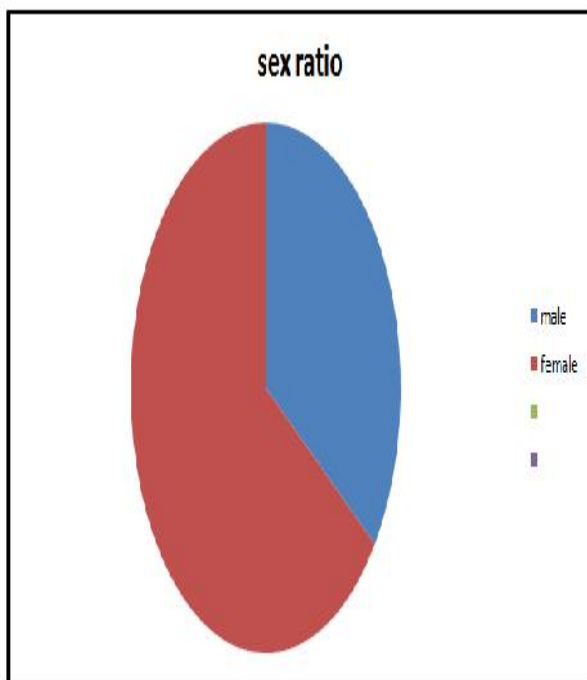
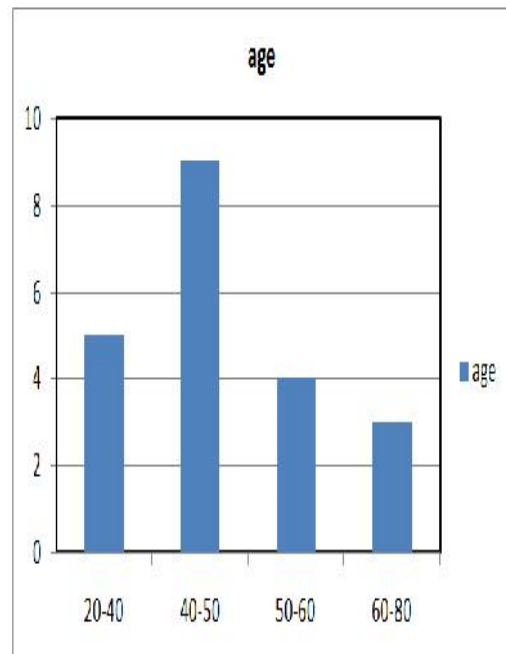
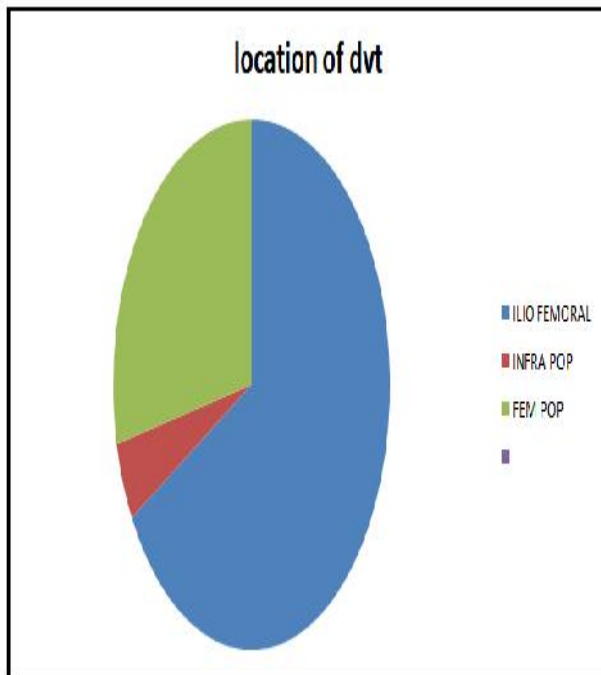
Absolute contraindication for thrombolysis includes: (1) active internal bleeding; (2) recent (within 2 months) cerebrovascular accident, trauma, or intracranial or intraspinal surgery; (3) known intracranial neoplasm; (4) severe uncontrollable hypertension; (5) uncontrollable clotting disorders; or (6) previous severe allergic reactions to the thrombolytic agent.

The relative contraindication includes: (1) recent (within 10 days) operative or obstetric procedures, biopsy or procedure in a location that is not compressible, gastrointestinal bleeding, or trauma, including cardiopulmonary resuscitation; (2) left heart thrombus; (3) subacute bacterial endocarditis; (4) severe liver or kidney disease; (5) diabetic hemorrhagic retinopathy; (6) acute pancreatitis; (7) pregnancy; or (8) any other condition in which bleeding constitutes a significant hazard or would be particularly difficult to manage because of its location

## Results

Total 20 patients were included in this study who met the inclusion criteria. Different parameters were analyzed in these patients and the results were tabulated . Limb salvage rate was 100% in intervention group. There were two death in this group. One patient died after failed systemic thrombolysis for massive pulmonary embolism. Other patient died of mi after IVC filter placement





## Discussion

Interventional strategies for complicated DVT in our study included:

1. Catheter directed thrombolysis
2. Open venous thrombectomy
3. Systemic thrombolysis
4. IVC filter placement

## Open Transfemoral Embolectomy

Open trans-femoral thrombectomy for IFDVT has been well described but not widely practiced. "Comerota et al" has described a comprehensive, contemporary approach to open surgical thrombectomy that consists of the following key elements:

- Good preoperative imaging of the extent of the clot
- Use of intraoperative fluoroscopy
- Infra-inguinal and proximal thrombectomy using appropriately sized thrombectomy catheters. Intraoperative use of recombinant tissue plasminogen activator (rTPA) Intra and postoperative use of catheter-directed heparin
- Creation of an arteriovenous fistula
- Postoperative use of intermittent pneumatic compression.

## Systemic Thrombolysis

Systemic thrombolysis for DVT has only been infrequently reported. A study done by Schwieder et al. showed significant recanalization in only a 1/3rd of patients who had systemic rTPA and anticoagulation. It also carried a risk of bleeding in 26.5% of patients. The AHA does not recommend systemic thrombolysis for reducing the clot burden in acute DVT

## Catheter Directed Thrombolysis

CDT refers to the infusion of thrombolytic agents directly into a venous thrombus via a catheter placed using fluoroscopic guidance. It came into vogue in the early to mid-1990s especially for the management of extensive, IFDVT.

The basic steps of CDT for IFDVT include:

- Accurate imaging of the extent of thrombus including computed tomography venography to identify involvement of the inferior vena cava (IVC)
- Safe intravenous access with a sheath in a vein proximal to the thrombus, preferably using ultrasound guidance. The popliteal vein is often used, but the superficial femoral vein can also be used. Contra lateral femoral access is also an option
- Initial guide wire traversal across the thrombus
- There are no data comparing end-holed and multiple side-holed catheters. If an end-holed catheter is used, then the tip of the catheter is placed in the proximal aspect of the clot and may need to be repositioned frequently

- The thrombolytic infusion is then commenced
- Repeat venography is used at 12–24 h intervals to monitor progress.

## IVC Filter Placement

### Indications

- Documented VTE with contraindication to anticoagulation
- Documented VTE with complications of anticoagulation
- Recurrent PE despite therapeutic anticoagulation
- Documented VTE with inability to achieve therapeutic anticoagulation

### Contraindications

- Chronically occluded vena cava
- Vena cava anomalies
- Inability to access the vena cava
- Vena cava compression
- No location in the vena cava available for placement

## Conclusion

Interventions to remove clot from acutely thrombosed outflow veins of a limb have been indicated in limbs with patients with impending venous gangrene to prevent limb loss. Open surgical thrombectomy while effective is invasive. Endovascular thrombolysis and mechanical thrombectomy are less invasive and highly successful alternatives and should be considered in all good risk patients with acute ileo-femoral DVT. Judicial use of IVC filter is essential to avoid long term filter induced complications. Systemic thrombolysis should be reserved for patients with hemodynamic instability with pulmonary embolism.

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#### VENOUS THROMBECTOMY BEING PERFORMED



#### PATIENT WITH SUBMASSIVE PULMONARY EMBOLISM TREATED WITH SYSTEMIC THROMBOLYSIS

