The Venous Thromboembolic Center

A Philanthropic Leadership Initiative
• The center’s mission is to deliver advanced screening, detection, care, and management services for patients experiencing a VTE in a fully integrated fashion.

• Multidisciplinary teams of clinicians and scientists from across the medical center are working together to streamline high-quality patient care, conduct innovative research, and become a premier resource of VTE education.

• VTEC will help create evidenced-based practices and protocols for screening, preventing, diagnosing, and treating VTE to be used throughout the medical center to standardize superior patient care.

Contacts
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With the introduction of new oral anticoagulants (NOAC) there are now two pharmacologic pathways to treatment:

LMWH or Fondaparinux recommended for initial anticoagulation (AC)

- Continue for 5 days
- Overlap with warfarin until INR 2.0-3.0

* Start warfarin on Day 1 of anticoagulation.

New Oral Anticoagulants approved to treat acute DVT:

- Apixaban (Eliquis)
- Rivaroxaban (Xarelto)

*Dabigatran (Pradaxa) approved for use after 5-10 days of parenteral therapy.
Distal Leg DVT (below the knee)

If Moderate to Severe Symptoms (pain, edema, warmth):

• First occurrence: AC for 3 months
• Recurrent: AC for longer than 3 months
• (indefinite)

If No (or very mild) symptoms present:

• Generally recommend AC for 3 months
• Acceptable to forgo AC treatment if
• NO risk factors for extension re present AND
• Able to obtain serial dopplers over the course of 2 weeks.

Risk factors for extension include:

• Positive D-dimer
• DVT that is close to the proximal veins
• Active malignancy
• Previous blood clots
• Inpatient status

Proximal Leg or IVC DVT

Should be treated with anticoagulants

• Thrombolysis or thrombectomy not routinely recommended (however, may consider catheter directed thrombolysis in extreme settings i.e. phlegmasia, or caval thrombosis)
• Outpatient treatment if feasible
• Treatment duration dependent on cause

Duration of AC:

• DVT triggered by surgery: 3 months
• DVT due non-surgical risk factors (estrogen, long-distance travel, non-surgical hospitalization): 3 months
• Unprovoked (idiopathic) DVT: Long-term (dependent on bleeding risk) Re-evaluation q 6 months. Consider hematology consult.
Similar recommendations regarding initiation of therapy as DVT (see slide 3)

- First occurrence: *3 months*
- Recurrent: Indefinite duration

Upper extremity DVT associated with a central venous catheter:

- Continue catheter use if clinically indicated
- AC as long as catheter in place
- AC for *3 months* after catheter removed
I. Thrombolysis recommended if:
   • PE and hemodynamic instability OR
   • Those with a PE, normotensive, but with the expectation to become hypotensive with subsequent PE (i.e. right heart strain on echo, poor pulmonary reserve)

II. Catheter thrombectomy or surgical embolectomy recommended if:
   • Thrombolysis contraindicated
   • Failed thrombolytic
   • Clinically in shock

III. Anticoagulation recommended (Guidelines on next series of slides)
ANTICOAGULATION GUIDELINES FOR PE

Initial therapy:
- AC with LMWH, Fondaparinux, IV Heparin, or SC Heparin
- Minimum 5 days
- Until INR is therapeutic at 2.0-3.0 for 24 hours
- LMWH or Fondaparinux recommended over Heparin for treatment of PE in hemodynamically stable patients without renal failure.
- Start warfarin on Day 1 of anticoagulation.

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AC treatment duration (similar principles to DVT):
- PE triggered by surgery: 3 months minimum (6 months if low bleeding risk)
- PE due to a mild risk factor (I.e. non-surgical risk factors such as estrogen therapy, long-distance travel, non-surgical hospital stay, etc): 3 months minimum (6 months if low bleeding risk)
- Unprovoked (idiopathic) PE: long-term, Reevaluate q 6 months. Consider hematology consult.
MASSIVE PE TREATMENT GUIDELINE (SHOCK) *ACTIVATE PULMONARY EMBOLISM RESPONSE TEAM*

Hypotensive/SHOCK +/- pressors AND confirmed or suspected PE

- Anticoagulation (if no c/i):
  - bolus heparin

- PERT activation (includes critical care consult)

If no c/i to CP bypass / surgery

- Emergent surgical embolectomy

If c/I CP bypass / surgery

- Emergent CDT in OR hybrid room +/- ECMO
  - Vs.
  - IV tPA bolus (50mg or 100mg)

IVC filter

DC 08/10/2020
**SUBMASSIVE PE TREATMENT GUIDELINE**

*ACTIVATE PULMONARY EMBOLISM RESPONSE TEAM*

1. **Symptomatic PE**
2. **PERT activation**
   - Echocardiogram
   - BNP/troponins
3. **Confirmed submassive PE**
   - Clinically ill patient
   - RV dysfunction on echo or CTA
   - Troponin elevation
   - PE in transit on echo or CTA
   - Evidence of end-organ malperfusion, e.g. elevated lactate
4. **PERT discussion**
5. **Switch to Massive PE protocol** if ill patient, evidence of end-organ malperfusion, e.g. elevated lactate, or PE in transit
6. **Urgent *CDT within 12-24 hours***
7. **Anticoagulation**
8. **IVC filter**

*CDT: Catheter-directed thrombolysis*
NYU Langone Health’s Pulmonary Embolism Response Team (PERT) is an interdisciplinary team that assesses pulmonary embolism emergencies and facilitates prompt development of comprehensive treatment plans. PERT is activated using Send Word Now, an advanced technological emergency notification service that allows us to send rapid mobile alerts and tele-conference bridging to mobilize experts in VTEC, MICU, IR, and CT Surgery.

- 33911 & request to be connected with the Pulmonary Embolism Response Team
- 646-754-7378 (non-NYU Langone Health lines)

Pulmonary Embolism Response Team (PERT)

Does your patient have a confirmed or suspected PE and any of:

- Tachycardia
- New oxygen requirement
- Moderate to severe dyspnea
- Hemoptysis
- Moderate to severe chest pain
- Echo with RV dilation +/- hypokinesis
- CTA with signs of right heart strain
- Saddle embolus or significant clot burden
- Serum Tn > upper limits of normal

If yes to any of the above w/o alternate etiology then activate PERT:

1. Call 4PERT (646 – 754 – 7378)
2. Order IP consult for Pulmonary Embolism Response Team in EPIC
How to Activate PERT

If you suspect your patient has a massive or sub massive PE, dial:

The PERT can be activated 24 hours a day, 7 days a week by calling:

a. **Tisch**: Call 33-911 from any NYULH phone and ask Operator to connect you to the PERT TEAM. (Alternative: 646-754-7378

b. **Brooklyn**: (347) 377-5188 or x5188

The PERT is comprised of the following members:

**Tisch**

- Critical Care Attending (in-house 24/7)
- CT Surgery Attending
- **Interventionalist** (Interventional Radiology Attending)

**Brooklyn**

- Critical Care Attending (in-house 24/7)
- **Interventionalist** (Interventional Radiologist and/or Vascular Surgeon) Attending
Acute DVT (of the leg, arm, pelvis, or abdominal/splanchnic) or PE that was asymptomatic and incidentally discovered:

- Acute Asymptomatic DVT of the Proximal Leg, Pelvis, or IVC: AC as described previously
- Asymptomatic DVT in Abdomen (portal, splenic, mesenteric or hepatic vein thrombosis): These DVT are often of unknown chronicity thus: AC only if clinically relevant

Acute Asymptomatic PE:

- Review CT to confirm PE - If uncertain confirm with other diagnostic modalities
- If confirmed: AC as described previously
**SPECIAL CONSIDERATIONS**

**Bleeding Risk**
Consideration must be given to each individual's bleeding risk, especially for those needing long-term AC. Risk factors for increased bleeding include:
- Increased age (>75)
- High Fall Risk
- Uncontrolled hypertension
- Polypharmacy - concomitant use of antiplatelet medications or NSAIDs
- History of Bleeding

**Cancer related DVT or PE**
- Treat for at least 3 months and preferably long-term, unless bleeding risk is very high.
- Low molecular weight heparin is the preferred treatment, rather than warfarin.

**Superficial Thrombophlebitis**
- Superficial thrombophlebitis of the leg ≥ 5cm
- AC recommended: Fondaparinux (preferred) or LMWH for 45 days

**IVC Filters**
Can be used for those who cannot tolerate AC due to:
- Active bleeding
- High bleeding risk (including High Fall Risk)
- Failed AC therapy
- Permanent IVC filter alone is not indication for AC
- Consider filter retrieval when feasible.
Post-thrombotic Syndrome can occur after a DVT and result in symptoms such as:

- chronic swelling
- Discomfort
- Discoloration
- varicose veins
- venous ulcerations
- Cellulitis

**Prevention/ Treatment**

- Encourage ambulation/ exercise when feasible.
- Compression Stockings
  - Recommend use for 2 years post DVT to prevent or minimize the occurrence of post thrombotic syndrome.
- Venous interventions if necessary
- Catheter directed thrombolysis may play a role in prevention
WHEN TO CALL A HEMATOLOGY CONSULT

Indications for inpatient hematology consult

- AC in patients with active malignancy
- Pregnant patients
- Suspected Antiphospholipid Syndrome
- AC failure
- R/o Heparin induced thrombocytopenia
- Bridging AC prior to surgery or other invasive procedures.
- Significant blood count abnormalities
- Major bleeding complication

Indications for outpatient hematology consult

- Thrombophilia testing
- Long term AC management/duration
- Bridging AC prior to surgery or other invasive procedures


Prenatal Treatment

For acute VTE that occur during pregnancy:
- Recommend initiating treatment with therapeutic LMWH Enoxaparin (Lovenox) - 1mg/kg every 12 hours SC

For patients being treated for an acute VTE who become pregnant:
- Recommend switching to LMWH once pregnancy confirmed

Retrievable IVC filters may be an option in pregnancy for women who have:
- Developed a VTE despite anticoagulation
- Developed a complication of anticoagulation (i.e. significant bleeding)

Consider a Hematology consult for:
- Allergy to LMWH
- Blood count abnormalities
- Inherited or acquired thrombophilia
CONSIDERATIONS DURING LABOR AND DELIVERY

• UFH SC can be initiated as an alternative to LMWH at 36 weeks gestational age to facilitate labor/delivery process (requires close monitoring)

• Hold LMWH 24 hours prior to scheduled delivery if feasible

• Therapeutic anticoagulation should be reinitiated 6 hours after vaginal delivery or 12 hours after cesarean section:
  - For this reason, neuraxial or epidural catheters should be discontinued not more than two hours after vaginal delivery and not more than eight hours after cesarean delivery, and alternative methods of pain control should be initiated.
  - See Dept. of Anesthesia Anticoagulation Guidelines for Neuraxial or Peripheral Nerve Procedures for further advisement.
POST-PARTUM REGIMENS

• Treatment should last at least 6 weeks postpartum (and at least 3 months total)

• Total treatment duration based on risk factors

• Warfarin or LMWH may be used postpartum and during lactation

• During initiation of warfarin, LMWH should be used for at least the first five days and until INR reaches therapeutic level
RESOURCES

• ACCP 2012 Chest Guidelines on Antithrombotic Therapy and Prevention of Thrombosis
• ACOG Guidelines (2011)
• UptoDate: DVT and PE in Pregnancy: Treatment (2014)