

# **CLINICAL COMPANION TOOL:** Venous Thromboembolism (VTE) Management & Best Practices

A QUICK REFERENCE GUIDE FOR CLINICIANS

acofp AMERICAN COLLEGE OF OSTEOPATHIC FAMILY PHYSICIANS

### INTRODUCTION

### Purpose of the Clinical Companion Tool

 This Clinical Companion Tool is designed to serve as a quickreference resource for clinicians managing patients with Venous Thromboembolism (VTE), including Deep Vein Thrombosis (DVT) and Pulmonary Embolism (PE). It supports risk assessment, diagnosis, treatment selection, and patient education to improve outcomes and prevent complications.

### How to use this tool in practice

- Quickly assess VTE risk factors and determine need for prophylaxis.
- Use clinical decision tools (Wells Score, PERC Rule) to guide testing and imaging.
- Select appropriate anticoagulation based on patient-specific factors.
- Decide on outpatient vs. inpatient management.
- Monitor for complications and ensure proper follow-up care.
- Educate patients on medication adherence, lifestyle changes, and warning signs.

# TABLE OF CONTENTS

VTE Risk Factors	4
Symptoms Checklist	5
Diagnosis	7
Treatment Considerations	8
Long-Term Considerations1	0
Patient Communication and Education	11



# **VTE RISK FACTORS**

Venous thromboembolism (VTE) risk varies based on patient history, medical conditions, and lifestyle factors. This visualization categorizes risk factors based on their odds ratio (OR)—a measure of how much each factor increases the likelihood of VTE.

- Major Risk Factors (OR > 10): These significantly elevate VTE risk and often require preventive measures.
- Moderate Risk Factors (OR 2-9): These contribute to VTE development but may require additional risk factors to be clinically significant.
- Minor Risk Factors (OR < 2): These slightly increase risk but become more concerning when combined with moderate or major factors.

Assess multiple risk factors cumulatively to determine VTE prophylaxis needs and treatment strategies.

Spinal cord injury		
Major trauma		
Previous VTE	MAJOR	
Myocardial infarction (within 3 months)	Risk Factors or >10	
Fracture of lower limb		
Hospitalization for heart failure/AF		
Hip or knee replacement		
Arthroscopic knee surgery		
Paralytic stroke		
Congestive heart/respiratory failure		
Superficial vein thrombosis		
Postpartum period		
Oral contraceptive therapy		
Malignancy	MODEDATE	
Inflammatory bowel disease	MODERATE Dick Easters	
Erythropoiesis-stimulating agents		
Chemotherapy	01 2-5	
Autoimmune diseases		
Hormone replacement therapy		
Infection (specifically pneumonia, UTI)		
Central venous lines		
Blood transfusion		
Thrombophilia		
Obesity (BMI ≥ 30)		
Pregnancy		
Bed rest > 3 days		
Varicose veins	MINOP	
Diabetes mellitus	Plinok Pick Eactors or <2	
Laparoscopic surgery		
Hypertension		
Immobility due to sitting		
Increasing age		

### **VTE Risk Factors**

# SYMPTOMS CHECKLIST

VTE presents in two critical forms: Deep Vein Thrombosis (DVT) and Pulmonary Embolism (PE). Early recognition of symptoms is essential for prompt diagnosis and treatment to prevent complications.

### Deep Vein Thrombosis (DVT)

DVT occurs when a blood clot forms in a deep vein, most commonly in the lower extremities.

- Identify the location and extent of swelling, redness, or discoloration.
- Ask the patient about pain severity and tenderness when standing or walking.
- Assess for warmth over the affected area (suggestive of inflammation and clot presence).
- Look for engorged superficial veins, which may indicate venous congestion.



SEVERITY LEVEL	SYMPTOMS	CLINICAL IMPLICATION
Mild	Minor leg discomfort, slight swelling	Monitor symptoms, consider risk factors
Moderate	Noticeable leg swelling, tenderness	Consider DVT evaluation (D-dimer, ultrasound)
Severe	Significant swelling, intense pain, red discoloration	High suspicion for DVT—urgent imaging & anticoagulation
Critical	Severe pain, cyanosis, limb-threatening signs	Consider phlegmasia cerulea dolens—medical emergency

### Differential Diagnosis/Conditions Mimicking DVT

Cellulitis

Baker's cyst rupture

Lymphedema

- Superficial
  - thrombophlebitis
  - Venous insufficiency
    - Post-thrombotic syndrome Muscle strain/tear
- External venous compression
- Popliteal artery aneurysm

### Pulmonary Embolism (PE)

PE occurs when a blood clot travels to the lungs, blocking blood flow and leading to potentially life-threatening complications.

- Identify difficulty breathing (dyspnea) and chest pain location.
- Assess for tachycardia and signs of circulatory strain.
- Look for signs of hypoxia (cyanosis, altered mental status).
- Determine if symptoms indicate a massive PE requiring immediate intervention.



SEVERITY LEVEL	SYMPTOMS	CLINICAL IMPLICATION
Mild	Mild breathlessness, occasional cough	Monitor symptoms, assess risk factors
Moderate	Shortness of breath with exertion, mild chest pain	Consider PE workup (D-dimer, risk stratification)
Severe	Resting dyspnea, sharp pleuritic chest pain, tachycardia	High-risk PE, immediate imaging (CTRA)
Critical	Syncope, sever hypoxia, hypotension, cardiogenic shock	Massive PE—Emergency thrombolysis or thrombectomy

Differential Diagnosis/Conditions Mimicking PE

- Myocardial infarction
- Pneumonia
- Aortic dissection
- Pericarditis
- Exacerbation of COPD
- Pneumothorax
- Musculoskeletal chest pain
- Anxiety/panic attack
- Congestive heart failure
- Pulmonary hypertension

### DIAGNOSIS

Early and accurate diagnosis of Deep Vein Thrombosis (DVT) and Pulmonary Embolism (PE) is critical for preventing complications. This workflow ensures appropriate risk stratification, testing, and imaging based on clinical suspicion.



# **TREATMENT CONSIDERATIONS**

Effective management of Deep Vein Thrombosis (DVT) and Pulmonary Embolism (PE) begins with choosing the appropriate anticoagulation strategy, ensuring patient safety, and determining the best setting for treatment—whether outpatient or inpatient.

#### Who should NOT receive immediate anticoagulation?

- Active bleeding or high bleeding risk (recent surgery, intracranial hemorrhage).
- Severe renal impairment (consider adjusted dosing).
- Hemodynamically unstable PE requiring thrombolysis or intervention.

### When to Send to the Emergency Department?

- Massive PE: Hypotension, shock, syncope
- Phlegmasia Cerulea Dolens (Severe DVT): Limb-threatening ischemia
- Oxygen Saturation < 90%</p>
- ▶ High-risk bleeding or contraindications to anticoagulation.

### OUTPATIENT VS. INPATIENT MANAGEMENT

### Patients Who May Be Managed as Outpatients:

- Hemodynamically stable PE (no hypotension, no severe hypoxia).
- DVT with no signs of limb ischemia.
- Low bleeding risk & adequate home support.
- Reliable follow-up available.

### **Patients Requiring Hospitalization:**

- Massive PE or significant hemodynamic instability.
- Extensive DVT (phlegmasia or high clot burden).
- High bleeding risk or contraindication to anticoagulation.
- Severe renal impairment requiring heparin adjustments.

# **INITIAL ANTICOAGULATION OPTIONS**

Anticoagulant	Heparin (UFH)	Low Molecular Weight Heparin (LMWH)	Direct Oral Anticoagulants (DOACs)
How It Works	<ul> <li>Blocks clotting factors to prevent clot growth and new clot formation.</li> <li>Works immediately when given by IV.</li> </ul>	<ul> <li>A more predictable version of heparin that lasts longer and requires less monitoring.</li> <li>Given as a once- or twice-daily injection under the skin (subcutaneous).</li> </ul>	<ul> <li>Directly blocks clotting factors without the need for injections or frequent monitoring.</li> <li>Taken orally (pill form), making it the most convenient option.</li> </ul>
Key Features	<ul> <li>Fast onset—Preferred in high-risk PE or unstable patients.</li> <li>Easily reversible— Protamine sulfate can reverse its effects.</li> <li>Used in hospitalized patients—Given as IV infusion with close monitoring.</li> </ul>	<ul> <li>More predictable response—No routine blood monitoring needed</li> <li>Lower risk of HIT than Heparin.</li> <li>Safe for pregnancy and cancer patients— LMWH is the preferred anticoagulant for these groups.</li> </ul>	<ul> <li>No injections— Can be started immediately after diagnosis.</li> <li>No routine blood monitoring required.</li> <li>Lower bleeding risk than Warfarin.</li> </ul>
Limitations	<ul> <li>Requires frequent aPTT monitoring (blood tests).</li> <li>Higher risk of bleeding than LMWH or DOACs.</li> <li>Can cause Heparin-Induced Thrombocytopenia (HIT) - a rare but serious side effect.</li> </ul>	<ul> <li>Requires injections, which some patients may find inconvenient.</li> <li>Cannot be reversed easily (protamine sulfate has only partial effect).</li> <li>Adjustments needed for renal impairment.</li> </ul>	<ul> <li>Not for patients with severe kidney disease.</li> <li>More expensive than Heparin/LMWH.</li> <li>Some DOACs require a few days of LMWH first before switching.</li> </ul>
Best For	<ul> <li>Unstable PE</li> <li>Patients with renal failure</li> <li>High bleeding risk</li> </ul>	<ul> <li>Outpatient DVT/PE treatment</li> <li>Pregnancy</li> <li>Cancer-associated VTE</li> </ul>	<ul> <li>Most patients needing outpatient treatment for DVT/PE unless contraindications exist.</li> </ul>
Route of Admin	IV infusion	Subcutaneous injection	Oral (pill)
Monitoring Required	Frequent aPTT monitoring	No routine monitoring needed	No routine monitoring required

# LONG-TERM CONSIDERATIONS

#### **Ongoing Management & Monitoring**

- Ensure appropriate duration of anticoagulation (3-6 months for provoked VTE, extended therapy for high-risk cases).
- Educate patients on medication adherence, lifestyle modifications, and bleeding risk.
- Monitor for post-thrombotic syndrome and refer for follow-up imaging if symptoms persist.

#### Key Takeaway:

- Early risk stratification using Wells Score or PERC Rule is essential.
- Initiate anticoagulation promptly unless contraindicated.
- Know when to escalate care for severe cases requiring thrombolysis or hospitalization.



### PATIENT COMMUNICATION AND EDUCATION

#### What is VTE?

Blood flows is like a river, typically flowing smoothly through your body. Sometimes, a blood clot can form when it's not supposed to, like in a vein deep inside your leg or in your lungs. If this happens, it can block the flow of blood, like a big rock stuck in a river.



### Medication Adherence: Why Taking Your Medicine is Super Important!

Your blood is like a busy highway, carrying oxygen and nutrients all over your body. Sometimes, a blood clot is like a traffic jam that blocks the road. Doctors give you special medicine called anticoagulants (or "blood thinners") to help keep your blood flowing smoothly.

#### What Do Anticoagulants Do?

- Prevents new clots from forming.
- Helps your body break down existing clots over time.
- Keeps your blood flowing like it should so you stay healthy.

### PATIENT COMMUNICATION AND EDUCATION (CONT.)

#### Bleeding Risk Awareness: What to Watch For and When to Get Help!

When you take blood thinning medicine (anticoagulants), your blood doesn't clot as easily. This helps prevent dangerous clots, but it also means you might bleed more easily if you get hurt.

Warning Signs of Bleeding

- Bleeding that won't stop (like from a cut or nosebleed).
- Bruises that appear for no reason.
- Red or dark pee (like the color of tea).
- Black or bloody stool (like coffee grounds).
- Bleeding gums when brushing your teeth.



#### **Medication and Food Interactions**

Always check with your doctor before taking these medications or foods.

#### Pain relievers & anti-inflammatory drugs

- NSAIDs: Ibuprofen (Advil, Motrin), Naproxen (Aleve)
- Aspirin (unless prescribed)

#### **Antibiotics & Antifungals**

- Some antibiotics (e.g., Azithromycin, Ciprofloxacin, Metronidazole)
- Antifungal medications (Fluconazole, Ketoconazole)

#### **Other Medications**

- Steroids (Prednisone)
- Heart & Blood Pressure Medications
- Herbal supplements

#### Foods High in Vitamin K

- Leafy greens: Spinach, Kale, Collard greens, Swiss chard
- Broccoli, Brussels sprouts, Asparagus
- Green tea, Soy products

#### Foods That May Increase Bleeding Risk

- Grapefruit & Cranberry juice—Can interfere with how your body processes the medication.
- ▶ Garlic, Ginger, Turmeric—Natural blood-thinners in high doses.
- Alcohol—Can increase bleeding risk and affect liver metabolism.

#### Recognizing Red Flags & When to Seek Emergency Care

Immediate Emergency (Call 911)	Urgent (See Doctor Soon)	
Severe shortness of breath	Leg swelling or pain	
Chest pain with breathing	Persistent leg redness & warmth	
Coughing up blood	New or worsening symptoms while on treatment	
Sudden Loss of Consciousness	Feeling faint or rapid heartbeat	
Severe headache or neurological symptoms	Unusual bleeding or bruising	



### Clinical Guidelines & Peer-Reviewed Literature

- Kearon C, Akl EA, Ornelas J, et al. (2016). Antithrombotic Therapy for VTE Disease: CHEST Guideline and Expert Panel Report. Chest, 149(2), 315–352. https://doi.org/10.1016/j.chest.2015.11.026
- Konstantinides SV, Meyer G, et. al., ESC Scientific Document Group, 2019 ESC Guidelines for the diagnosis and management of acute pulmonary embolism developed in collaboration with the European Respiratory Society (ERS): The Task Force for the diagnosis and management of acute pulmonary embolism of the European Society of Cardiology (ESC), *European Heart Journal*, Volume 41, Issue 4, 21 January 2020, Pages 543–603, <u>https://doi. org/10.1093/eurheartj/ehz405</u>
- Wells PS, Anderson DR, Rodger M, et al. (1997). Excluding pulmonary embolism at the bedside without diagnostic imaging: management of patients with suspected pulmonary embolism presenting to the emergency department by using a simple clinical model and D-dimer. Annals of Internal Medicine, 129(12), 997-1005. https://doi.org/10.7326/0003-4819-129-12-199812150-00002

- Di Nisio M, van Es N, Büller HR. (2016). Deep vein thrombosis and pulmonary embolism. The Lancet, 388(10063), 3060-3073. <u>https://doi.org/10.1016/</u> <u>S0140-6736(16)30514-1</u>
- American Society of Hematology. (2020). ASH Clinical Practice Guidelines on Venous Thromboembolism. https://www.hematology.org/education/ clinicians/guidelines-and-guality-care/ clinical-practice-guidelines/venousthromboembolism-guidelines
- American Society of Hematology. Anticoagulation therapy. Venous Thromboembolism Guidelines. <u>https://www.hematology.org/education/</u> <u>clinicians/guidelines-and-guality-</u> <u>care/clinical-practice-guidelines/</u> <u>venous-thromboembolism-guidelines/</u> <u>anticoagulation-therapy</u>

#### **Clinical Tools & Resources**

- MDCalc. (n.d.). *Wells Criteria for DVT.* Retrieved from <u>https://www.mdcalc.</u> <u>com/calc/362/wells-criteria-dvt</u>
- MDCalc. (n.d.). Wells Criteria for Pulmonary Embolism (PE). Retrieved from <u>https://www.mdcalc.com/calc/115/</u> wells-criteria-pulmonary-embolism
- American Family Physician. (2012). Diagnosis of Deep Venous Thrombosis and Pulmonary Embolism. Retrieved from <u>https://www.aafp.org/pubs/afp/</u> issues/2012/1115/p913.html

- Merck Manuals. (n.d.). Differentiating Cellulitis and Deep Venous Thrombosis. Retrieved from <u>https://www.</u> <u>merckmanuals.com/professional/</u> <u>multimedia/table/differentiating-</u> <u>cellulitis-and-deep-venous-thrombosis</u>
- WebMD. (n.d.). *Is it DVT or Something Else*? Retrieved from <u>https://www.webmd.</u> <u>com/dvt/is-it-dvt-or-something-else</u>

### Patient Communication & Education

- Centers for Disease Control and Prevention (CDC): Venous Thromboembolism (Blood Clots) <u>https://www.cdc.gov/ncbddd/dvt/</u> <u>index.html</u>
- Mayo Clinic—DVT and PE overview
   <a href="https://www.mayoclinic.org/diseases-conditions/deep-vein-thrombosis/symptoms-causes/syc-20352557">https://www.mayoclinic.org/diseases-conditions/pulmonary-embolism/symptoms-causes/syc-20354647</a>
- National Blood Clot Alliance—"Stop the Clot" <u>https://www.stoptheclot.org</u>
- MedlinePlus (U.S. National Library of Medicine) <u>https://medlineplus.gov/</u> <u>deepveinthrombosis.html</u> <u>https://medlineplus.gov/</u> <u>pulmonaryembolism.html</u>