Order Set: VTE Prophylaxis for the Medically Ill Patient

About This Order Set

As leaders in the field of anticoagulant therapy, the Anticoagulation Forum (AC Forum) has created the following Order Set template on VTE prophylaxis in the medically ill. This Order Set incorporates both evidence-based data and consensus opinion to provide practical guidance on a range of real-world clinical situations that may be encountered by clinicians managing patients in the acute care setting. The AC Forum created this resource to guide facilities in the creation, implementation, and maintenance of order sets for their own facilities.

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Further information and handouts are available at the AC Forum website at www.acforum.org.
# VTE Prophylaxis for the Medically Ill Patient

## DOCUMENT PURPOSE

This order set is intended to facilitate standardized venous thromboembolism (VTE) prophylaxis risk stratification of hospitalized medically ill patients for:

- Prevention of hospital-acquired VTE
- Anticoagulant prophylaxis-associated bleeding
- Prescription of risk-appropriate VTE prophylaxis

## VTE Risk Assessment

See appendices for risk assessment tools (IMPROVE, Padua, Caprini) to assist with VTE risk assessment.

- High or moderate risk of VTE
- Low risk of VTE

*If the patient is low risk for VTE per your hospital’s Risk Assessment Model and is not anticipated to experience severe immobility, then no VTE prophylaxis (pharmacological or mechanical) is necessary. Reassess your patients’ VTE risk status as clinically indicated.*

### LOW VTE RISK BASED ON RISK ASSESSMENT SCORES

- Improve 4 Score: 0-1
- Improve 7 Score: 0-1
- Padua Score: 0-3
- Caprini Score: 0-1

### HIGH OR MODERATE VTE RISK BASED ON RISK ASSESSMENT SCORES

- Improve 4 Score ≥2
- Improve 7 Score: ≥2
- Padua Score: ≥4
- Caprini Score: ≥2
Bleeding Risk Assessment

**IMPROVE Bleeding Risk Factor**

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate renal failure (GFR 30-59)</td>
<td>1.0</td>
</tr>
<tr>
<td>Sex: Male</td>
<td>1.0</td>
</tr>
<tr>
<td>Age: 40 – 84</td>
<td>1.5</td>
</tr>
<tr>
<td>Current cancer</td>
<td>2.0</td>
</tr>
<tr>
<td>Rheumatic diseases</td>
<td>2.0</td>
</tr>
<tr>
<td>CV catheter</td>
<td>2.0</td>
</tr>
<tr>
<td>ICU / CCU stay</td>
<td>2.5</td>
</tr>
<tr>
<td>Severe renal failure (GFR &lt; 30 ml/min)</td>
<td>2.5</td>
</tr>
<tr>
<td>Hepatic failure (INR &gt; 1.5)</td>
<td>2.5</td>
</tr>
<tr>
<td>Age ≥ 85</td>
<td>3.5</td>
</tr>
<tr>
<td>Admission platelets &lt; 50 x 10⁹</td>
<td>4.0</td>
</tr>
<tr>
<td>Bleeding prior 3 months</td>
<td>4.0</td>
</tr>
<tr>
<td>Gastro-duodenal ulcer</td>
<td>4.5</td>
</tr>
</tbody>
</table>

**Total Score...**

Scores ≥ 7 indicate higher bleeding risk and caution with pharmacologic prophylaxis. Reassess candidacy for anticoagulant or mechanical prophylaxis as clinically indicated.

Baseline Information

**ASSESSMENTS**

- aPTT________
- Prothrombin time (PT) ______________________
- HGB________
- PLTS________
- AST________
- ALT________

**RENA9 FUNCTION**

- Calculate estimated CrCl using the Cockcroft-Gault equation

\[
\text{Estimated CrCl} = \frac{\left[\frac{(140 - \text{Age}) \times \text{actual weight in kg}}{72 \times \text{serum creatinine}}\right]}{0.85 \text{ if female}}
\]

- Age:________
- Actual Body Weight:________(kg)
- Gender:________
- Serum Creatinine:________(mg/dL)
  - *monitor renal function during hospital stay*
- Estimated CrCl:________(mL/minute)
Review inclusion criteria to determine if your patient may benefit from in-hospital and extended prophylaxis with rivaroxaban. For patients at high risk of VTE, and low risk for bleeding, consider extended prophylaxis with rivaroxaban for up to 39 days. If patients do not meet criteria, likely avoid use of rivaroxaban and post-discharge prophylaxis.

**CRITERIA FOR ORAL EXTENDED PROPHYLAXIS IN ACUTELY ILL MEDICAL PATIENTS**

- No invasive procedures are planned in the next 30 days
- No contraindications to anticoagulant prophylaxis
- Creatinine clearance ≥ 30 ml/min*
- Not taking concomitant therapy with a known combined P-gp and strong CYP3A4 inhibitor (e.g., ketoconazole, ritonavir) or inducer (e.g., carbamazepine, phenytoin, rifampin)
- Non-pregnant or breastfeeding
- Not currently on dual antiplatelet therapy (DAPT)
- No active bleeding within last 3 months
- No gastroduodenal ulcers within the last 3 months
- No history of bronchiectasis, pulmonary cavitation, or pulmonary hemorrhage
- No active cancer (undergoing, acute, in-hospital cancer treatment)
- Confirmation of insurance coverage of rivaroxaban for duration of prophylactic regimen and hospitalized with acute NYHA Class III/IV heart failure, respiratory failure, acute infectious disease or rheumatic illness or ischemic stroke with lower extremity paresis, and severe immobility (bed or chair bound 100% of the day) for at least 1 day and moderate immobility (bed or chair bound 50% of day) for at least 3 days

**AND ALL OF THE FOLLOWING:**

- ☐ Appropriate hospitalization condition
- ☐ Age >60
- ☐ Age 40-59 and a prior VTE or active cancer and one additional risk factor:

**RISK FACTORS**

- ☐ Previous VTE or superficial vein thrombosis
- ☐ History of NYHA Class III or IV HF
- ☐ Concomitant acute infection
- ☐ Obesity (BMI >35)
- ☐ History of cancer
- ☐ Inherited or acquired thrombophilia
- ☐ Current use of erythropoiesis-stimulating agent
- ☐ Hormone therapy
### VTE PROPHYLAXIS OPTIONS (SELECT ONE):

#### Oral (if patient meets extended prophylaxis criteria)

- **If CRCL ≥ 30mL/min:**
  - □ Rivaroxaban 10 mg PO once daily for 31-39 days total

- **For CRCL <30 mL/min:**
  - **AVOID** Rivaroxaban*

#### Parenteral (preferred for non-extended prophylaxis)

*Select one option based on patient characteristics and drug availability (Agents are in alphabetical order)*

**Enoxaparin**

- □ Standard Dosing: 40mg SC once daily
- □ **CrCL 20-30mL/min:** 30mg SC once daily
- **CrCl <20mL/min:** **AVOID USE**

Obese (BMI > 40kg/m²): (Evidence limited; Select option per clinical judgement)

- □ 40mg SC BID
- □ 60mg SQ BID (some evidence among BMI >47kg/m²)
- □ 0.5mg/kg SQ QD

**Dalteparin**

- □ Standard Dosing: 5000u SQ once daily
- **CrCl<30mL/min:** **AVOID USE**
- □ Obese (BMI >40kg/m²): 7500u SQ once daily

**Fondaparinux**

- □ Standard Dosing (wt ≥ 50kg): 2.5mg SQ once daily
- **Wt <50kg or CrCL<30mL/min:** **AVOID USE**

**Unfractionated Heparin (UFH)**

- □ Standard Dosing: 5000u SC every 8 or 12 hours
- □ Obese (BMI > 40kg/m²): 7500u SQ every 8 or 12 hours

*Rivaroxaban is FDA-approved for this indication in patients with CrCl ≥15mL/min, but based on limited evidence. Utilize caution in this population.
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<table>
<thead>
<tr>
<th>References</th>
<th>Action</th>
</tr>
</thead>
</table>
### IMPROVE: 7- ELEMENT IN-HOSPITAL RISK MODEL

**VTE Risk Factors**

<table>
<thead>
<tr>
<th>3 POINTS</th>
<th>2 POINTS</th>
<th>1 POINT</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Previous VTE</td>
<td>□ Thrombophilia</td>
<td>□ Age &gt; 60 years</td>
</tr>
<tr>
<td>□ Lower limb paralysis</td>
<td>□ Current cancer</td>
<td>□ Immobilization ≥ 7 days</td>
</tr>
<tr>
<td>□ Current cancer</td>
<td></td>
<td>□ ICU / CCU stay</td>
</tr>
</tbody>
</table>

**IMPROVE 7 VTE Score:**
Scores 0-6 are low risk with no indication for prophylaxis
Scores ≥ 7 are high risk and warrant prophylaxis

### IMPROVE: 4- ELEMENT IN-HOSPITAL RISK MODEL

**VTE Risk Factors**

<table>
<thead>
<tr>
<th>3 POINTS</th>
<th>2 POINTS</th>
<th>1 POINT</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Previous VTE</td>
<td>□ Thrombophilia</td>
<td>□ Age &gt; 60 years</td>
</tr>
<tr>
<td>□ Current cancer</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**IMPROVE 4 VTE Score:**
Scores 0-2 are low risk with no indication for prophylaxis
Scores ≥ 2 are high risk and warrant prophylaxis
## CAPRINI SCORE

Below depicts the different weighted points for the risk factors included in the Caprini Score:

### 5 POINTS
- Stroke (in the previous month)
- Fracture of the hip, pelvis, or leg
- Elective arthroplasty
- Acute spinal cord injury (in the last month)

### 3 POINTS
- Age ≥ 75 years
- Prior episode of VTE
- Positive family history for VTE
- Prothrombin 20210A
- Factor V Leiden
- Lupus anticoagulants
- Anticardiolipin antibodies
- High homocysteine in the blood
- Heparin induced thrombocytopenia
- Other congenital or acquired thrombophilia

### 2 POINTS
- Age: 61 – 74 years
- Arthroscopic surgery
- Laparoscopy lasting more than 45 minutes
- General surgery lasting more than 45 minutes
- Cancer
- Plaster cast
- Bed bound for more than 72 hours
- Central venous access

### 1 POINT
- Age 41 – 60 years
- BMI > 25 kg/m²
- Minor surgery
- Edema in the lower extremities
- Varicose veins
- Pregnancy
- Post-partum
- Oral contraceptive
- Hormonal therapy
- Unexplained or recurrent abortion
- Sepsis (in the previous month)
- Serious lung disease such as pneumonia (in the previous month)
- Abnormal pulmonary function test
- Acute myocardial infarction
- Congestive heart failure (in the previous month)
- Bed rest
- Inflammatory bowel disease

**Note:** The Caprini score is calculated by adding the scores of all factors present in the patient. The Caprini score is interpreted in the following way:

- Total score of 0-1: Low risk of VTE
- Total score of ≥2: High/moderate risk of VTE
### VTE Prophylaxis for the Medically Ill Patient

#### Appendixes: VTE Risk Assessments Continued...

### PADUA PREDICTION SCORE

**3 POINTS**
- □ Active cancer
- □ Previous VTE
- □ Reduced mobility
- □ Thrombophilic condition

*Active Cancer*: local or distant metastases and with chemo or radiotherapy in previous 6 months  
*Mobility*: anticipated bed rest with bathroom privileges for at least 3 days

**2 POINTS**
- □ Recent (<1 month) trauma/surgery

**1 POINT**
- □ Age ≥ 70 years
- □ Heart or respiratory failure
- □ Acute myocardial infarction or ischemic stroke
- □ Acute infection or rheumatologic disorder
- □ BMI ≥ 30
- □ Ongoing hormonal treatment

**Padua Scores:**
Scores 0-3 are low risk and do not warrant prophylaxis.  
Scores ≥4 are high risk for VTE and subsequent complications; recommendation for thromboprophylaxis.