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VTE Prophylaxis for the Medically Ill Patient (Updated 2020)

ACTION

Administration

DOCUMENT PURPOSE

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

- Hospital-acquired VTE
- Prophylaxis-associated bleeding on anticoagulation administration
- 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

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Bleeding Risk Assessment

IMPROVE Bleeding Risk Factor	Points
<input type="checkbox"/> Moderate renal failure (GFR 30-59)	1
<input type="checkbox"/> Sex: Male	1
<input type="checkbox"/> Age: 40 – 84	1.5
<input type="checkbox"/> Current cancer	2
<input type="checkbox"/> Rheumatic diseases	2
<input type="checkbox"/> CV catheter	2
<input type="checkbox"/> ICU / CCU stay	2.5
<input type="checkbox"/> Severe renal failure (GFR < 30 ml/min)	2.5
<input type="checkbox"/> Hepatic failure (INR > 1.5)	2.5
<input type="checkbox"/> Age ≥ 85	3.5
<input type="checkbox"/> Admission platelets < 50 x 10 ⁹	4
<input type="checkbox"/> Bleeding prior 3 months	4
<input type="checkbox"/> Gastro-duodenal ulcer	4.5
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 _____

RENAL FUNCTION

- Calculate estimated CrCl using the Cockcroft-Gault equation

$$\frac{[(140 - \text{Age}) \times \text{actual weight in kg}]}{[72 \times \text{serum creatinine}]} \times 0.85 \text{ if female}$$

- Age: _____
 Actual body weight: _____ (kg)
 Gender: _____
 Serum Creatinine: _____ (mg/dL)

**Monitor renal functioning during hospital stay*

- Estimated CrCl: _____ (mL/minute)

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Risk-Appropriate VTE Prophylaxis Orders

Review inclusion criteria to determine if your patient may benefit from in-hospital and extended prophylaxis with betrixaban or rivaroxaban. For patients at high risk of VTE, and low risk for bleeding, consider extended prophylaxis with betrixaban or rivaroxaban for up to 42 days. If patients do not meet criteria, likely avoid use of betrixaban or 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 strong PGP inhibitor (for betrixaban only)
- Not taking concomitant therapy with a strong CYP3A4 Inhibitor (for rivaroxaban only)
- 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 betrixaban/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

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Risk-Appropriate VTE Prophylaxis Orders Continued

VTE PROPHYLAXIS OPTIONS (SELECT ONE):

Oral (if patient meets extended prophylaxis)

If CrCl > 30 mL/min:

- Betrixaban 160 mg PO on day one, then 80 mg daily for 35-42 days
- Rivaroxaban 10 mg PO once daily for 31-39 days total

For CrCl 15 – 29 mL/min:

- Betrixaban 80 mg PO on day one, then 40 mg daily for 35-42 days
- Rivaroxaban 10 mg PO once daily for 31-39 days total

For CrCl < 15 mL/min:

AVOID Betrixaban and Rivaroxaban

Parenteral (preferred for non-extended prophylaxis)

For CrCl > 30 ml/min:

- Dalteparin 5000 u SC once daily
- Enoxaparin 40 mg SC once daily
- Fondaparinux 2.5 mg SC once daily

For CrCl 15 – 29 mL/min:

- Enoxaparin 30 mg SC once daily

For CrCl < 15 ml/min:

- Unfractionated heparin 5000 u SC bid tid

- Mechanical prophylaxis

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Appendixes: VTE Risk Assessments

IMPROVE: 7- ELEMENT IN-HOSPITAL RISK MODEL

VTE RISK FACTORS

3 POINTS

Previous VTE

2 POINTS

- Thrombophilia
- Lower limb paralysis
- Current cancer

1 POINT

- Age > 60 years
- Immobilization ≥ 7 days
- ICU / CCU stay

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

3 POINTS

Previous VTE

2 POINTS

- Thrombophilia
- Current cancer

1 POINT

Age > 60 years

IMPROVE 4 VTE Score:

Scores 0-2 are low risk with no indication for prophylaxis
Scores ≥ 2 are high risk and warrant prophylaxis

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VTE prophylaxis for the medically ill patient

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Appendixes: VTE Risk Assessments Continued

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 \geq 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 **\geq 2**: High/moderate risk of VTE

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Appendixes: VTE Risk Assessments Continued

PADUA PREDICTION SCORE

3 POINTS

- | | |
|--|--|
| <input type="checkbox"/> Active cancer | <input type="checkbox"/> Reduced mobility |
| <input type="checkbox"/> Previous VTE | <input type="checkbox"/> 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

- | | |
|---|--|
| <input type="checkbox"/> Age ≥ 70 years | <input type="checkbox"/> Acute infection or rheumatologic disorder |
| <input type="checkbox"/> Heart or respiratory failure | <input type="checkbox"/> BMI ≥ 30 |
| <input type="checkbox"/> Acute myocardial infarction or ischemic stroke | <input type="checkbox"/> 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.

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Appendixes: VTE Risk Assessments Continued**APEX CRITERIA****VTE Risk Factors:**

- 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 = 100% bed or chair rest for at least 1 day and anticipated severe or moderate immobility= 50% of time at bed or chair rest with bathroom privileges for at least 4 days, and;
- Age and additional VTE risk factors:
 - ≥ 75 years old
 - 60 to 74 years old, plus D-dimer ≥ 2x ULN **OR** two of the following risk factors
 - 40 to 59 years old, plus history of VTE **OR** history of cancer, plus D-dimer ≥2x ULN **OR** one of the following risk factors:

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

BMI = body mass index; HF = heart failure; NYHA = New York Heart Association; ULN = upper limit of normal

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