Adult Venous Thromboembolism (VTE) Treatment for Cancer Patients (DVT and PE)

This practice algorithm has been specifically developed for MD Anderson using a multidisciplinary approach and taking into consideration circumstances particular to MD Anderson, including the following: MD Anderson’s specific patient population; MD Anderson’s services and structure; and MD Anderson’s clinical information. Moreover, this algorithm is not intended to replace the independent medical or professional judgment of physicians or other health care providers. This algorithm should not be used to treat pregnant or lactating women.

Clinical Suspicion of VTE

- In patients with a high clinical suspicion of deep vein thrombosis (DVT)/pulmonary embolism (PE), in the absence of contraindications, it is recommended that treatment with anticoagulants be started while awaiting the outcome of diagnostic test(s).
- For suspected PE, consider obtaining ECHO, Troponin level, and BNP

APPENDIX A: Contraindications to Anticoagulation Therapy

APPENDIX B: Contraindications to Thrombolysis

APPENDIX C: Outpatient Treatment Criteria

APPENDIX D: Recurrent VTE Anticoagulation Therapy Options for Patients Currently on Standard Anticoagulant Therapy

APPENDIX E: Criteria for after hours STAT 2D-ECHO

APPENDIX F: PE Classification

APPENDIX G: Anticoagulation Therapy Options for Cancer Patients

APPENDIX H: Direct Oral Anticoagulants

Suggested Readings

Development Credits

Page 1 of 14

Upper Extremity DVT → See Page 2
Lower Extremity DVT → See Page 3
PE → See Page 4
Upper Extremity DVT

1 In patients with a high clinical suspicion of DVT/PE, in the absence of contraindications, it is recommended that treatment with anticoagulants be started while awaiting the outcome of diagnostic test(s).

2 Significant extremity swelling as evidenced by significant impact on performance status that affects quality of life, or is associated with phlegmasia or lymphedema.

3 See Appendix B: Contraindications to Systemic Thrombolysis

4 Anticoagulation after catheter removal can be stopped after 3 months.

5 Consider post-thrombotic syndrome if symptoms occur in same extremity as prior VTE.

**First occurrence?**

- Yes
  - **Ultrasound/doppler**
    - Yes
      - **Acute DVT confirmed?**
        - Yes: Consult Vascular Surgery or Interventional Radiology
          - Consider catheter-directed thrombolysis if age of clot less than 30 days
        - No: See box A, Page 5
    - No: **New defect?**
      - Yes: Consult Vascular Surgery or Interventional Radiology
        - Consider catheter-directed thrombolysis if age of clot less than 30 days
      - No: See box A, Page 5
  - No: **Ultrasound/doppler**

- No: Consider prophylaxis if clinically indicated (See VTE Prophylaxis for Hospitalized Adult Patients Algorithm)

**Significant extremity swelling?**

- Yes: Consult Vascular Surgery or Interventional Radiology
  - Consider catheter-directed thrombolysis if age of clot less than 30 days
- No: See box A, Page 5

**Catheter related?**

- Yes: Consider removal of catheter
- No: Maintain catheter and anticoagulate indefinitely while catheter is in place

See box A, Page 5
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1 In patients with a high clinical suspicion of DVT/PE, in the absence of contraindications, it is recommended that treatment with anticoagulants be started while awaiting the outcome of diagnostic test(s)

2 Significant extremity swelling: significant impact on performance status that affects quality of life, or is associated with phlegmasia or lymphedema

3 See Appendix B: Contraindications to Systemic Thrombolysis

4 Consider post-thrombotic syndrome when symptoms occur in site of prior VTE

---

**Lower Extremity DVT**

- **First occurrence?**
  - Yes
    - Ultrasound/doppler
    - Acute DVT confirmed?
      - Yes
        - Consult Vascular Surgery or Interventional Radiology
        - Consider catheter-directed thrombolysis if age of clot is less than 30 days
      - No
        - See box A, Page 5
  - No
    - Ultrasound/doppler
    - New defect?
      - Yes
        - See box A, Page 5
      - No
        - Continue current management
        - Consider post-thrombotic syndrome or other causes of symptoms
        - Consider applying compression stockings if post-thrombotic syndrome
**Adult Venous Thromboembolism (VTE) Treatment for Cancer Patients (DVT and PE)**

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---

**Suspected Pulmonary Embolism (PE)**

- **CT angiogram**
  - **PE confirmed?**
    - **Yes**
      - Determine RV/LV ratio by contacting radiology department
      - Consider checking BNP and troponin level
      - **First occurrence?**
        - **Yes**
          - Low risk
        - **No**
          - Low-Intermediate risk, High-Intermediate risk or High risk
            - **New defect?**
              - **Yes**
                - Consult PERT First Responder and refer to PERT Algorithm
              - **No**
                - Continue current management
      - **Low risk**
        - Consult Pulmonary Embolism Response Team (PERT) First Responder and refer to PERT Algorithm
        - Primary team to manage as clinically indicated, see Page 5
    - **No**
      - Continue evaluation of other causes of symptoms
      - Consider prophylaxis if clinically indicated (See VTE Prophylaxis for Hospitalized Adult Patients Algorithm)

---

1. In patients with a high clinical suspicion of DVT/PE, in the absence of contraindications, it is recommended that treatment with anticoagulants be started while awaiting the outcome of diagnostic test(s). For suspected PE, obtain the following: ECHO, troponin level, BNP.
2. If CT angiogram cannot be performed, consider VQ scan. Consider STAT ECHO if clinical criteria are met, refer to Appendix E: Criteria for after hours STAT 2D-ECHO.
3. See Appendix F: PE Classification.
4. Admission criteria to Telemetry/Intermediate unit: Low-Intermediate Risk patients requiring anticoagulation
5. Admission criteria for ICU: High-Intermediate and High Risk patients in need of inotropic support with bradycardia, hypotension, or right ventricular dysfunction, RV/LV diameter ratio greater than 1 by 2D ECHO or CT, and elevated troponin or BNP.
6. PERT First Responder: On-Call fellow/trainee and attending provider.

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Approved by The Executive Committee of the Medical Staff 06/27/2017

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Adult Venous Thromboembolism (VTE) 
Treatment for Cancer Patients (DVT and PE)

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---

**Upper Extremity DVT**

- Contraindications to anticoagulation?  
  - Yes: Withhold anticoagulation and monitor
  - No: Does patient meet outpatient criteria for anticoagulation treatment? (see Appendix C)
    - Yes: Select anticoagulants, see Appendix D for management instructions
    - No: Admit patient for evaluation and treatment or if already inpatient, continue with evaluation and treatment

**Lower Extremity DVT**

- Lower extremity DVT or Low Risk PE?  
  - Yes: Select anticoagulants, see Appendix G for management instructions
  - No: Temporary contraindication to anticoagulant?
    - Yes: Place retrievable IVC Filter
    - No: Place permanent IVC Filter

**Low Risk PE**

- Patient on current anticoagulation therapy?  
  - Yes: Select anticoagulants, see Appendix G for management instructions
  - No: Monitor patient per selected anticoagulation therapy (see respective appendices)*

*For patients with VTE and cancer, continue anticoagulant therapy indefinitely, or until cancer resolves, if no contraindication emerges

---

1 See Appendix A: Contraindications to Anticoagulation
2 Criteria to consider for placement of a retrievable filter
   - If temporary/limited time (less than or equal to 2-3 months) of contraindication to anticoagulants place a retrievable IVC filter
   - Greater than 6 months survival expected
   - Performance Status less than or equal to 1

---

Approved by The Executive Committee of the Medical Staff 06/27/2017
APPENDIX A: Contraindications to Anticoagulation Therapy

**Absolute Contraindications:**
- Cerebral hemorrhage, hemorrhage in the eye or vital organs or a drop in hemoglobin of 2 grams/dL in 24 hours
- Neurosurgery, ocular surgery or intracranial bleeding within past 10 days
- Platelets less than 25 K/microliter, consult to benign hematology
- Cerebral hemorrhage, hemorrhage in the eye or vital organs or a drop in hemoglobin of 2 grams/dL in 24 hours
- Neurosurgery, ocular surgery or intracranial bleeding within past 10 days
- Platelets less than 25 K/microliter, consult to benign hematology

**Relative Contraindications:**
- Brain metastases conferring risk of bleeding (renal, choriocarcinoma, melanoma, thyroid cancer)
- Spinal procedure and/or epidural placement
- Major trauma or head trauma
- Major abdominal surgery within 48 hours
- Severe hypertension (systolic blood pressure greater than 200 mmHg, diastolic blood pressure greater than 120 mmHg)
- Endocarditis/pericarditis
- GI, GU bleeding within past 14 days
- Preexisting coagulopathy
- Platelets less than 50 K/microliter, consider consult to benign hematology
- Hypersensitivity to heparin, low molecular weight heparin (LMWH) or heparin induced thrombocytopenia
- Patient on active protocol that prohibits use of anticoagulation
- Bleeding diathesis

APPENDIX B: Contraindications to Systemic Thrombolysis

**Absolute Contraindications:**
- History of hemorrhagic stroke or stroke of unknown origin
- Intracranial tumor
- Ischemic stroke in previous 3 months (except ischemic stroke within 4.5 hours)
- History of major trauma, surgery or head injury in previous 3 weeks
- Platelet count below 100 K/microliter

**Relative Contraindications:**
- Pregnancy or first post-partum week
- Non-compressible puncture sites
- Traumatic resuscitation
- Refractory hypertension (systolic blood pressure greater than 180 mmHg; diastolic blood pressure greater than 100 mmHg)
- Advanced liver disease
- Infective endocarditis
- Recent GI bleed (last 3 months)
- Life expectancy less than or equal to 6 months
### APPENDIX C: Outpatient Treatment Criteria

1. See Appendix A for contraindications
2. No co-morbidity requiring inpatient hospitalization
3. No clinical conditions requiring hospitalization
4. Likelihood of good compliance, ability to provide self-care and not at high-risk for falls
5. Adequate home support system and geographical accessibility for follow-ups
6. If pulmonary embolism, low risk and pulse oximetry greater than 95%; stable vital signs
7. Not intermediate risk (not submassive)

### APPENDIX D: Recurrent VTE Anticoagulation Therapy Options for Patients Currently on Standard Anticoagulant Therapy

- If patient is on sub-therapeutic warfarin, adjust dose to achieve a target INR of 2-3.
- If INR is therapeutic, change warfarin to LMWH.
- If patient is on a LMWH, check anti-factor Xa level 4 hours post injection.
- If peak anti-factor Xa level is subtherapeutic (less than 0.5 anti-factor Xa units), adjust dose of the LMWH to achieve a peak anti-factor Xa of 0.5 – 1.5 units
- If peak factor Xa level is within the therapeutic range, consider increasing dose of LMWH by 20%.
- If peak factor Xa level is therapeutic and the VTE event is a symptomatic pulmonary embolism, place a permanent IVC filter.
- Consider General Internal Medicine or Benign Hematology consult.

---

1. See recommendations for specific agents on Page 8
2. Range may vary, based on specific institutional ranges
APPENDIX E: Criteria for After Hours STAT 2D-ECHO for Patients with Suspected PE

<table>
<thead>
<tr>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Patient has to be seen first by a member of the PERT team in order to confirm that none of the other imaging modalities are possible (CT angiogram or VQ scan)</td>
</tr>
<tr>
<td>b. Patient is hemodynamically unstable (systolic blood pressure less than 90 mmHg or receiving vasopressors)</td>
</tr>
<tr>
<td>c. PE has to be highly suspected and no other etiology would explain shock (no septic, hemorrhagic or hypovolemic shock)</td>
</tr>
<tr>
<td>d. PERT team member is to contact and discuss directly the need of the echo with the cardiologist on-call before sonographer is contacted.</td>
</tr>
</tbody>
</table>

APPENDIX F: PE Classification

<table>
<thead>
<tr>
<th>Low Risk</th>
<th>Intermediate Risk</th>
<th>High Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any PE:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Without RV dysfunction <strong>and</strong></td>
<td></td>
<td>● Sustained hypotension (systolic blood pressure less than 90 mmHg for at least 15 minutes) <strong>or</strong></td>
</tr>
<tr>
<td>● With normal BNP/troponin</td>
<td></td>
<td>● Persistent bradycardia (heart rate less than 40 bpm) with signs or symptoms of shock <strong>or</strong></td>
</tr>
<tr>
<td></td>
<td>Low-Intermediate</td>
<td>● Need for inotropic support</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>RV dysfunction <strong>or</strong> elevated BNP <strong>or</strong> troponin</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High-Intermediate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RV dysfunction <strong>and</strong> elevated BNP <strong>or</strong> troponin</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### APPENDIX G: Anticoagulation Therapy Options for Cancer Patients

**LMWH Regimens for Treatment of Cancer Associated Thrombosis**

<table>
<thead>
<tr>
<th>DRUG</th>
<th>DOSE / ROUTE / FREQUENCY</th>
<th>MONITORING</th>
<th>DOSE ADJUSTMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dalteparin (Fragmin®)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Preferred choice, FDA approved for cancer patients</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Use dalteparin with caution in patients with platelets less than 50 K/microliter</td>
<td>Round to nearest International Units (IU) dose, given subcutaneously daily</td>
<td>• Baseline CBC with platelets, aPTT, PT and serum creatinine&lt;br&gt;• For surgical patients, platelets every 3 days between days 4 and 14 after beginning LMWH then as clinically indicated</td>
<td>• Consider reducing the daily dose by 50% when platelets are between 20 K/microliter – 50 K/microliter and to 5,000 IU when platelets are less than 20 K/microliter&lt;br&gt;• If creatinine clearance less than 30 mL/minute: adjust dose to obtain anti-Xa level of 0.5-1.5 IU/mL (4-6 hours after fourth dose)&lt;br&gt;• Obtain anti-Xa level in patients weighing greater than 150 kg or less than 50 kg, and adjust dose to obtain anti-Xa level of 1.5 IU/mL (4-6 hours after fourth dose)</td>
</tr>
<tr>
<td>Actual Body Weight (kg)</td>
<td>Month 1 200 IU/kg&lt;br&gt;Month 2-6 150 IU/kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than or equal to 56</td>
<td>10,000 IU&lt;br&gt;12,500 IU&lt;br&gt;15,000 IU&lt;br&gt;18,000 IU</td>
<td>7,500 IU&lt;br&gt;10,000 IU&lt;br&gt;12,500 IU&lt;br&gt;15,000 IU</td>
<td></td>
</tr>
<tr>
<td>57-68</td>
<td>10,000 IU&lt;br&gt;12,500 IU&lt;br&gt;15,000 IU&lt;br&gt;18,000 IU</td>
<td>7,500 IU&lt;br&gt;10,000 IU&lt;br&gt;12,500 IU&lt;br&gt;15,000 IU</td>
<td></td>
</tr>
<tr>
<td>69-82</td>
<td>10,000 IU&lt;br&gt;12,500 IU&lt;br&gt;15,000 IU&lt;br&gt;18,000 IU</td>
<td>7,500 IU&lt;br&gt;10,000 IU&lt;br&gt;12,500 IU&lt;br&gt;15,000 IU</td>
<td></td>
</tr>
<tr>
<td>83-98</td>
<td>10,000 IU&lt;br&gt;12,500 IU&lt;br&gt;15,000 IU&lt;br&gt;18,000 IU</td>
<td>7,500 IU&lt;br&gt;10,000 IU&lt;br&gt;12,500 IU&lt;br&gt;15,000 IU</td>
<td></td>
</tr>
<tr>
<td>Greater than or equal to 99</td>
<td>Limited data suggests dalteparin 200 IU/kg based on actual body weight (with no dose capping) in one or two divided doses. An alternative option is enoxaparin 1 mg/kg twice daily. Consider monitoring anti-Xa levels and adjust dose as needed.</td>
<td>Same as above</td>
<td></td>
</tr>
<tr>
<td><strong>Enoxaparin (Lovenox®)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Use enoxaparin with caution in patients with platelets less than 100 K/microliter</td>
<td>1 mg/kg subcutaneously every 12 hours or 1.5 mg/kg* subcutaneously daily in selected patients</td>
<td>• If creatinine clearance less than 30 mL/minute: 1 mg/kg daily&lt;br&gt;• Obtain anti-Xa level in patients with weight greater than 150 kg or less than 50 kg&lt;br&gt; a. For 1 mg/kg every 12 hour dosing regimen: adjust dose to obtain anti-Xa level of 0.6 - 1 IU/mL (4-6 hours after fourth dose)&lt;br&gt; b. For 1.5 mg/kg every 24 hour dosing regimen: adjust dose to obtain anti-Xa level of 1-1.5 IU/mL (4-6 hours after fourth dose)</td>
<td></td>
</tr>
</tbody>
</table>

*Note: • Low-Molecular Weight Heparins (LMWH) (preferred agents)<br>• If LMWHs are not accessible, consider switching to warfarin after 5 days of LMWH therapy. Heparin and warfarin therapy should overlap 5 days during the acute management of venous thrombosis<br>• Patients who tolerate anticoagulation should be continued on it indefinitely or until active cancer resolves<br>• Patient should be observed closely for bleeding and signs and symptoms of neurologic impairment if therapy is administered during or immediately following diagnostic lumbar puncture, epidural anesthesia, or spinal anesthesia

1 If lab results indicate Heparin Induced Thrombocytopenia, follow management guideline per Heparin Induced Thrombocytopenia (HIT) Treatment Algorithm

Appendix G continued on next page
## APPENDIX G – continued: Anticoagulation Therapy Options for Cancer Patients

**Unfractionated Heparin (UFH)**

<table>
<thead>
<tr>
<th>TREATMENT</th>
<th>MONITORING</th>
</tr>
</thead>
</table>
| • If fixed dose, unmonitored subcutaneous UFH is chosen.  
• Initial dose: 333 units/kg subcutaneously for one dose, followed by 250 units/kg subcutaneously twice daily in addition to warfarin for at least 5 days until the INR is greater than 2 for 24 hours. | Baseline labs for heparin should be CBC with platelets, aPTT/PT, serum creatinine |

**Warfarin¹ (Selected Vitamin K Antagonists) – For Long-term Management**

<table>
<thead>
<tr>
<th>TREATMENT</th>
<th>MONITORING</th>
</tr>
</thead>
</table>
| • Overlap warfarin (2.5 – 5 mg PO) with induction therapy (LMWH, Factor Xa Inhibitor, or UFH-SC) beginning on Day 1 of therapy  
• Continue induction therapy until INR greater than or equal to 2 for two days, AND patient has received at least 4-5 days of induction therapy overlap | • INR Goal: 2-3  
• Baseline CBC with platelet count, aPTT/PT, liver function tests  
• Follow-up for PT/INR within 3-5 days, then at least every month if not more frequently |

**Fondaparinux (Arixtra®) (Factor Xa Inhibitor)**

<table>
<thead>
<tr>
<th>ACTUAL BODY WEIGHT (kg)</th>
<th>FONDAPARINUX Daily SC DOSE</th>
<th>MONITORING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 50</td>
<td>5 mg</td>
<td>Requires baseline laboratory tests: CBC with platelets, aPTT/PT, serum creatinine</td>
</tr>
<tr>
<td>50 – 100</td>
<td>7.5 mg</td>
<td></td>
</tr>
<tr>
<td>Greater than 100</td>
<td>10 mg</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MONITORING</th>
</tr>
</thead>
</table>
| • If creatinine clearance is between 30 - 50 mL/minute: use with caution  
• If creatinine clearance is less than 30 mL/minute: contraindicated  
• Use fondaparinux with caution in patients with platelets less than 100 K/microliter |

¹ Use of warfarin in cancer patients has been shown to be less effective at preventing clot recurrence than LMWH
Appendix H continued on next page

## Direct Oral Anticoagulants (DOAC) (ATTENTION: Expert panels DO NOT RECOMMEND use of these drugs in patients with cancer. A multidisciplinary consultation is strongly recommended with Benign Hematology, Cardiology, and/or General Internal Medicine). Each case needs to be individually assessed prior to use of DOACs.

<table>
<thead>
<tr>
<th>Direct Oral Anticoagulants (DOAC)</th>
<th>Rivaroxaban (Xarelto®) Oral Factor Xa Inhibitor</th>
<th>Dabigatran (Pradaxa®) Direct Thrombin Inhibitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>VTE Dosing Instructions</td>
<td>CrCl greater than or equal to 30 mL/minute</td>
<td>CrCl greater than 30 mL/minute</td>
</tr>
<tr>
<td></td>
<td>15 mg PO twice daily with food for 3 weeks</td>
<td>150 mg twice daily AFTER 5-10 days</td>
</tr>
<tr>
<td></td>
<td>followed by 20 mg PO daily with food</td>
<td>treatment with parenteral anticoagulant</td>
</tr>
<tr>
<td></td>
<td>CrCl less than 30 mL/minute or ESRD</td>
<td>CrCl less than 50 mL/minute and</td>
</tr>
<tr>
<td></td>
<td>Avoid use</td>
<td>[concomitant administration of Pgp-I]</td>
</tr>
<tr>
<td></td>
<td>CrCl less than 30 L/minute or HD</td>
<td>Avoid use</td>
</tr>
<tr>
<td>Use in liver disease</td>
<td>CTP class B or C: NOT recommended</td>
<td>CTP class B or C: NOT recommended</td>
</tr>
<tr>
<td>Contraindications</td>
<td>Active bleed, spinal puncture, neuroaxial</td>
<td></td>
</tr>
<tr>
<td></td>
<td>anesthesia</td>
<td></td>
</tr>
<tr>
<td>Significant drug-drug interactions</td>
<td>P-glycoprotein and CYP 3A4 interactions</td>
<td></td>
</tr>
<tr>
<td>Monitoring parameters</td>
<td>• Routine monitoring of coagulation tests not</td>
<td></td>
</tr>
<tr>
<td></td>
<td>required</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Baseline CBC with differential, serum</td>
<td></td>
</tr>
<tr>
<td></td>
<td>creatinine, renal function test, hepatic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>function tests</td>
<td></td>
</tr>
</tbody>
</table>

Pgp-I = P-glycoprotein inhibitor; CrCl = creatinine clearance (mL/minute); ESRD = end stage renal disease; HD = Hemodialysis; CTP = Child-Turcotte-Pugh score

Note:

**Reasons to avoid use of Direct Oral Anticoagulants (DOAC) in the cancer population:**
- Limited number of patients with cancer studied in DOAC clinical trials
- Lack of standardized testing for monitoring
- Assessing for drug-drug interaction: Lexicomp® or Micromedex®, available at http://insidemdanderson.org (for internal use only)
- Limited availability of reversal agents available
- Complicated drug-drug interactions with chemotherapy agents

Appendix H continued on next page
APPENDIX H continued: Direct Oral Anticoagulants (DOAC) (ATTENTION: Expert panels DO NOT RECOMMEND use of these drugs in patients with cancer. A multidisciplinary consultation is strongly recommended with Benign Hematology, Cardiology, and/or General Internal Medicine). Each case needs to be individually assessed prior to use of DOACs.

### Direct Oral Anticoagulants (DOAC) vs. Edoxaban

**Apixaban (Eliquis®)** Oral Factor Xa Inhibitor

- No dose adjustment is recommended
- **Note:** Patients with a serum creatinine greater than 2.5 mg/dL or CrCl less than 25 mL/minute (as determined by Cockcroft-Gault equation) were excluded from clinical trials
- 10 mg PO twice daily for 1 week followed by 5 mg PO twice daily
- CrCl greater than 51 mL/minute

**Edoxaban**<sup>1</sup> (Savaysa®) Oral Factor Xa Inhibitor

- CrCl 15-50 mL/minute
- Dose reduce to 30 mg PO daily
- CrCl less than 15 mL/minute or ESRD
- Avoid use

#### VTE Dosing Instructions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Apixaban Dosing</th>
<th>Edoxaban Dosing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong dual CYP3A4 and concomitant Pgp-1&lt;sup&gt;2&lt;/sup&gt; ketoconazole, itraconazole, ritonavir, clarithromycin</td>
<td>Decrease dose by 50% if patient on 2.5 mg twice daily then avoid</td>
<td></td>
</tr>
<tr>
<td>CrCl greater than 51 mL/minute</td>
<td>CrCl less than 15 mL/minute or ESRD</td>
<td></td>
</tr>
<tr>
<td>CrCl 15-50 mL/minute</td>
<td>Dose reduce to 30 mg PO daily</td>
<td></td>
</tr>
<tr>
<td>CrCl less than 15 mL/minute</td>
<td>Avoid use</td>
<td></td>
</tr>
</tbody>
</table>

### Use in liver disease

- CTP class B or C: NOT recommended
- CTP class B or C: NOT recommended

### Contraindications

- Active bleed, spinal puncture, neuroaxial anesthesia
- P-glycoprotein and CYP 3A4 interactions

### Significant drug-drug interactions

- Routine monitoring of coagulation tests not required
- Baseline CBC with differential, renal function test, hepatic function tests

### Monitoring parameters

- Pgp-1 = P-glycoprotein inhibitor; CrCl = creatinine clearance (mL/minute); Scr = Serum creatinine; ESRD = end stage renal disease; CTP = Child-Turcotte-Pugh score
- Edoxaban is currently not on the MD Anderson formulary
- P-gp-1 (verapamil and quinidine or short-term concomitant azithromycin, clarithromycin, erythromycin, oral itraconazole or oral ketoconazole)

**Note:**

**Reasons to avoid use of Direct Oral Anticoagulants (DOAC) in the cancer population:**

- Limited number of patients with cancer studied in DOAC clinical trials
- Lack of standardized testing for monitoring
- Assessing for drug-drug interaction: Lexicomp® or Micromedex®, available at http://insidemanderson.org (for internal use only)

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**Pgp-1 =** P-glycoprotein inhibitor; **CrCl =** creatinine clearance (mL/minute); **Scr =** Serum creatinine; **ESRD =** end stage renal disease; **CTP =** Child-Turcotte-Pugh score

<sup>1</sup>Edoxaban is currently not on the MD Anderson formulary

<sup>2</sup>P-gp-1 (verapamil and quinidine or short-term concomitant azithromycin, clarithromycin, erythromycin, oral itraconazole or oral ketoconazole)
Adult Venous Thromboembolism (VTE) Treatment for Cancer Patients (DVT and PE)

This practice algorithm has been specifically developed for MD Anderson using a multidisciplinary approach and taking into consideration circumstances particular to MD Anderson, including the following: MD Anderson’s specific patient population; MD Anderson’s services and structure; and MD Anderson’s clinical information. Moreover, this algorithm is not intended to replace the independent medical or professional judgment of physicians or other health care providers. This algorithm should not be used to treat pregnant or lactating women.

SUGGESTED READINGS


Adult Venous Thromboembolism (VTE) Treatment for Cancer Patients (DVT and PE)

This practice consensus algorithm has been specifically developed for MD Anderson using a multidisciplinary approach and taking into consideration circumstances particular to MD Anderson, including the following: MD Anderson’s specific patient population; MD Anderson’s services and structure; and MD Anderson’s clinical information. Moreover, this algorithm is not intended to replace the independent medical or professional judgment of physicians or other health care providers. This algorithm should not be used to treat pregnant or lactating women.

DEVELOPMENT CREDITS

This practice consensus algorithm is based on majority expert opinion of the VTE workgroup consisting of Faculty at the University of Texas MD Anderson Cancer Center. It was developed using a multidisciplinary approach that included input from the faculty and staff. The core team included:

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