VTE Management in Oncology Patients

October 24, 2014

St. John’s, Newfoundland

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MD MMed Haem, FCPath(Haem),
Cert Clin(Haem)

Dr. Mary DeCarolis (Moderator)
MD, GPO
Housekeeping

• Sign the sheet on the table
• Complete evaluation form

Also on the table
• Information on web-based discussion with hematologist and oncologists
Schedule

8 am Opening and introductions

8:05 Dr. Rufaro Chitsike
VTE Management in Oncology Patients:

8:35 Dr. DeCarolis
Clinical case: Cytopenia on Anticoagulation Therapy

8:45 Q&A
• Graduated from Medical School at the University of Zimbabwe in 2000, completing his residency in Hematology at Wits University in South Africa in 2010, where he also completed a Masters in Hematology.
• Completed a Fellowship in Thrombosis at McGill University in Montreal.
• Currently works as a Hematologist at the Health Sciences Centre with Eastern Health in St John’s.
• Completed medical degree and residency at McMaster University, Hamilton, ON
• GPO since 1988
• Founding member and still actively involved in CAGPO
• Interested in understanding Physician fatigue/oncology MD burnout
• Currently practices as a GPO at Grand River Regional Cancer Centre, in Kitchener, Ontario.
VTE Management in Oncology Patients

Steering Committee
Alok Khorana, MD
Marc Carrier, MD
Petr Kavan, MD
Carlo De Angelis, PharmD
Steering Committee

Alok Khorana, MD, FACP, Taussig Cancer Institute, Cleveland Clinic, Cleveland, Ohio

Marc Carrier, MD, FRCPC, M.Sc. The Ottawa Hospital and Ottawa Hospital Research Institute, Ottawa, Ont

Petr Kavan, MD, PhD, FRCPC, Jewish General Hospital, McGill University, Montréal, Que

Carlo De Angelis, PharmD, Odette Cancer Centre, Sunnybrook Health Sciences Centre, Toronto, Ont
Disclosure

• Speaker Dr. Rufaro Chitsike perceives no conflict of interest with this presentation but has worked with or consulted for:
  • LEO Pharma Canada Inc.
  • Bayer
  • sanofi-aventis
By the end of this course, participants will be able to:

1. Identify VTE risk in cancer patients
2. Assess patient risk for VTE
3. Discuss criteria for choosing anticoagulant therapy
4. Review treatment strategies that balances both thrombosis and bleeding risk in cancer patients
Section 1: The Risks

Thromboembolism is the 2\textsuperscript{nd} most common cause of death in ambulatory cancer patients.
Risk of VTE is **25 Times** More Common in Cancer Patients than Normal Population

Risk of VTE /1000 persons per year

- Population: 1-2
- Cancer patients: 25

VTE + Cancer is associated with reduced survival

Survival among Breast Cancer patients diagnosed with local stage disease initially from the day of VTE diagnosis

Section 2: Assessing Risk and Primary Thromboprophylaxis

Reduce the incidence of blood clots in cancer patients—risk assess and provide thromboprophylaxis when indicated
Can we predict VTE risk in our cancer patients?

Please visit cme.oncologyeducation.com to share your answer in our discussion forums.
### Risk Factors for Cancer-Associated VTE

<table>
<thead>
<tr>
<th>Patient-related factors</th>
<th>Treatment-related factors</th>
<th>Cancer-related factors</th>
<th>Bio-markers</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Increased age</td>
<td>• Ethnicity</td>
<td>• Co-morbidities</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Obesity</td>
<td>• Obesity</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Performance status</td>
<td></td>
</tr>
</tbody>
</table>

# Risk Factors for Cancer-Associated VTE

## Patient-related factors

## Treatment-related factors

## Cancer-related factors

## Bio-markers

- Chemotherapy, antiangiogenesis agents, hormonal therapy
- Radiation therapy
- Surgery ≥60 mins
- ESAs, transfusions
- Indwelling venous access

---

## Risk Factors for Cancer-Associated VTE

<table>
<thead>
<tr>
<th>Patient-related factors</th>
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<th>Cancer-related factors</th>
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</tr>
</thead>
</table>

- Primary site of cancer
- Stage
- Histology
- Time since diagnosis

Risk Factors for Cancer-Associated VTE

Patient-related factors

Treatment-related factors

Cancer-related factors

Bio-markers

- Platelet count ≥ 350 x 10^9/L
- Leukocyte count >11 x 10^9/L
- Hemoglobin < 100g/L

VTE Risk Assessment (NEW)

Cancer patients should be assessed for VTE risk at the time of chemotherapy initiation and periodically thereafter.

Risk assessment can be conducted based on a validated risk assessment tool

- individual risk factors, including biomarkers or cancer site, do not reliably identify cancer patients at high risk of VTE.

[Evidence: moderate; Recommendation type, strength: informal consensus, strong]

VTE Risk Score for Cancer Patients

Online Calculator
www.vtesimplified.ca

Applying the risk score (SAVE-ONCO)

- Of 550 enrolled patients:
  - 17.4% at high risk (risk score ≥3)
  - 63.2% at moderate risk (risk score 1-2)
  - 19.4% at low risk (risk score 0)

- Validated in >10 000 patients in multiple countries

<table>
<thead>
<tr>
<th>Patient Characteristic</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site of Cancer</td>
<td></td>
</tr>
<tr>
<td>Very high risk (stomach, pancreas)</td>
<td>2</td>
</tr>
<tr>
<td>High risk (lung, lymphoma, gynecologic, GU excluding prostate)</td>
<td>1</td>
</tr>
<tr>
<td>Platelet Count</td>
<td></td>
</tr>
<tr>
<td>≥ 350 x 10^9/L</td>
<td>1</td>
</tr>
<tr>
<td>Hb &lt;100 g/L or use of ESA</td>
<td>1</td>
</tr>
<tr>
<td>Leukocyte count</td>
<td></td>
</tr>
<tr>
<td>&gt;11 x 10^9/L</td>
<td>1</td>
</tr>
<tr>
<td>BMI ≥ 35 kg/m²</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
</tbody>
</table>

Assessing VTE Risk

62 yo with newly diagnosed breast cancer

- No previous history of VTE, fully mobile

- eGFR: 60 mL/min
- Hb: 105 g/L
- plt: 175 X 10⁹/L
# Applying the Risk Score

## Step 1: Calculate the Risk Score

**Patient Characteristic**

**Site of Cancer**
- Very high risk (stomach, pancreas) 2
- High risk (lung, lymphoma, gynecologic, GU excluding prostate) 1

**Platelet Count**
- \( \geq 350 \times 10^9/L \) 1

**Hb**
- \(< 100 \text{ g/L or use of ESA} \) 1

**Leukocyte count**
- \( > 11 \times 10^9/L \) 1

**BMI**
- \( \geq 35 \text{ kg/m}^2 \) 1

### Total

Step 1: Calculate the Risk Score

Step 2: Consider other VTE Risk Factors

Is the patient High Risk or Non-High Risk?

- Previous venous thrombosis
- Immobilization
- Hormonal Therapy
- Angiogenesis inhibitors (e.g. thalidomide, lenalidomide)

Educate patient about VTE risk and prevention.

**High Risk**
If risk score \( \geq 3 \) \&/or other VTE risk factors

- Consider Pharmacologic Prophylaxis
- Any LMWH at prophylactic dose\(^\wedge\)
- Decision should be guided by contraindications
- Assess risk:benefit ratio*:
thrombocytopenia, mod-severe renal dysfunction, antiplatelet therapy

\(^\wedge\)enoxaparin dose adjustment is recommended in patients with impaired renal function\(^1,2\)

**Non-High Risk**
Risk score <3

- Reassess as appropriate
- or
- Consider thromboprophylaxis if other VTE risk factors exist

- Reassess as appropriate, and at a minimum of 3 months after initiation of prophylactic treatment

Sources: VTE Oncology Simplified Shared Care Guideline. VTE Prophylaxis in Oncology Outpatients. May 2013; LOVENOX Product Monograph. Sanofi-aventis Canada Inc. September 28, 2010
Prophylaxis evidence in cancer patients

Cancer Patients
Clinical Setting

- Major cancer surgery
  - ENOXACAN-1
  - Canadian Colorectal DVT Prophylaxis
  - ENOXACAN-2
  - FAME
  - CANBESURE

- Hospitalization for acute medical illness
  - MEDENOX
  - PREVENT
  - EXCLAIM
  - ARTEMIS

- Outpatient chemotherapy
  - PROTECHT
  - CONKO-004
  - FRAGEM
  - SAVE-ONCO
Inpatient Prophylaxis

- Give pharmacologic thromboprophylaxis to hospitalized patients who have:
  - active malignancy and acute medical illness or reduced mobility, in the absence of bleeding or other contraindications

  [Evidence: strong; Recommendation type, strength: evidence based, strong]

- Consider pharmacologic thromboprophylaxis in hospitalized patients without additional risk factors, in the absence of bleeding or other contraindications.

  [Evidence: moderate; Recommendation type, strength: evidence based, strong]

• Routine pharmacologic thromboprophylaxis is NOT recommended in cancer outpatients.
  [Evidence: moderate; Recommendation type, strength: evidence based, strong]

• Consider LMWH prophylaxis on a case-by-case basis in highly selected outpatients with solid tumors receiving chemotherapy.
  [Evidence: moderate; Recommendation type, strength: evidence based, weak]
Oncologists should educate patients regarding VTE, particularly in settings that increase risk such as major surgery, hospitalization, and while receiving systemic antineoplastic therapy.

[Evidence: insufficient; Recommendation type, strength: informal consensus, strong]
Blood Clots and Cancer

What YOU need to know

What is a blood clot?
Blood clotting is a normal process that occurs in your body to help stop bleeding after an injury. Sometimes, a blood clot forms when it isn't needed and no injury has occurred. These clots can form a "plug" especially in small blood vessels, blocking blood flow and cause potentially life-threatening problems.

Why do some cancer patients get blood clots?
When you have cancer, you are more likely to experience events like hospitalization, major surgery, immobility and/or ongoing infections, which increase your chances of having a clot. There are also features of cancer and cancer treatments that may increase the risk for a blood clot. The reasons for this are not well understood, but the type of cancer, the severity/stage of cancer and chemotherapy treatments all play a role.

Cancer patients have an increased risk of blood clots:

Venous/Artery Blood Clots:

1) Deep vein thrombosis (DVT) – this is an abnormal clotting in a deep vein, usually in the leg. It can occur in one or more veins of the leg or pelvis or a deep vein of the arm, especially if there is a central venous catheter.

2) Pulmonary embolism (PE) – this happens if the blood clot comes loose from the walls of the vein and travels through the bloodstream to the lungs. It can sometimes be life-threatening.

Arterial Artery Blood Clots:
Arterial thromboembolism (ATE) – this is a clot that forms in an artery, blocking the flow of healthy oxygenated blood to an organ or limb. This can cause stroke (rare) which can be life-threatening.

As a cancer patient, why should I be concerned about blood clots?
• Cancer patients are four to six times more likely to get blood clots than people without cancer.
• Blood clots in the lungs (PE) can make it difficult to breathe, affect your energy level and even cause death.
• Blood clots in the leg (DVT) can result in long-term leg pain, swelling and difficulty walking.

How do I know if I am at risk?
For cancer patients (active or in remission), there are things you can do to decrease your chances of a blood clot, including:
- Cancer treatments
- Previous blood clots (DVT or PE)
- Permanent IV catheter for chemotherapy
- Recent major surgery
- Obesity
- Recurrent immobility, such as prolonged travel, sitting, or bed rest
- Chronic infection
- A family history of DVT or PE
- Age >65 years

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Blood Clots

Treatment and Prevention

How are blood clots diagnosed?
Your cancer care team may use an ultrasound or a CT scan to look for blood clots inside your body.

How are blood clots treated?
Blood clots are treated with drugs, called anticoagulants, that help make your blood less sticky. These drugs do not break up an existing clot but rather stop the clot from becoming larger and allow the body to remove the clot on its own. It will also prevent new clots from forming. The preferred anticoagulants are the ones that you inject into the fatty tissue under your skin; they are preferred over the oral tablet or pill form (e.g. warfarin) because they have been shown to be more effective, especially in cancer patients. While on an anticoagulant, you should be careful with sharp objects, avoid contact with high-risk physical activities, and avoid taking ASA (Aspirin™) & NSAIDs (non-steroidal anti-inflammatory drugs, such as ibuprofen or naproxen) without your doctor's permission.

Compression stockings that squeeze your feet and legs to help the blood circulate more quickly may be prescribed. These reduce the risk of long-term pain and swelling caused by damage in the veins resulting from the clot.

What can I do to prevent blood clots?

In general
- Stay active - Don't smoke or stop smoking if you do
- Maintain a normal body weight if you can
- Drink plenty of liquids
- Wear compression stockings and get up and walk frequently

In the hospital
- Many blood clots can be prevented with low doses of an anticoagulant or by staying as active as possible
- Move your arms and legs often and walk frequently if possible
- Discuss blood clot prevention with your healthcare professional before undergoing any surgery, if possible
- Immediately report any unexplained new chest, leg or arm symptoms to your healthcare professional

SIGNS AND SYMPTOMS OF A BLOOD CLOT

Symptoms are the same for cancer patients as they are for people without cancer.

Symptoms of Possible DVT
- Sudden or recent swelling of one leg or arm
- Unexplained pain or tenderness of one leg or arm
- Skin may be warm to the touch or is discoloured (red, purple or blue)

Symptoms of Possible PE
- Recent or sudden shortness of breath or breathlessness
- Sharp chest pain or upper back pain, especially when inhaling
- Light-headedness or coughing up blood

DVT and PE are EMERGENCIES. If you have any of the above symptoms, GO TO THE EMERGENCY ROOM and SEEK MEDICAL CARE IMMEDIATELY!

Supported by an unrestricted educational grant by LEO Pharma Inc

www.vtesimplified.ca  

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Section 3: Treatment & Secondary Prophylaxis

LMWHs are the preferred therapy for VTE – providing better outcomes than warfarin.
Why treat VTE?

To prevent fatal PE
To prevent recurrence
To prevent post-thrombotic syndrome

Treatment & Secondary Prophylaxis

• **LMWH is preferred for VTE treatment**
  
  o over UFH for the initial 5-10 days for those with newly diagnosed VTE
  
  o for long-term anticoagulation, LMWH preferred for at least 6 months as monotherapy due to improved efficacy over warfarin.

  [Evidence: strong; Recommendation type, strength: evidence based, strong]
• Use of novel oral anticoagulants for either prevention or treatment of VTE in cancer patients is not recommended at this time.

[Evidence: insufficient; Recommendation type, strength: informal consensus, strong]
For initial treatment of VTE, **LMWH is superior to UFH in reducing mortality**

Significant **29% mortality reduction** in cancer patients receiving LMWH for acute* treatment of VTE versus those receiving UFH

*5-7 days  

Anticoagulation Beyond Initial 6 Months

May be considered for:

- select patients with active cancer (i.e. metastatic disease)
- those receiving chemotherapy
- those with persistent major risk factors

[Evidence: insufficient; Recommendation type, strength: informal consensus, weak to moderate]

LMWH Superior to VKA for Long-Term Treatment of Cancer-Associated VTE

Continued use of LMWH is superior to switching to VKAs for secondary prevention of VTE in adult patients with cancer

- RR of VTE recurrence 0.53 (95% CI: 0.36-0.76; p=0.007)
- RR of major bleeding 0.98 (95% CI: 0.49-1.93, p=0.95)
- Minor bleeding events and all-cause mortality were similar between the 2 intervention arms

Cumulative incidence of recurrent VTE in the cancer groups

Section 4:

Balancing the Risk

To reduce the risk choice of appropriate anticoagulant needs to consider:

• Clinical data
• Kidney function
• Risk factors
Exam:

Diagnosed with DVT – left leg

BP 128/80
eGFR: 25 mL/min

Comorbidities:

Hypertension
Renal impairment
## Considerations for VTE Treatment

### DVT Treatment Options

<table>
<thead>
<tr>
<th>Options</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>No therapy</td>
<td>No</td>
</tr>
<tr>
<td>Dalteparin</td>
<td>Yes</td>
</tr>
<tr>
<td>Enoxaparin</td>
<td>Yes</td>
</tr>
<tr>
<td>Tinzaparin</td>
<td>Yes</td>
</tr>
<tr>
<td>Unfractionated Heparin</td>
<td>Yes</td>
</tr>
<tr>
<td>Warfarin</td>
<td>Yes</td>
</tr>
<tr>
<td>New oral anticoagulant (apixaban, dabigatran, rivaroxaban)</td>
<td>No</td>
</tr>
</tbody>
</table>
## Key Features of Anticoagulants

<table>
<thead>
<tr>
<th></th>
<th>UFH</th>
<th>LMWH</th>
<th>Warfarin</th>
<th>New Oral Anti-coagulants</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Onset of Action</strong></td>
<td>Rapid</td>
<td>Rapid</td>
<td>Slow (days)</td>
<td>Fast</td>
</tr>
<tr>
<td><strong>Offset</strong></td>
<td>Fast (4-6 hrs)</td>
<td>Intermediate (12-24 hrs)</td>
<td>Slow (4-5 days)</td>
<td>Intermediate (1-2 days)</td>
</tr>
<tr>
<td><strong>Drug Interactions</strong></td>
<td>Few</td>
<td>Few</td>
<td>Many</td>
<td>Some</td>
</tr>
<tr>
<td><strong>P-gp Inhibitors</strong></td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td><strong>Adjust Dose in Kidney Dysfunction</strong></td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
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<td>NO</td>
<td>NO</td>
<td>NO</td>
</tr>
</tbody>
</table>

- **Onset of Action**: The time it takes for the anticoagulant to begin its effect.
- **Offset**: The time it takes for the anticoagulant effect to wear off.
- **Drug Interactions**: The degree to which other medications can interact with the anticoagulant.
- **P-gp**: P-glycoprotein, an enzyme that can affect the absorption and excretion of medications.

**Notes**

- **Adjust Dose in Kidney Dysfunction**: Tinzaparin (adjust dose <15mL/min)
- **Inhibitors**: Reversal in 6-24 h with Vit K-dose delivery dependent
- **Antidote/Reversibility**: Full reversal with protamine sulfate
- **Contraindications & Cautions**: If eGFR < 30mL/min

**References**

- Weitz JI, Gross PL. ASH Education Book December 8, 2012 vol. 2012 no. 1 536-540;
Considerations when Selecting a LMWH for Cancer-Associated Thrombosis: **Kidney Function**

Adjust Dose if Kidney Function Impaired

<table>
<thead>
<tr>
<th>eGFR (mL/min)</th>
<th>UFH</th>
<th>Tinzaparin (innohep®)</th>
<th>Dalteparin (Fragmin®)</th>
<th>Enoxaparin (Lovenox®)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;30</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>15 - 29</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>YES*</td>
</tr>
<tr>
<td>&lt;15</td>
<td>NO</td>
<td>YES*</td>
<td>YES*</td>
<td>YES*</td>
</tr>
</tbody>
</table>

*Bioaccumulation possible

**Note:** LMWHs cannot be used interchangeably, unit for unit with UFH, or with other LMWHs.

Key Takeaways

1. Cancer patients have a **VTE risk 25-times** that of non-cancer patients

2. **Site of cancer, weight and time since diagnosis** significantly increase cancer-associated VTE risk
3. Key considerations for choosing anticoagulation therapy should include renal function, bleeding risk, and patient preference (i.e. dosing frequency, monitoring, administration)

4. LMWHs are preferred over UFH and warfarin as monotherapy for thromboprophylaxis and treatment of VTE due to improved efficacy and reduced risk of bleeding
Thank you
Case 2: Cytopenia on Anticoagulation Therapy
64 year old ♀
• Presented to hospital with weakness, fatigue and night sweats
• Left axillary lymph node excisional biopsy
  – Confirmed diffuse large B cell lymphoma stage IVB with positive bone marrow

Other:
• PMHx: Hypertension, dyslipidemia, GERD
• Meds:
  – Pantoprazole 40 mg PO daily, simvastatin 20 mg PO daily and hydrochlorothiazide 25 mg PO daily
### Labs & Initial Treatment

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Normal Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hb</td>
<td>140 g/L</td>
<td>120-160</td>
</tr>
<tr>
<td>WBC</td>
<td>7.15 $10^9$/L</td>
<td>4.00-11.00</td>
</tr>
<tr>
<td>PLT</td>
<td>220 $10^9$/L</td>
<td>140-440</td>
</tr>
<tr>
<td>Albumin</td>
<td>48 g/L</td>
<td>38-52</td>
</tr>
<tr>
<td>Urea</td>
<td>4.3 mmol/L</td>
<td>3.0-8.0</td>
</tr>
<tr>
<td>eGFR</td>
<td>95 mL/min</td>
<td></td>
</tr>
<tr>
<td>LFTs</td>
<td>w/in Normal</td>
<td></td>
</tr>
<tr>
<td>LDH</td>
<td>450 (2x ULN)</td>
<td></td>
</tr>
<tr>
<td>PT</td>
<td>13.2 (11.5-14.5)</td>
<td></td>
</tr>
<tr>
<td>aPTT</td>
<td>31.6 (27.0-35.0)</td>
<td></td>
</tr>
</tbody>
</table>

Receives first dose of rituximab-CHOP chemotherapy

Counselled about VTE and symptoms
Case

• Presents to ER 10 days later with left lower limb swelling and significant shortness of breath

• In ER:
  – Vitals: BP 115/67; HR: 112; RR: 16; \( O_2 \) Sats 96% on 2 Lpm (88% on RA); Temp: 37.1°C
  – CVS: tachycardia but otherwise unremarkable
  – Lower extremities: swelling of the left lower limb.

• Labs:
  – WBC 1.3 X 10⁹/L (neutro 0.6); HGB 90; g/L;
    PIt 68 X 10⁹/L
  – eGFR normal
Imaging

- **Doppler**: occlusive thrombus in the common femoral vein consistent with deep vein thrombosis

- **CTPA**: Bilateral segmental and sub-segmental filling defects consistent with pulmonary embolism
Management Considerations

- **Possible etiology** of thrombocytopenia:
  - Chemotherapy effect; heparin-induced thrombocytopenia; infection/sepsis, etc.

- **Severity** of thrombocytopenia (< or ≥ 50 X 10⁹/L)

- **Expected duration and course** of thrombocytopenia
  - Transient or permanent
  - Platelet count is the nadir or will drop further

- **Reversible** cause that can be corrected

- **Other risk factors** for bleeding
  - Impaired kidney function, older age, etc.

## Cancer-Associated Thrombosis Management Strategy

<table>
<thead>
<tr>
<th>Platelet Count</th>
<th>Treatment</th>
</tr>
</thead>
</table>
| $\geq 50 \times 10^9/L$ | **Full therapeutic doses of anticoagulation**  
  • without platelet transfusion |

[Consensus Recommendation SSC of the ISTH]

### If eGFR >30 mL/min

<table>
<thead>
<tr>
<th>Dalteparin Dose</th>
<th>Enoxaparin Dose</th>
<th>Tinzaparin Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 IU/kg SC once daily</td>
<td>1 mg/kg SC BID <strong>OR</strong> 1.5 mg/kg SC once daily</td>
<td>175 IU/kg SC once daily</td>
</tr>
<tr>
<td><strong>OR</strong> 100 IU/kg SC BID</td>
<td></td>
<td></td>
</tr>
<tr>
<td>After 1st month: 150 IU/kg recommended</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Patient weight: 74 kg  
Tinzaparin dose: 12 959 U = 14 000/0.7 mL prefilled syringe
## Cancer-Associated Thrombosis Management Strategy

<table>
<thead>
<tr>
<th>Platelet Count</th>
<th>Treatment</th>
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</table>
| ≥50 X 10⁹/L    | Full therapeutic doses of anticoagulation  
• without platelet transfusion |
| <50 X 10⁹/L with acute venous thrombosis (< 30 days) | Full therapeutic doses of AC with LMWH + platelet transfusion to maintain a platelet count ≥50 X 10⁹/L |

- If platelet transfusion not possible or contraindicated, retrievable inferior vena cava filter could be inserted and removed when platelet count recovers and anticoagulation can resume.

[Consensus Recommendation SSC of the ISTH]

### Cancer-Associated Thrombosis Management Strategy

<table>
<thead>
<tr>
<th>Platelet Count</th>
<th>Treatment</th>
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</thead>
</table>
| ≥50 X 10⁹/L                                                                   | **Full therapeutic doses of anticoagulation**  
• without platelet transfusion                                                  |
| <50 X 10⁹/L with acute venous thrombosis (< 30 days)                          | **Full therapeutic doses of AC with LMWH + platelet transfusion to maintain a platelet count ≥50 X 10⁹/L**                                    |
| 25-50 X 10⁹/L with sub-acute (1-3 mo) or chronic (>3 mo) venous thrombosis   | **Reduce dose of LMWH to 50% of the therapeutic dose or to prophylactic dose**                                                             |

Patient weight: 74 kg  
Tinzaparin dose: 12 959 U = 14 000/0.7 mL prefilled syringe  
50% dose= half of 0.7 mL syringe or 4 500 IU/0.45 mL syringe
## Cancer-Associated Thrombosis Management Strategy

<table>
<thead>
<tr>
<th>Platelet Count</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥50 X 10⁹/L</td>
<td>Full therapeutic doses of anticoagulation</td>
</tr>
<tr>
<td></td>
<td>• without platelet transfusion</td>
</tr>
<tr>
<td>&lt;50 X 10⁹/L with acute venous thrombosis (&lt; 30 days)</td>
<td>Full therapeutic doses of AC with LMWH + platelet transfusion to maintain a platelet count ≥50 X 10⁹/L</td>
</tr>
<tr>
<td>25-50 X 10⁹/L with sub-acute (1-3 mo) or chronic (&gt;3 mo) venous thrombosis</td>
<td>Reduce dose of LMWH to 50% of the therapeutic dose or to prophylactic dose</td>
</tr>
<tr>
<td>&lt;25 X 10⁹/L (&gt;1 mo)</td>
<td>No anticoagulation</td>
</tr>
</tbody>
</table>

[Consensus Recommendation SSC of the ISTH]

Key Takeaways

1. Assess thrombocytopenia (etiology, severity, etc.)
2. Weigh relative risks of recurrent thrombosis and bleeding
3. Platelet Count
   - Platelets ≥ 50 x10⁹/L → full dose LMWH
   - Platelets 25-50 x 10⁹/L → management and LMWH dosing dependent on thrombosis being acute or sub-acute/chronic
   - Platelets <25 x 10⁹/L (>1 mo) → NO AC
This program is focused on helping physicians identify and manage the challenges of venous thromboembolism (VTE) in cancer patients. VTE, including deep vein thrombosis (DVT) and pulmonary embolism (PE), frequently complicate cancer and its treatment. Evidence shows that VTE is a primary cause of short- and long-term mortality in cancer patients.

**Case 1:** Recurrent VTE on Anticoagulation Therapy

**Case 2:** Cytopения on Anticoagulation Therapy

**Case 3:** Catheter-Associated Thrombosis in a Patient with Borderline Renal Function

**Case 4:** Incidental DVT/PE in NHL Patient

*NHL = Non-Hodgkin Lymphoma

**TO PARTICIPATE IN THIS PROGRAM:**

Live, 30-minute web-based clinical cases, facilitated by teams of Canadian hematologists and oncologists. Go to [www.regonline.ca/vteandcancer](http://www.regonline.ca/vteandcancer) to sign up and register for the online sessions.

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THANK YOU