POLICY

IWK Health Centre Adult Population Clinical Teams will identify medical, surgical and obstetrical patients at risk of developing Venous Thromboembolism (VTE) and provide appropriate thromboprophylaxis.

Utilizing evidence based literature, best practices and bench marking with other organizations and Accreditation Standards, the IWK Women’s & Newborn Health Program will use this document as a guide for Venous Thromboembolism (VTE) Prophylaxis.

The patient’s permanent health record will include documentation that clearly indicates that an assessment of VTE risk was performed. The Venous Thromboembolism Prophylaxis (Form ID IWKVETH) will be utilized to capture this assessment. The documentation will clearly identify if the patient is at risk to develop thromboembolism as well as outline the associated plan of care.

NOTE: This ROP is not a requirement for pediatric hospitals. The ROP applies to clients 18 years of age or older. In circumstances where a patient over the age of 18 years is admitted to an IWK pediatric unit, these patients will be assessed on a 1:1 basis for risk of developing Venous Thromboembolism (VTE) and treatment options assessed accordingly.
GUIDING PRINCIPLES AND VALUES

VTE is a serious complication for patients who are hospitalized and/or undergoing surgery. VTE can be reduced or prevented by identifying patients at risk and providing appropriate, evidence-based thromboprophylaxis interventions during the patient’s hospital stay and post discharge when indicated (Accreditation Canada, 2014; CHEST, 2012; Safer Health Care Now VTE Starter Kit, 2008 & SOGC, 2014).

Development of a DVT or PE is associated with increased patient mortality, and is the most common preventable cause of hospital death. In addition, VTE increases both lengths of stay and hospital costs (Accreditation Canada, 2014; Safer Health Care Now VTE Starter Kit, 2008).

Pharmacological and non-pharmacological prevention strategies will be employed to prevent VTE. IWK Health Centre Adult Clinical Teams will provide information and education to health care professionals and patients about the risks of VTE and its prevention.

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Clinical Teams and Responsibilities

- IWK Adult Clinical teams will assess patients at risk of development of VTE.
- IWK Adult Clinical teams will consider the modality. If pharmacological, the choice of anticoagulant plus the schedule, dose, timing, compliance and duration need to be determined considering patient specific factors.
- If a patient is identified by the adult team as at risk for developing VTE or have had a known VTE, treatment options will be considered based on assessment, offered and documented on the permanent health record.
- Patients who develop Venous Thromboembolism (VTE) during their hospital stay, post hospital stay, or are readmitted an AEMS report should be filed and reviewed through the appropriate Team Quality Review Process.
- Patient’s surgical or medical condition and associated assessments will help guide clinical teams in conjunction with guidelines for thromboprophylaxis and monitoring.
GUIDELINES

Treatment Interventions

All Cases:
Hydration
Early Mobilization

Treatment options may include: pharmacological and/or non pharmacological interventions. The Venous Thromboembolism Prophylaxis Order (Form ID IWKVETH) will be utilized to capture this assessment.

Pharmacological thromboprophylaxis: considerations anticoagulant type, route, dose and timing.

Pharmacological Thromboprophylaxis may be contraindicated in patients who are actively bleeding or have been diagnosed with a bleeding disorder or thrombocytopenia. Consider consult with a hematologist for advice and type of pharmacological treatment options.

Heparin Prophylaxis:
The usual dose of unfractionated heparin (UFH) is 5000 units subcutaneously preoperatively and q12 hourly or q 8 hourly postoperatively. This is usually continued until full mobilization or discharge from hospital. If there are reasons why thromboprophylaxis is not given preoperatively (eg regional anaesthesia or risk of bleeding) it should be given as soon as feasible postoperatively.

A rare complication is heparin-induced thrombocytopenia (HIT). This typically occurs following 4-10 days of use. HIT occurs more frequently with UFH (estimated at 0.1% using prophylactic dosing) than with low molecular weight heparin (LMWH). If prophylaxis is to be used for more than 4 days, a baseline platelet count and repeat count at 5 days is advisable.

Pregnancy/Post-partum:
Women having a caesarean section in labor are at highest risk of VTE. However, there will be some women following elective caesarean section or after vaginal delivery who may have cumulative risk factors that warrant heparin prophylaxis. In some individual cases, such as placenta previa/accreta, heparin prophylaxis may be postponed until the postoperative period when hemostasis is secure.

Heparin Prophylaxis following Regional Anaesthesia:
Spinal: If the spinal is uneventful, heparin can be administered 2 hours post procedure. In the event of a spinal bloody tap (~1%) or any complications, the anesthesiologist will determine the timing of heparin administration

Epidural: If the epidural is uneventful, heparin can be administered 2 hours after the epidural catheter has been removed. In the event of a bloody tap (~5%) or any complications, the anesthesiologist will determine the timing of heparin administration.
Non pharmacological thromboprophylaxis could include: Thromboembolic Deterrent Stockings (TEDS) Sequential Stockings, Sequential Compression Devices (SCD), Intermittent Pneumatic Compression Stockings (IPCS). This will be dependent upon clinical care teams, patient specific assessments and associated requirements determined by the attending physician. For details, see appendix A.

REFERENCES

Accreditation Canada Venous Thromboembolism (VTE) Prophylaxis Required Organizational Practice and Associated Standards (2014).


Applying guidelines to medical and surgical patients. Society of Obstetricians and Gynecologists of Canada (SOGC), Cancer, Surgical, Medical, Cardiac, and Orthopedic to the clinical settings (2014).


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RELATED DOCUMENTS

Pamphlet

IWK Heparin Drug Dosing Guidelines

Policies:
Consent to Treatment Policy 124.0
Patient Identification Policy 1100
Medication Management Preprinted Orders - Policy 3.08
Medication Management High Alert Medications - Policy 25.05

Forms:
Preprinted Order - Adult Therapeutic Heparin (Unfractionated) Infusion Form ID- IWKADTH
Preprinted Order - Venous Thromboembolism Prophylaxis Gynecology & Breast Health Form ID - IWKVETH
Preprinted Order - Venous Thromboembolism Prophylaxis Order – Antepartum Form ID - IWKVETHPR
Preprinted Order - Venous Thromboembolism Prophylaxis Order – Postpartum Form ID - IWKVENTH

Appendices:

Appendix A - Definitions
Appendix B - Mechanical VTE Prophylaxis
Appendix A

DEFINITIONS

Venous thromboembolism (VTE): the collective term used to describe deep vein thrombosis (DVT) and pulmonary embolism (PE).

Deep vein thrombosis (DVT): a clot that occurs in the deep veins of the limbs (most often legs).

Pulmonary embolism (PE): a clot that occurs in the pulmonary arteries, usually as a result of a DVT.
Appendix B

Venous Thromboembolism (VTE) Prophylaxis - ADULT

Clinical Features

DVT
- unilateral leg
- swelling
- tenderness/pain especially over the course of a vein
- skin warm to touch
- redness/discoloration

PE
- shortness of breath/difficulty breathing
- pleuritic chest pain
- hemoptysis
- unexplained tachycardia
- presyncope or syncope

Risk Factors

Identified Risk Factors for VTE include *but not limited to*:

**Major or prolonged surgery**
- General surgery
- Gynecologic surgery
- Urologic surgery
- Hip or knee replacement surgery
- Limb surgery
- Hip fracture surgery
- Neurosurgery
- Cardiovascular Surgery

**Medical illness**
- Cardiac Disease, Congestive Heart Failure (CHF), recent MI
- Severe Respiratory Diseases
- Cancer
- Previous History or Family History of VTE (PE or DVT)
- Sickle cell
- Stroke
- Trauma or Major Spinal Cord Injury
- Recent Myocardial Infarction (MI)
- Hypercoagulable states (e.g. thrombophilia)

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• Inflammatory Bowel Diseases
• Nephrotic Syndrome
• Trauma (hip, limbs, pelvis, or spinal cord)
• Acute medical illness
• Central Venous Catheter

Medications/Treatments
• Estrogen Therapy (eg: Hormone Replacement Therapy; Combined Hormonal Contraceptives)
• Selective Estrogen Receptor Modulators (eg: Raloxitene).
• Cancer Treatments
• Erythropoieses – stimulating agents (eg: erythropoietin)

Additional Risk Factors
• Age greater than 60
• Obesity
• High Risk Pregnancy
• Post Partum
• Smoking
• Reduced mobility
• Poor hydration

Mechanical VTE Prophylaxis

Recent evidence suggests that in selected patients intermittent pneumatic compression devices or a combination of compression devices and pharmacologic prophylaxis is most efficacious. These guidelines are designed to guide both the selection of appropriate patients for intermittent pneumatic compression devices and to standardize the utilization of these stockings.

Intermittent pneumatic compression stockings function by reducing venous stasis and increasing tissue factor pathway inhibitor plasma levels therefore increasing endogenous fibrinolytic activity. In contrast unfractionated and low molecular weight heparin inhibits factor X. The combination of mechanical and pharmacologic prophylaxis is likely synergistic. The Cochrane Review supports, especially in high-risk patients, the use both intermittent pneumatic compression devices and pharmacologic therapy.

Comparison with Graduated Compression Stockings
Both graduated compression stockings and intermittent pneumatic compression devices are used in the prevention of VTE related to surgery. There is less convincing evidence for the use of graduated compression stockings compared to intermittent pneumatic compression devices. A systematic review published in 2010 identified 9 surgical trials that directly compared these 2 types of mechanical prophylaxis. Of the trials that reached statistical significance, all showed intermittent pneumatic compression devices to have lower DVT rates.
**Use in Patients at High-Risk of Bleeding**

The primary attraction of mechanical methods for VTE prevention is the lack of bleeding potential. Intermittent pneumatic compression devices may be used as an alternative to pharmacologic therapy in patients at high risk of bleeding or in patients with bleeding lesions (eg. peptic ulcer) for VTE prevention. When mechanical prophylaxis is used in such circumstances, consideration should be given to the use of pharmacologic agents once the bleeding risk becomes acceptably low.

**Use of Intermittent Pneumatic Compression Stockings**

**General principles**

Mechanical methods of thromboprophylaxis should be placed on the patient after induction of anesthesia and used continuously until hospital discharge. For compression stockings to prevent VTE they must fit and be applied properly and be worn with few interruptions until discharge. The limb must be accurately measured to prevent incorrect pressure gradients, which may have the potential to increase DVT risk. Comerota et al. reported high rates of non-compliance on in-patient wards noting that patients need to be encouraged to wear the devices until full ambulation.

Fitting and application of IPCSs

The intermittent pneumatic compression stockings consist of a controller, non-disposable tubing and single use leg garments.

**Fitting:**

The appropriate sleeve size must be selected after measurements are taken of the patient's mid-thigh circumference (refer to size chart on sleeve package). Select sleeve size based on the measurement taken from the larger of the 2 legs.

**Application:**

1. Lift the patient’s leg and place the sleeve under the patient’s leg. The side with the printed instructions should be against the patient’s leg. The blue arrows printed on the sleeve should be centered directly behind the patient’s leg.
2. Align the open area of the sleeve behind the patient’s knee to allow for unrestricted flow of blood through the popliteal area of the leg.
3. Lower the patient’s leg onto the sleeve.
4. Wrap the sleeve securely around the patient’s leg starting at the ankle and working up toward the calf and then the thigh.
5. The sleeve should fit securely but not tightly around all sections of the patient’s leg. Two fingers should be able to fit between the sleeve and the leg.
6. Connect the sleeve, tubing and controller. Ensure there are no kinks or twists in the tubing that may restrict airflow.

**OR usage:**

1. Once the patient is under anaesthesia and ready for surgery the IPCSs should be activated.
2. During the operative procedure the sleeve cooling should be turned off to minimize local air movement.
Postoperative care:
1. The controller should be connected and functioning in the PACU
2. Once the patient is settled in their room the controller should be connected and functioning.
3. It is important that the devices do not in any way limit ambulation.
4. The IPCS devices may be removed while the patient is ambulating or bathing but should be put back on when the patient returns to a seated or supine position.
5. Remove the sleeves if the patient experiences numbness, tingling or leg pain.

Contraindications to the use of Compression Devices
Intermittent pneumatic compression devices are contraindicated in patients with evidence of leg ischemia due to peripheral vascular disease. Additional contraindications may include dermatitis or severe leg edema. These devices should not be used if a DVT is suspected. There is also the theoretical concern that if patients have been immobilized on bed rest for a period of greater than or equal to 72 hours without any form of prophylaxis, the use of compression devices may dislodge a recently formed clot in the lower leg and therefore should be avoided.

Summary
Intermittent pneumatic compression devices should be used in patients at high risk of bleeding and in combination with pharmacologic prophylaxis in patients at high risk of VTE.

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### Version History

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<th>Minor Revisions (e.g. spelling correction, wording changes, etc.)</th>
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