AIM eModule 5: Maternal Venous Thromboembolism (VTE) Prevention: Response ~ Every Unit
Welcome to the AIM eLearning Module 5: Maternal (VTE) Safety bundle where we will review response, for every unit

Learning objectives
Upon completion of this activity you will:
1. Learn strategies and recommendations for prevention of obstetric thromboembolism.
2. Review recommendations for thromboprophylaxis including mechanical, dosing of prophylactic and therapeutic pharmacologic anticoagulation.
3. Discuss standardized recommendations for appropriate timing of pharmacologic prophylaxis with neuraxial anesthesia

Response ~ Every unit
The third domain of Maternal VTE Prevention safety bundle is Response, on every unit and contains 3 key elements:
1. Use standardized recommendations for mechanical thromboprophylaxis
2. Use standardized recommendations for dosing of prophylactic and therapeutic pharmacologic anticoagulation
3. Use standardized recommendations for appropriate timing of pharmacologic prophylaxis with neuraxial anesthesia

Consensus bundle on VTE
The “Response” component of the VTE bundle emphasizes that, when patients are identified as high risk for thromboembolism the response should be appropriate thromboprophylaxis based on risk factors and the clinical situation.

Based on the review of available research evidence and current major guideline recommendations, the National Partnership for Maternal Safety workgroup has recommended these three prophylaxis strategies.

These recommendations are based on guidelines and observational research from numerous national and international organizations including ACOG, the American College of Chest Physicians, the Royal College of Obstetricians and Gyneecologists, and American Society of Regional Anesthesia.

We will review these recommendations in detail over the next few slides.

You may also access these resources using the link on this slide or download at the conclusion of this elearning module.
Response ~ Every unit
As mentioned previously, the VTE workgroup recommends that venous thromboembolism risk assessment be performed at the first prenatal visit and that patients receive pharmacologic prophylaxis based on criteria similar to the recommended guidelines.

Outpatient antepartum thromboprophylaxis
The VTE workgourp recommendations for Outpatient Antepartum Thromboprophylaxis are detailed in this slide and can be found in table one of National Partnership for Maternal Safety workgroup recommendations.

The VTE Workgroup also recommends that, for patients receiving pharmacologic VTE prophylaxis along with low dose aspirin for the prevention of preeclampsia based on U.S. Preventive Services Task Force recommendations, aspirin be discontinued at 35–36 weeks of gestation.

Potential contraindications to prescribing enoxaparin or heparin
There are Potential contraindications to prescribing low molecular weight heparin that must be considered. This includes

- Thrombocytopaenia - Low platelet count (<100 000/uL)
- High risk of uncontrolled haemorrhage or current bleeding
- Acute bacterial endocarditis and
- Adverse reactions to enoxaparin or heparin

Heparin-induced thrombocytopenia (HIT)
Heparin-induced thrombocytopenia (known as HIT) is the development of thrombocytopenia, or a low platelet count, due to the administration of various forms of heparin. Considerations for screening of HIT should include screening for High-risk and Low-risk thrombophilies

Inpatient antepartum thromboprophylaxis
It is also recommended that thromboprophylaxis with a daily Low molecular weight heparin or twice-daily unfractionated heparin to be given for all antepartum patients hospitalized for at least 72 hours who are not at high risk for bleeding or imminent childbirth.

All Patients receiving unfractionated heparin or Low molecular weight heparin on an outpatient basis should have this treatment continued if hospitalized.

For women at high risk for childbirth or bleeding, mechanical thromboprophylaxis or a prophylactic dose of unfractionated heparin (5,000 units every 12 hours) should be used.
The selective use of unfractionated heparin rather than Low molecular weight heparin may facilitate intrapartum neuraxial anesthesia.

**Vaginal birth**
For Vaginal Birth and for women with a history of venous thromboembolism or a thrombophilia, it is recommended that intrapartum use of pneumatic compression while in bed and for the postpartum administration of low molecular weight heparin or unfractionated heparin.

For women at high risk for venous thromboembolism based on RCOG criteria or with Padua scores of 4 or higher, pharmacologic prophylaxis with low molecular weight heparin or unfractionated heparin may be considered.

**Cesarean birth**
The VTE work group recommends that all women undergoing cesarean birth who are not receiving pharmacologic prophylaxis receive perioperative mechanical thromboprophylaxis with pneumatic compression devices, which should be continued until the patient is fully ambulatory. The VTE workgroup also recommends use of pharmacologic thromboprophylaxis for women with identified risk factors.

It is important to consider that many women undergoing cesarean birth will have multiple risk factors and therefore might be considered at particularly high risk depending on the criteria or scoring system used. This is outlined on this slide which can be found in Appendix 1 of the National Partnership for Maternal Safety: consensus bundle on venous thromboembolism.

Given the challenges in consistently identifying women with risk factors and issues related to poor compliance with mechanical devices, hospitals may choose a strategy in which all women undergoing cesarean birth receive postoperative thromboprophylaxis unless there is a specific contraindication. Although there are no data on the optimal timing of initiating heparin postoperatively, the National Partnership for Maternal Safety VTE workgroup supports the routine administration of prophylactic unfractionated heparin when post-cesarean patients otherwise meet criteria for post-anesthesia care.

**Extended postpartum thromboprophylaxis**
For extended pharmacologic postpartum thromboprophylaxis, the VTE workgroup recommends that on hospital discharge from childbirth that risk assessment and thromboprophylaxis be considered.
These recommendations are based primarily on the ACOG and The American College of Chest Physicians guidelines. This criteria and can be found on Table 2 in the National Partnership for Maternal Safety workgroup recommendations.

Timing of anesthesia
At the time of this publication, preliminary recommendations from the American Society for Regional Anesthesia and Pain Medicine (ASRA) on venous thromboembolism prophylaxis and neuraxial anesthesia suggest that neuraxial procedures be delayed at least 4, and preferably 6, hours after a 5,000-unit dose of subcutaneous unfractionated heparin.

How or if these recommendations may change practice, or access to neuraxial analgesia, is unclear at this time. In the setting of increased focus on obstetric thromboembolism, the Society for Obstetric Anesthesia and Perinatology is preparing an expert statement that includes guidance on pharmacologic prophylaxis recommendations in relation to neuraxial anesthesia; this statement will be particularly important in coordinating management between obstetricians and anesthesiologists. As recommendations on neuraxial anesthesia and pharmacologic prophylaxis evolve, communication between obstetricians and anesthesiologists will be critical to providing optimal care.

Additional recommendations to neuraxial anesthesia and pharmacologic prophylaxis
Based on current evidence, the VTE workgroup has made the following 4 additional recommendations in regard to neuraxial anesthesia and pharmacologic prophylaxis:

1. The workgroup has made recommendations for timing of neuraxial anesthesia in relation to pharmacologic thromboprophylaxis and as outlined in Table 3 of the National Partnership for Maternal Safety Consensus Bundle on Venous Thromboembolism. These recommendations will apply to most women requiring venous thromboembolism prophylaxis during pregnancy.

2. For hospitalized antepartum patients at increased risk of emergently requiring anesthesia for childbirth the benefits of venous thromboembolism risk reduction from pharmacologic prophylaxis compared with mechanical prophylaxis may be outweighed by risks from restrictions on neuraxial anesthesia. In such cases, we recommend consultation with the anesthesiologist and ongoing multidisciplinary communication about evolving care plans to anticipate the need for neuraxial anesthesia and for any adjustments of pharmacologic prophylaxis, or coagulation testing, or both.

3. The appropriate time interval between a dose of 7,500 or 10,000 units of subcutaneous unfractionated heparin administered twice daily and placement of neuraxial anesthesia is unclear. For the small proportion of patients receiving prophylactic unfractionated heparin on an outpatient basis, the decision to use 5,000 units twice daily compared with a higher dose should be based on consideration of the risks and benefits of a higher dose, taking into account
potential restrictions on neuraxial anesthesia if urgent or emergent delivery is required.

4. The National Partnership for Maternal Safety VTE workgroup supports the concurrent use of nonsteroidal anti-inflammatory drugs and low-dose prophylactic unfractionated heparin or LMW heparin after neuraxial anesthesia and cesarean birth given extensive clinical practice supporting the safety of this treatment and patient benefit in terms of decreased use of opioids.

Screening for Heparin-induced thrombocytopenia
Heparin-induced thrombocytopenia is an extremely rare complication for obstetric patients receiving unfractionated heparin or LMW heparin for prophylaxis. It is unclear whether evidence supports screening for obstetric patients receiving prophylactic-dose unfractionated heparin or LMW heparin anticoagulation. For patients expected to be on either unfractionated heparin or LMW heparin for more than 7 days, a reasonable clinical strategy would include checking a complete blood count 7 to 10 days after initiation of therapy. Guidelines from ASRA recommends that patients receiving heparin for more than 4 days have platelet counts checked before neuraxial block and catheter removal.

Appropriate use of mechanical prophylaxis
Recent evidence on sequential compression device use found that compliance was low for patients who underwent cesarean birth (52.5%). Reasons for noncompliance included patient factors, nursing factors, and systems issues. Based on available evidence, the VTE workgroup supports the following recommendations with regard to mechanical prophylaxis:

• For patients for whom mechanical prophylaxis is indicated, device use is recommended while patients are in bed until hospital discharge.

• Because device compliance may be low, individual centers should consider the relative benefits of pharmacologic prophylaxis for at-risk patients given that administration is less likely to be affected by patient, nursing, or systems factors.

Contraindications to mechanical prophylaxis
Considerations and contraindications to mechanical prophylaxis need to be considered and include:

• Incorrect fit which may restrict blood flow
• Inflammatory conditions of the lower leg
• Morbid obesity which may make it difficult to achieve correct fit
• Severe lower limb deformity
• Severe oedema of the legs
• Severe peripheral arterial disease or peripheral/diabetic neuropathy.

Summary
The third domain of the Maternal Venous Thromboembolism Prevention Safety Bundle is response on every unit and has 3 key elements that every organizations should consider:

1. The use of standardized recommendations for mechanical thromboprophylaxis
2. The use of standardized recommendations for dosing of prophylactic and therapeutic pharmacologic anticoagulation
3. And the use of standardized recommendations for appropriate timing of pharmacologic prophylaxis with neuraxial anesthesia

You can find these recommendations and detailed information for each in the Consensus Bundle on VTE provided by the National Partnership for Maternal Safety VTE workgroup.

**Resources and references: Maternal Venous Thromboembolism (VTE) prevention**

Please download the resources to support the VTE Maternal Safety Bundle by accessing the link at the top of this page

**AIM program contact**

Please contact AIM directly with any questions on the materials provided or how we can better support your needs.