7 CAESAREAN DELIVERY

7.9 THROMBOPROPHYLAXIS AFTER CAESAREAN BIRTH

### CONSIDER RISK FACTORS FOR VTE:
- Age >35
- Obesity (BMI >30 pre-pregnancy)
- Prolonged labour (>24 hours)
- Varicose veins
- Caesarean
- Infection (systemic/ severe)
- Oral contraceptives
- Prolonged hospital admission
- Pre-eclampsia
- Smoker
- Recent surgical procedures in puerperium (especially abdominal & pelvic)
- Prolonged or severe immobility (e.g. Paraplegia/ lower limb paralysis, prolonged bed rest, plaster cast/ brace, prolonged travel)
- Multiparity (>3); multiple pregnancy; puerperium
- Postpartum haemorrhage (>1000mL)
- Inherited or acquired thrombophilia (asymptomatic)
- Medical illness (e.g. Maternal heart, nephritic, inflammatory bowel, sickle cell, respiratory disease, malignancy)

### NON-PHARMACOLOGICAL THROMBOPROPHYLAXIS:
- **ALL** women after caesarean:
  - Early mobilisation
  - Adequate hydration
  - Graduated compression stockings (GCS), unless contraindicated, until fully mobile
  - Educate on VTE prevention, signs & symptoms, & action to take if symptoms develop.
  - Consider intermittent pneumatic compression device intra/postoperatively if cannot wear GCS &/or receive pharmacological thromboprophylaxis.

### PHARMACOLOGICAL THROMBOPROPHYLAXIS:
- **Lower risk:**
  - Elective caesarean with no other risk factors:
    - **No** thromboprophylaxis with LMWH (low molecular weight heparin; enoxaparin).³

- **Intermediate risk** (assess bleeding risk & contraindications prior - see full guideline):
  - Elective caesarean with one or more risk factors (in addition to puerperium) OR
  - Emergency/ non-elective caesarean section (CS) in labour:
    - Consider 5-7 days postnatal prophylactic LMWH³ (enoxaparin 40mg at 2000hrs*).
    - *Bridging doses* for births outside daylight hours: If CS between 1600-2400hrs replace day 1 LMWH dose with 5000IU unfractionated heparin (UFH) at 4 & 12hrs after CS; For births 2400-0800hrs give bridging dose 5000IU UFH 4hrs after CS.
    - Consider extending postnatal LMWH if persisting or >3 risk factors.³

- **High risk (Previous VTE or requiring antenatal LMWH):**
  - At least 6 weeks postnatal prophylactic LMWH (enoxaparin).³
  - See also relevant KEMH Clinical Guidelines within Section B: 2.12: Venous thrombosis and embolism in pregnancy and the puerperium.
**AIM**

- To ensure the appropriate prophylaxis for all women undergoing a caesarean birth in order to reduce the risk of venous thromboembolism (VTE).

**BACKGROUND**

Caesarean birth increases the risk of VTE\(^1\) in addition to the already hypercoagulable state of pregnancy.\(^6\) VTE during pregnancy and the immediate postnatal period is rare although when it occurs it is associated with high degrees of morbidity and mortality.\(^1\) VTE is a major cause of maternal mortality in Australia and the USA,\(^5\) and is the most common direct cause of maternal death in the UK.\(^5,7\) Furthermore, for those who survive VTE there is increased risk of future cardiovascular complications, making VTE risk and prophylaxis assessment a necessity for all hospitalised patients.\(^8\) Some women have additional risk factors, placing them at higher risk of developing VTE.

**KEY POINTS**

1. Pregnancy has up to a tenfold increased risk of VTE compared to non-pregnant women,\(^1\) with an emergency caesarean having a further twofold increased risk of VTE than elective caesarean, and a fourfold increase than vaginal birth.\(^3\) Although a number of risk factors have been identified, the size of the increases in risk attributable to these factors is generally poorly quantified.

2. In women with risk factors a combination of pharmacological and non-pharmacological methods are recommended.\(^9 - 11\) There is limited literature on the effect of mechanical methods for postpartum thromboprophylaxis, however benefit has been shown in other clinical areas.\(^1,9\)

3. When used after caesarean delivery, low molecular weight heparin (Enoxaparin) may increase the frequency of bleeding and wound haematoma, although it is associated with less abnormal bleeding than unfractionated heparin.\(^1\) Pharmacological prophylaxis is potentially contraindicated in women with primary postpartum haemorrhage > 1000mL,\(^1\) although these women are actually at increased risk of VTE.\(^3\) The decision to utilise pharmacological thromboprophylaxis in these women should be at the discretion of the obstetrician and anaesthetist.

4. Discuss with the woman to ensure her support and adherence to the selected VTE prophylaxis.\(^12\) Educate all women on VTE (deep vein thrombosis & pulmonary embolism) prevention, signs and symptoms and the action to take if symptoms develop.\(^13 - 15\)

**RISK FACTORS FOR VTE IN THE PERIPARTUM PERIOD**

- Age (> 35 years\(^3,13,15\))
- Caesarean birth\(^3,4\), especially emergency caesarean\(^1\)
- Inherited or acquired thrombophilias\(^1,4,15\)
- Malignancy- Active or occult\(^1,16\)
- Medical illness- acute (e.g. severe infection\(^1,3,4,16\), maternal heart\(^1,16\), nephritic\(^3\), inflammatory bowel\(^1,16\), or respiratory disease)\(^1\)
- Multiple pregnancy\(^3\) or multiparity >3\(^3\)
- Obesity\(^1,4,13,16\) (BMI > 30\(^3\) pre/early pregnancy\(^15\))
- Postpartum haemorrhage\(^15\) (>1000ml)\(^3\)
- Pre-eclampsia\(^3,4,13,15\)
- Previous VTE\(^1,3,4,16\) or family history\(^13,15\)
- Prolonged or severe immobility\(^1,3,4,16\) (e.g. paraplegia / lower limb paralysis, prolonged bed rest\(^3\), immobilisation in a plaster cast or brace or prolonged travel\(^3\) resulting in limited movement and subsequent venous stasis).
- Prolonged labour (24hrs)\(^3\)
Recent surgical procedures, especially abdominal & pelvic surgery\textsuperscript{1, 16}.
- Sickle cell disease\textsuperscript{3}
- Smoker\textsuperscript{3, 4}
- Varicose veins\textsuperscript{1, 3, 15, 16}.

**THROMBOPROPHYLAXIS**

**NON-PHARMACOLOGICAL THROMBOPROPHYLAXIS**

All women require early ambulation and adequate hydration.\textsuperscript{1, 17}
- Unless contra-indicated all women should have:
  - Graduated compression stockings (GCS) fitted pre-operatively.\textsuperscript{1}
- Unless contra-indicated (e.g. peripheral arterial disease or arterial ulcers), intermittent pneumatic compression (IPC) devices should be utilised for the intra and post operative periods (for up to 24 hours) in women who are unable to wear GCS and/or are unable to receive pharmacological prophylaxis.\textsuperscript{1} Pharmacological thromboprophylaxis should be added to IPC for high risk women if their risk for bleeding subsides.\textsuperscript{3} Their use should also be considered in women who will be immobile post operatively for extended periods of time.
- In women who are considered to be very high risk IPC devices should be used instead of GCS for the intra and post operative period. They should be replaced by GCS when the patient resumes mobility.

**Contraindications to mechanical prophylaxis\textsuperscript{4}**:
- Incorrect fit (restricts blood flow)
- Inflammatory conditions of the lower leg
- Morbid obesity (where unable to achieve correct fit)
- Severe lower limb deformity
- Severe oedema of the legs
- Severe peripheral arterial disease or peripheral/diabetic neuropathy.

**PHARMACOLOGICAL THROMBOPROPHYLAXIS**

Women having an Elective Caesarean with no other risk factors for VTE (other than puerperium) do not require post-operative thromboprophylaxis with low molecular weight heparin (LMWH) Clexane.\textsuperscript{17, 18}
- For those with risk factors (as detailed above) consider:
  - Enoxaparin 40mg subcutaneously\textsuperscript{16, 19} prescribed at 2000 hrs post operatively unless contra-indicated.
- The first dose of pharmacological prophylaxis should be given at least 4 hours after delivery\textsuperscript{1, 19}
- Removal of the epidural catheter should occur at least 12 hours after the last dose of LMWH.\textsuperscript{3}
- After removal, the next dose should be at least 2 hours\textsuperscript{1}, but preferably 4 hours later.\textsuperscript{3}
- The duration of pharmacological prophylaxis is between 5 to 7 days or until the patient is fully mobile\textsuperscript{1} and discharged from hospital.\textsuperscript{19} In high risk patients (e.g. previous VTE or who received pharmacological prophylaxis during pregnancy) this may be extended for six weeks after the birth.\textsuperscript{1, 3, 16, 19} See also relevant KEMH Clinical Guidelines within Section B: 2.12: Venous thrombosis and embolism in pregnancy and the puerperium.

**Guidelines for pharmacological prophylaxis for women who deliver outside normal daytime hours**
With the current administration time of enoxaparin being fixed at 2000hrs, women who deliver after 1600hr or prior to 0800hr may have a considerable delay prior to their first dose of enoxaparin. In these women the use of subcutaneous heparin should be considered as a bridging method until their first dose of enoxaparin. Women who deliver between 1600 and 2400 will require two bridging doses of heparin whilst women who deliver after 2400 will only require one.

- Women who deliver between 1600 and 2400 hours will be administered a 5000IU subcutaneous dose of unfractionated heparin at 4 and 12 hours post surgical completion (unless contra-indicated).
- Women who deliver between 2400 and 0800 hours will be administered a single 5000IU subcutaneous dose of unfractionated heparin at 4 hours post surgical completion (unless contra-indicated).

**Potential contraindications to prescribing enoxaparin or heparin:**
- Thrombocytopaenia\(^{16}\) - Low platelet count (<100 000/uL)
- High risk of uncontrolled haemorrhage or current bleeding
- Acute bacterial endocarditis\(^{16}\)
- Adverse reaction/ allergy to enoxaparin or heparin,\(^{16}\)

**Patient related risk factors for bleeding:**
- Current active major bleeding\(^3\) (defined as requiring at least 2 units of blood or blood products to be transfused in 24 hours)
- Current chronic, clinically significant and measurable bleeding over 48 hours
- Bleeding disorders (e.g. haemophilia)
- Recent central nervous system bleeding
- Intracranial or spinal lesion
- Renal impairment
- Abnormal blood coagulation including underlying coagulopathy or coagulation factor abnormalities
- Thrombocytopaenia. Pharmacological prophylaxis is not recommended for patients with a platelet count < 50000/uL. It is generally considered safe with a platelet count of > 100,000/uL. A platelet count between these two values should be discussed with senior obstetric and anaesthetic staff.
- Severe platelet dysfunction
- Active peptic ulcer or active ulcerative gastrointestinal disease
- Obstructive jaundice or cholestasis
- Recent major surgical procedure with a high bleeding risk
- Concomitant use of medication that may affect the clotting process (e.g. anticoagulants, antiplatelets, non-steroidal anti-inflammatory drugs or thrombolytic agents)
- Neuraxial anaesthesia or recent lumbar puncture for any reason
- High risk of falls.


### REFERENCES (STANDARDS)

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### RESPONSIBILITY

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