Document No: 489173

TITLE: Prevention of Venous Thromboembolism in Pregnancy and Postpartum

1. Statement/Purpose

To ensure that all pregnant and postpartum patients are assessed for VTE prophylaxis when admitted to Lakes District Health Board Hospitals

- Pregnancy is associated with a 5-10 fold increase in VTE risk.
- Risk of death from VTE in pregnancy is 0.87/100,000 maternities, similar to the risk of death from puerperal sepsis. (PMMRC 12th annual report, published June 2018)
- The majority of women who develop pregnancy-associated VTE have personal or pregnancy-specific risk factors that were untreated or unrecognised.
- VTE risk assessment is mandatory for all adult patients on admission to hospital and reassessment should be done throughout admission.
- Recommendations for VTE prophylaxis during pregnancy and postpartum are based largely on expert opinion. This is due to the lack of robust clinical trials and the relative infrequency of pregnancy-associated VTE. There are no published clinical studies of validated prediction rules for the diagnosis of VTE in pregnancy.

2. Scope

All obstetric, midwifery, nursing, medical, surgical and pharmacy staff employed at Lakes District Health Board hospitals.

3. Definitions

VTE	Venous thromboembolism
DVT	Deep vein thrombosis
PE	Pulmonary embolism
LMWH	Low molecular weight heparin
TED	Thromboembolic deterrent
CS	Caesarean section
NVD	Normal vaginal delivery
PPH	Postpartum haemorrhage
APS	Antiphospholipid syndrome

4. Procedure/Management

4.1. Screening for risk factors Antenatally

Refer to Appendix A - Antenatal Thromboprophylaxis Assessment Flowchart

At the first antenatal visit all pregnant women should have a careful history taken for risk factors for venous thromboembolism.

Risk Factor	Adjusted Odds Ratio
Previous VTE	24.8
Age >35	1.4 - 1.7
Obesity (BMI>30)	1.7 - 5.3
Smoking	1.7 - 3.46
Family history of VTE	2.9 - 4.1
Immobility	7.7 - 10.1
Multiparity (>2)	1.6 - 2.9
Multiple pregnancy	1.4 - 4.2
Varicose veins	2.4
Preeclampsia	3.0 - 5.8
Fertility treatment/assisted reproduction	2.6 - 4.3
Hyperemesis	2.5
Postpartum Risk Factors	
Planned CS	1.3 - 2.7
Emergency CS/CS in labour	2.7 - 4.0
Placental abruption	2.5 - 16.6
Postpartum sepsis/infection	4.1-20.2
PPH	1.3-12.0

Table 1- Adapted from RCOG Green Top Guideline 2015

Risk assessment should be repeated if a woman is admitted to hospital or develops additional complications during pregnancy.

All women should be counselled during pregnancy regarding the signs and symptoms of venous thromboembolism and the increased risk of VTE during pregnancy.

Decisions relating to thromboprophylaxis should be discussed with individual patients, explaining the risks and benefits. The preferences of the patient will affect the decisions made.

4.2. Specific VTE risk factors

Extended antenatal thromboprophylaxis with LMWH is suggested for women with a previous unprovoked or hormonally provoked VTE.

Previous VTE is the strongest risk factor for pregnancy associated VTE. Risk is highest if the previous VTE was unprovoked (no identified risk factor) rather than provoked (e.g. following long bone fracture).

Where a woman has had a previous hormonally provoked VTE i.e. pregnancy-associated or whilst on the oral contraceptive pill, the risk of a recurrent VTE is increased in a subsequent pregnancy. For women with a previous provoked VTE, careful screening for additional risk factors should be undertaken and the decision for antenatal thromboprophylaxis individualised in consultation with the patient. If the previous VTE was clearly provoked, and there are no other risk factors, including a negative thrombophilia screen, it is reasonable not to commence antenatal thromboprophylaxis unless the patient is admitted to hospital. Postnatal thromboprophylaxis is recommended.

Hereditary thrombophilia
Some conditions are considered more significant than others in terms of the risk of pregnancy-associated VTE. Discussion with a haematologist or obstetric physician is suggested if there is a significant thrombophilia diagnosis.
Where there has been a previous VTE in the context of a thrombophilia, antenatal thromboprophylaxis with LMWH is recommended. Postnatal thromboprophylaxis decisions depend on type of thrombophilia and presence of other risk factors.

Significant thrombophilia	**Weak thrombophilia**
Antithrombin deficiency	Factor V Leiden heterozygous
Factor V Leiden homozygous	Prothrombin mutation heterozygous
Factor V Leiden/prothrombin mutation compound heterozygous	Family history of VTE associated with thrombophilia but unaffected control
Protein C deficiency	
Protein S deficiency	

Antiphospholipid syndrome
APS is often diagnosed after recurrent pregnancy losses and both aspirin and LMWH help to improve pregnancy outcomes when APS is diagnosed. In a patient with APS AND a previous VTE, a higher dose of LMWH may be recommended and there should be consultation with a haematologist.

Long-term anticoagulation
Patients who have an indication for long-term anticoagulation should not have this stopped due to pregnancy. Warfarin is teratogenic and women on long-term warfarin

must be offered a reliable form of contraception and counselled on the effect of warfarin on the developing fetus. Pre-pregnancy counselling is ideal. Where pre-pregnancy transition to LMWH is inappropriate, as soon as pregnancy is confirmed, ideally within two weeks of the missed period and prior to six weeks gestation, oral anticoagulants should be stopped and patients transitioned to therapeutic dose LMWH which should be continued throughout pregnancy. Input and advice from a haematologist or obstetric physician is vital. Warfarin may be restarted later in pregnancy and is safe in breastfeeding.

4.3. Mechanical prophylaxis

TED stockings are recommended for all pregnant and postpartum women who are admitted to hospital under secondary care. Stockings must be appropriately sized and provide graduated compression to 14-15 mmHg. TED stockings are particularly important for those women with a contraindication to LMWH. Data extrapolated from the non-pregnant population supports the role of TED stockings for patients at high risk of bleeding, for whom LMWH is contraindicated and as an adjunct to LMWH in surgical patients. Whilst there is a lack of data to recommend the duration of use of TED stockings, five days postpartum or until discharge home seems appropriate.

Flowtron/Intermittent calf compression devices are not routinely recommended antenatally, but are suggested during and after caesarean section where there is a high risk of postpartum VTE but a delay in starting chemical thromboprophylaxis is anticipated, e.g. Where there has been major PPH, or in women with acute VTE during pregnancy in whom anticoagulation has been ceased for delivery.

Contraindications to mechanical prophylaxis: severe peripheral arterial disease, severe peripheral neuropathy, severe lower limb oedema, recent skin graft, acute stroke, dermatitis/cellulitis.

4.4. Chemical thromboprophylaxis

Dosing of prophylactic low molecular weight heparin in pregnancy and postpartum- There is insufficient data to recommend increasing doses of prophylactic LMWH on the basis of BMI. However, in the UKOSS study, some overweight and obese women suffered a VTE whilst receiving LMWH doses appropriate for women of 50-90kg.

The following regimen is therefore suggested:

<50kg	20mg subcutaneous daily
50-90kg	40mg subcutaneous daily
91-130kg	60mg subcutaneous daily
>130kg	80mg subcutaneous daily

Contraindications to LMWH: Active bleeding, high risk of bleeding, allergic or adverse reaction to heparin, on current anticoagulation, birth or termination planned within 48hours, regional anaesthesia <6hours.

For patients with renal failure where the eGFR is <30ml/min, the recommended daily dose of LMWH should be halved.

LMWH is safe in breastfeeding.

4.5. Postpartum VTE prophylaxis

Refer to Appendix B - Postnatal VTE Risk Assessment checklist

VTE risk should be re-assessed immediately postpartum using the postpartum guideline.

All women who have received antenatal thromboprophylaxis for any reason should receive six weeks of postnatal LMWH. Where there is a known significant thrombophilia, a family history of VTE *and* any known thrombophilia, personal history of VTE or a family history of VTE without thrombophilia but with other risk factors, six weeks of LMWH is recommended.

Elective caesarean section confers twice the risk of VTE compared to vaginal delivery. Emergency caesarean carries four times the VTE risk of vaginal birth. Various studies exploring the magnitude of VTE risk after caesarean section compared to the risk of vaginal birth have found relative risks of 2-6.7. It is therefore suggested that all patients who are delivered by emergency caesarean section receive seven days of postnatal clexane, particularly if there are any other risk factors for VTE.

Flowtron/Intermittent calf compression devices during and after caesarean section are suggested where there is a high risk of postpartum VTE but a delay in starting chemical thromboprophylaxis is anticipated, e.g. where there has been major PPH, or in women with acute VTE during pregnancy in whom anticoagulation has been ceased for delivery.

TED stockings should remain for five days or until discharged.

LMWH should be commenced within 6-12 hours of delivery, provided there are no concerns regarding bleeding. Consistent administration times and avoidance of prolonged periods without chemical prophylaxis are recommended.

If a postnatal woman is readmitted after her initial postnatal discharge, VTE risk should again be reassessed.

5. Related Documentation

Venous Thromboembolism prophylaxis protocol - EDMS 415296
Surgical VTE risk assessment and prophylaxis guide EDMS 965504
Appendix A - Antenatal thromboprophylaxis Assessment flowchart
Appendix B - Postnatal VTE Risk Assessment checklist

6. References

Lakes District Health Board Surgical and Elective Services, Venous Thromboembolism (VTE) Prophylaxis Protocol, June 2019

Auckland District Health Board, Venous Thromboembolism in Pregnancy – Prevention, National Women's Hospital, Auckland, 2019.

Royal College of Obstetricians and Gynaecologists, Green-top Guideline No.37a, Reducing the Risk of Venous Thromboembolism during Pregnancy and the Puerperium, April 2015. www.rcog.org.uk

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Knight M, Bunch K, Tuffnell D, Jayakody H, Shakespeare J, Kotnis R, Kenyon S, Kurinczuk JJ (Eds.) on behalf of MBRRACE-UK. Saving Lives, Improving Mothers' Care - Lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2014-16. Oxford: National Perinatal Epidemiology Unit, University of Oxford 2018

McLintock C, Brighton T, Chunilal, S et al, Recommendations for the prevention of pregnancy-associated venous thromboembolism. ANZJOG, 52(1), 3-13.

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Appendix A - Antenatal Thromboprophylaxis Assessment flowchart

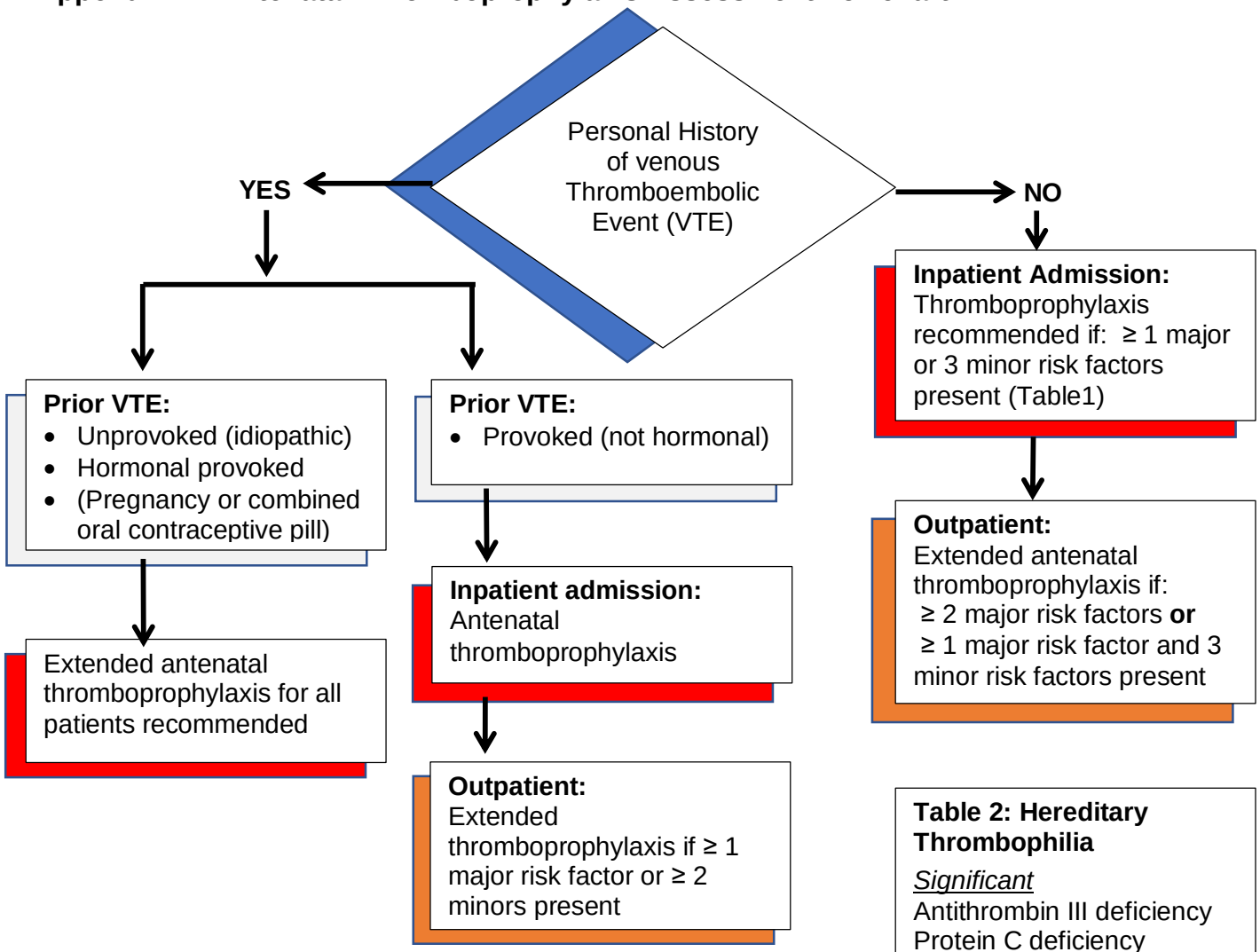

Table 1: Risk Factors

Major
Body mass index ≥ 30 kg/m^2
Family history of VTE*
Preeclampsia
Known significant thrombophilia (Table 2)
Active medical illness e.g. malignancy, nephrotic syndrome, pneumonia*

Minor
Maternal age ≥ 35 years
Immobilisation**
Smoker
Known weak thrombophilia (Table 2)
Severe varicose veins
Multiple pregnancy
Severe hyperemesis
Parity (≥ 3)

*event confirmed on imaging in a first degree relative
** e.g. bed rest or plaster of paris cast

Table 2: Hereditary Thrombophilia

Significant
Antithrombin III deficiency
Protein C deficiency
Protein S deficiency
Homozygous factor V Leiden
Combined hereditary defects

Weak
Heterozygous factor V Leiden
Heterozygous G20210A prothrombin mutation

NB: Flowchart does **NOT** apply to women with Antithrombin III deficiency, Antiphospholipid syndrome, multiple prior VTE on long term warfarin or prosthetic heart valve(s). Such women should be discussed with an obstetric physician or haematologist

LAKES DISTRICT HEALTH BOARD

MUST attach Patient Label Here
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MATERNITY SERVICES

Postnatal VTE Risk Assessment Checklist

To be completed by delivering practitioner prior to transfer to postnatal ward

Step 1

- ❑ Personal history VTE
- ❑ Received extended (6 weeks or more) antenatal thromboprophylaxis for ANY reason
- ❑ Family history of VTE and any known inherited thrombophilia (Antithrombin, Protein C and/or Protein 5 deficiency: homozygous Factor V Leiden or prothrombin gene mutation or compound heterozygote for FVL/prothrombin gene mutation)
- ❑ Family history of VTE with no known thrombophilia and other risk factors present
- ❑ Significant thrombophilia
- ❑ Family history of VTE with no known thrombophilia and other risk factors present

If YES to any of the above
6 Weeks Enoxaparin (or other low molecular weight heparin) required ❑

Step 2

Major Risk Factors
- ❑ Elective CS
- ❑ BMI ≥ 30
- ❑ Medical co-mobidity
- ❑ Pre-eclampsia
- ❑ Systemic infection
- ❑ Surgical procedure in puerperium (except CS)

Minor Risk Factors
- ❑ Immobility
- ❑ Age > 35 years
- ❑ Prolonged labour > 24 hours
- ❑ Smoker
- ❑ PPH>1000mL
- ❑ Extensive perineal trauma or prolonged repair
- ❑ Severe varicose veins
- ❑ Parity ≥ 3

≥ 2 **MAJOR** risk factors
OR
≥ 1 **MAJOR** risk factor and ≥ 2 **MINOR** risk factors
OR
Delivered by **Emergency** CS

Enoxaparin for 5 days or until fully mobile ❑

Flowtrons should be used if Enoxaparin contraindicated due to bleeding risk

❑ **NO** risk factors or 1 **MINOR** risk factor
- TEDS not required
- Enoxaparin not required
- Adequate hydration

❑ TED Stockings
Needed if:
- ≥ 1 **MAJOR** risk factor
- ≥ 2 **MINOR** risk factors
- 1 **MAJOR** risk factor + 1 **MINOR** risk factor
- **Emergency** CS

Remove flowtrons when mobilising

ENOXAPARIN PRESCRIPTION
- Regular "once daily" at prescribed time within 6 - 12 hours post birth
  - 80mg if > 130kg
  - 60mg if 91-130kg
  - 40mg if 51-90kg
  - 20mg if <50 kg

Post Natal VTE Risk Assessment Checklist

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