University Hospitals of Derby and Burton NHS Foundation Trust

Thromboprophylaxis during and up to 6 weeks after pregnancy
Maternity and Gynaecology -
Full Clinical Guideline

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Contents

1. Introduction

Pregnancy is associated with a five to tenfold increase in risk of venous thromboembolism (VTE) compared with the non pregnant state.
Pulmonary embolism remains a leading direct cause of maternal death in the UK. The introduction of risk stratification and targeted antenatal and postnatal thromboprophylaxis since 2004,has been associated with a reduction in deaths, primarily from antenatal VTE and following vaginal delivery. Over 80% of fatal PE occur in women with identifiable risk factors.

Thromboembolic risk exists from the beginning of the first trimester so women at especially high risk, including those with previous VTE, require thromboprophylaxis as early as possible. Two thirds of fatal antenatal VTE occur in the first trimester and almost half of all antenatal VTE occur before 15 weeks gestation.

The risk continues to increase with advancing gestational age and reaches its peak immediately postnatal with a five fold increase in risk in the first 3 weeks of the puerperium compared to the antenatal period. Admission to hospital during pregnancy increases the risk 18 fold and this risk remains increased six fold in the 28 days post discharge.

Risk stratification is required to identify women who would benefit from pharmacological thromboprophylaxis. Prolonged antenatal thromboprophylaxis requires great commitment from the woman so decisions about the need for antenatal thromboprophylaxis should be made by a Consultant Obstetrician. The threshold for giving postnatal thromboprophylaxis is lower than antenatal due to the greater relative risk per day and the shorter duration of treatment.

Covid-19 specific information has been added for women informing maternity healthcare professionals if they contract Covid-19.

2. Purpose and Outcomes

To provide guidance to midwives, obstetricians and other health professionals caring for pregnant women on risk stratification and prevention of VTE in pregnancy.
To provide evidence based clinical advice on the identification and referral of women at particular risk of VTE in pregnancy who would benefit from more specialised care, including preconceptual care.

3. Abbreviations

ACLA	-	Anti-Cardiolipin Antibodies
AN	-	Antenatal
APS	-	Antiphospholipid syndrome
APL abs	-	Antiphospholipid antibodies
AT111	-	Antithrombin 111
BMI	-	Body Mass Index
C/S	-	Caesarean Section
COCP	-	Combined Oral Contraceptive Pill
COH	-	Combined obstetric/haematology antenatal clinic
DOAC	-	Direct oral anticoagulant
DVT	-	Deep vein thrombosis
FH	-	Family history
FVL	-	Factor V leiden
HIT	-	Heparin induced thrombocytopenia
IOL	-	Induction of Labour
IUGR	-	Intra Uterine Growth Restriction
LAC	-	Lupus anticoagulant
LMWH	-	Low Molecular Weight Heparin
PE	-	Pulmonary embolism
PET	-	Pre Eclampsia
PN	-	Postnatal
TEDs	-	Thromboembolic stockings
VTE	-	Venous Thromboembolism

4. Pre-pregnancy

Women at particular risk of VTE, ideally, should be seen before pregnancy in the specialist obstetric haematology clinic to discuss and plan pregnancy care in order to facilitate early initiation of appropriately dosed thromboprophylaxis.
Referrals may come from various sources including the acute medical team, haematology, GP, obstetric, fertility or gynaecological services and include the following:

- Women with previous VTE, single or recurrent
- Women on long term anticoagulation
- Women with inherited or acquired thrombophilia
- Women with a very strong family history of VTE
- Women with other medical conditions associated with high risk thrombosis

5. Antenatal risk assessment (see Appendix A)

- *All women* to have a documented VTE risk assessment in early pregnancy. As a routine this should take place at the CMW booking visit but may be required at an earlier stage of pregnancy if admitted for other first trimester concerns eg hyperemesis or early pregnancy complications

- This risk assessment should be repeated if the woman develops other intercurrent problems during the antenatal period.

- *Women with a previous VTE, inherited or acquired thrombophilia or very strong FH of VTE* should be referred for urgent triage by the high risk VTE pathway. They require urgent booking under the Consultant Obstetrician with special interest in Obstetric Haematology for consideration of immediate antenatal thromboprophylaxis (VTE booking slot).

- *Women with four or more current risk factors* (other than previous VTE or thrombophilia) need consideration for early antenatal thromboprophylaxis. They should be referred by the high risk VTE pathway for urgent triage. Advice will be given on thromboprophylaxis and timing of initiation by the Consultant Obstetrician for Obstetric haematology. Booking should be arranged under the Consultant Obstetrician most appropriate to their other pregnancy care needs.

- *Women with three current risk factors* (other than previous VTE or thrombophilia) will be considered for antenatal thromboprophylaxis, but it may not be required until 28 weeks. Referral should be made by the high risk VTE pathway for triage and advice as above. A routine booking appointment should be made under the Consultant Obstetrician most appropriate to their other pregnancy care needs.

- *Women with two current risk factors in the antenatal period* (other than previous VTE, thrombophilia or very strong FH) will require consideration for postnatal thromboprophylaxis for at least 10 days postpartum. This should be discussed with the patient and documented in the pregnancy management plan at the Consultant antenatal visit.

- Women who require antenatal thromboprophylaxis will generally require this for 6 weeks postnatal, although in some circumstances this could be reassessed in the postnatal period.

- ***Women admitted as inpatients*** during the antenatal period (including gynaecology wards) should be routinely offered thromboprophylaxis unless there is a contraindication eg bleeding risk, risk of miscarriage or imminent delivery. Where LMWH is contraindicated TED stockings should be used.

- *All women* with an identified VTE risk as above should have a discussion in the antenatal period about their individual risks for VTE, benefits of prevention, safety and efficacy of LMWH (70-80% risk reduction) for them and their baby, including breast feeding. They should be given the patient information leaflet on reducing the risk of VTE in pregnancy

- *Women in whom smoking is identified as a VTE risk factor* in the antenatal period should have a further discussion about smoking cessation and referral for smoking cessation support. For some women stopping smoking may reduce the need for antenatal or postnatal thromboprophylaxis which may be a motivating factor with additional maternal and fetal benefit

- *Women who accept antenatal thromboprophylaxis* should have documented teaching of safe self injection and disposal techniques by a suitably qualified midwife and should be given a sharps bin.

- On commencing antenatal thromboprophylaxis advise the woman to withhold Clexane if she has bleeding, SROM, unusual pain or labour until admitted and assessed by medical staff

- The first month's supply of LMWH for antenatal use should be prescribed by the hospital. A letter should be sent to the GP detailing the indication for treatment, dose and duration of treatment. This is required under the local *shared care agreement* for ongoing prescribing of LMWH in pregnancy by general practitioners.

- All women starting LMWH should be advised of the small risk of skin and hypersensitivity reactions and be advised to report this as there are alternative options. If these occur discuss with the Consultant Obstetrician with special interest in Obstetric Haematology or haematologist.

- Refer *all women* requiring antenatal LMWH for anaesthetic review to discuss pain relief options and anaesthesia for labour

6. Specific Risk Factors

Table 1

Pre-existing	Previous VTE	
	Thrombophilia	*Heritable high risk* Antithrombin deficiency Protein C deficiency Protein S deficiency Homozygous defects Compound defects
		Heritable low risk Factor V Leiden (heterozygous) Prothrombin gene mutation (heterozygous)
		Acquired Antiphospolipid antibodies Persistent lupus anticoagulant and/or persistent Moderate/high titre anticardiolipin antibodies and/or β_2-glycoprotein 1 antibodies
	Medical comorbidities e.g. cancer, heart failure, active SLE, inflammatory polyarthropathy or IBD, nephrotic syndrome (>3g proteinuria/24 hours), type I diabetes mellitus with nephropathy, sickle cell disease, current intravenous drugs user, PNH	
	Age >35 years	
	Obesity (BMI ≥30) either pre-pregnancy or booking weight	
	Parity ≥3 (a woman becomes para 3 after her third delivery)	
	Smoking	
	Gross varicose veins (symptomatic bilateral or above knee or with associated phlebitis, oedema/skin changes)	
	Paraplegia	
Obstetric risk factors	Multiple pregnancy Current pre-eclampsia	
	Caesarean section Prolonged labour (>24 hours) Mid-cavity or rotational operative delivery Stillbirth Preterm birth Postpartum haemorrhage (>1litre/requiring blood transfusion)	
New onset/transient *These risk factors are potentially reversible and may develop at later stages in gestation than the initial risk assessment or may resolve and therefore what is important is an ongoing individual risk assessment*	Any surgical procedure in pregnancy or puerperium except immediate repair of the perineum, e.g. appendectomy, postpartum sterilisation Bone fracture	
	Hyperemesis	
	Ovarian hyperstimulation syndrome (1st trimester only)	Assisted reproductive technology (ART), in vitro fertilisation (IVF)
	Admission or immobility (≥3 days bed rest)	e.g. pelvic girdle pain restricting mobility
	Current systemic infection (requiring intravenous antibiotics or admission to hospital)	e.g. pneumonia, pyelonephritis, postpartum wound infection
	Long distance travel (>4 hours)	
	Covid-19 infection	

6.1 Previous VTE

Women on long term anticoagulation prior to pregnancy need urgent referral to the Consultant Obstetrician for obstetric haematology for conversion to appropriate doses of LMWH.

Newer direct oral anticoagulants (eg apixaban, rivaroxiban) are contraindicated in pregnancy due to lack of safety data.

Warfarin needs to be discontinued by 6 weeks gestation, or within 2 weeks of missed period to reduce the risk of warfarin embryopathy.

A careful history should be documented including: objective confirmation of VTE; duration of treatment; provoking factors

Assume previous diagnosis of VTE if good history and prolonged treatment with therapeutic anticoagulation

6.1.1 *Single previous VTE*

Unprovoked, or oestrogen related – advise antenatal and postnatal thromboprophylaxis

Transient risk factor (other than major surgery) or other risk factors (eg BMI, age etc) – advise antenatal and postnatal thromboprophylaxis

Strongly provoked by major surgery with no other risk factors – may be reasonable to withhold until 28 weeks after discussion with the woman. This should be discussed with the joint obstetric haematology team.

6.1.2 *Heritable Thrombophilia associated VTE*

Heritable thrombophilias include: Antithrombin 111 (AT111), Protein C and S deficiency, Factor V leiden (FVL) and prothrombin gene
Activated protein C resistance is the screening test for the FVL gene and is not itself a heritable thrombophilia

Risks of recurrence are higher for those with a family history or deficiencies of the naturally occurring anticoagulants (AT111, protein C and S) rather than Factor V Leiden and prothrombin genotype. As most previous VTE require thromboprophylaxis anyway for the majority the presence of a thrombophilia does not influence management.

However Antithrombin 111 associated VTE (usually on long term anticoagulation) require higher adjusted or therapeutic dose LMWH arranged through the joint obstetric haematology service. Consideration will be given to Anti-xa monitoring and need for Anti thrombin 111 replacement as some heparins are not effective in antithrombin 111 deficiency.

6.1.3 *Acquired thrombophilia associated VTE or arterial thrombosis*

Antiphospholipid antibody associated VTE (usually on long term anticoagulation) will also need higher adjusted or therapeutic dose LMWH through the joint obstetric haematology service

6.1.4 *Previous recurrent VTE*

May require higher adjusted doses of LMWH- refer urgently to joint obstetric haematology service Often on long term anticoagulation prior to pregnancy which will need changing to LMWH as soon as possible (see above). If not anticoagulated prior to pregnancy will need to commence LMWH as soon as possible.

6.2 Asymptomatic heritable thrombophilia (no previous VTE)

Refer to Obstetric Haematology team

Risk will be stratified according to the particular thrombophilia, FH of VTE(number of relatives, provoking factors, age etc), presence of other risk factors and the bleeding risk. This will be fully discussed with the woman taking her wishes into account.

6.2.1 *High risk thrombophilias*

AT111, protein C or S deficiency, homozygous FVL or prothrombin gene or combined defects (compound heterozygotes) require postnatal thromboprophylaxis for 6 weeks as a minimum and consideration of antenatal thromboprophylaxis.

6.2.2 *Low risk thrombophilias*

Heterozygous for FVL and prothrombin gene are lower risk and should be considered as an individual risk factor for VTE.

Antenatal thromboprophylaxis not routinely advised unless other additional risk factors or FH of VTE especially oestrogen related
In the presence of two or more other risk factors consider for antenatal thromboprophylaxis.
In the presence of a single other risk factor consider postnatal thromboprophylaxis, duration to be decided in COH clinic

6.2.3 ***MTHFR or PAI-1*** *gene mutations* (often tested for fertility treatment) are not considered to be associated with a clinically relevant increase in the risk of VTE in pregnancy

6.3 Acquired Antiphospholipid antibodies (no previous VTE)

APL antibodies include: lupus anticoagulant; anticardiolipin antibody; beta 2 glycoprotein They are required to be persistent on 2 or more occasions more than 12 weeks apart

These may be detected due testing for recurrent miscarriage or fetal loss, or following investigation for coagulation disorders or connective tissue disorders in the absence of a history of VTE

Antenatal clexane may already be initiated to improve pregnancy outcome for obstetric APS and in this group of women in the absence of other risk factors the overall risk of VTE is low

The risk of VTE in women with APL antibodies but no evidence of antiphospholipid syndrome (previous VTE or obstetric loss) or associated connective tissue disease is small. They should be considered as a risk factor similar to low risk heritable thrombophilias

6.4 First trimester risk factors

IVF

The risk of VTE is doubled compared to natural conception in the first trimester
Consider antenatal thromboprophylaxis with LMWH starting in the first trimester if three additional risk factors

Hyperemesis

Advise thromboprophylaxis if admitted for inpatient management

Consider thromboprophylaxis if outpatient management via hyperemesis clinic and additional risk factors or significant dehydration

Can be discontinued once hyperemesis has resolved

Ovarian hyperstimulation

Advise thromboprophylaxis starting in first trimester until resolved

Miscarriage /TOP (medical or surgical) up to 15 weeks

Risk stratification as per RCOG risk assessment tool.
If RA score 0-3 no need for thromboprophylaxis.
If admitted to hospital for overnight stay advise 7 days postnatal thromboprophylaxis
If score of 4 or more for thromboprophylaxis to commence antenatal as soon as risk identified (provided no bleeding risk), interrupt anticoagulation for procedure and continue for 7 days postnatal
Start 4 – 8 hours after miscarriage or TOP provided no bleeding risk

Obesity

Associated with a higher risk of PE than DVT, risk increasing with increasing BMI

Age

Conflicting data exists about the relative risk of VTE with advancing age. However there is good evidence that the greatest increase in risk occurs in the postpartum period

Co-morbidities

Comorbidities shown to be associated with an increased risk of VTE include

- Active inflammatory bowel disease (Crohns , Ulcerative colitis)
- SLE or other active autoimmune disease
- Significant Cardiac disease
- Type 1 diabetes with nephropathy
- Nephrotic syndrome (> 3g proteinuria/day)
- Sickle cell disease
- Haemolytic anaemia
- Previous splenectomy

- Current iv drug user
- Cancer
- Non obstetric antenatal surgery
- Immobility (> 3 days)

If uncertain as to significance of a co-morbidity please discuss with a senior obstetrician

6.5 Obstetric risk factors

- multiple pregnancy
- PET
- Caesarean section
- Prolonged labour
- Preterm birth
- PPH ≥1L or requiring transfusion
- Stillbirth
- Midcavity or rotational operative delivery

6.6 Varicose veins

Consider as risk factor for VTE if symptomatic, bilateral or above knee or associated with phlebitis, skin changes or venous stasis

6.7 Transient or new onset

- Hyperemesis or dehydration
- Ovarian hyperstimulation or IVF
- TOP or Miscarriage
- Current systemic infection e.g. UTI, pneumonia, cholecystitis
- Restricted mobility e.g. PGP, admission
- Surgical procedure in puerperium excluding immediate perineal repair
- Bone fracture
- Long haul travel > 4 hours

6.8 Admission to hospital

Significant risk factor: 18 fold increase in risk of first VTE especially in third trimester, if admission longer than 3 days and older women (over 35 yrs). There remains a small increase in risk for a month following discharge.

6.9 Smoking

The relative risk of VTE in current smokers is dependent on amount smoked.
Health care professionals need to be aware that smoking may be underreported by the woman when evaluating the VTE risk and have honest discussions with her.
The adjusted odds ratio for VTE suggests that smoking may be a stronger risk factor than maternal age.
Smoking 10-30/ day significantly increases the risk but all current smoking is associated with an increased odds ratio for VTE in pregnancy.
The strength of other risk factors needs to be taken into consideration when discussing thromboprophylaxis but as a pragmatic approach if smoking is thought to be genuinely less than 5/day then it is reasonable to consider this a weak VTE risk factor, bearing in mind that the greatest risk of VTE is in the late third trimester and the immediate postnatal period. It is better to encourage postnatal compliance with thromboprophylaxis at the period of greatest risk than to 'put her off' by unnecessary prolonged antenatal thromboprophylaxis.

7 VTE prevention during COVID-19 infection

All women with VTE risk factors during pregnancy should be advised to inform maternity healthcare professionals if they contract Covid 19 for further advice

7.1 Women who are self isolating at home but do not require hospital admission

- Should be advised to stay mobile and hydrated if possible
- Should have a new VTE risk assessment done and Covid 19 infection should be considered a transient risk factor scoring 1

- If this increases the VTE score to the threshold for thromboprophylaxis, arrangements should be made to offer and provide thromboprophylaxis until recovery from the acute illness (7-14 days)
- Arrangements for this can be made by either the PAU/MAU medical team or alternatively by contacting ANC; to arrange review of risk assessment by the appropriate Consultant team and prescription of enoxaparin. CMW to collect and deliver to patient and teach safe injection and disposal click here for full Covid in Maternity guidance
- If self isolating at home but not recovered from acute illness by 14 days with ongoing reduction in mobility or morbidity discuss need for prolonged thromboprophylaxis with Consultant Obstetric Lead for thromboprophylaxis

7.2 Women admitted to hospital with COVID-19 infection

- *Women admitted with confirmed/suspected Covid 19 infection on low flow oxygen therapy* with a low bleeding risk and low risk of imminent delivery should be offered therapeutic enoxaparin whilst an inpatient. If considered to have a bleeding risk on therapeutic doses, they should be offered low dose thromboprophylaxis if possible.
- *Women admitted with confirmed/suspected Covid 19 infection on high flow oxygen therapy* should be offered low dose thromboprophylaxis due to the risks of therapeutic anticoagulation in very unwell patients
- Women who have been hospitalised with confirmed Covid 19 should be given thromboprophylaxis for 10 days following discharge. Longer durations should be considered for women with persistent morbidity
- Women admitted with suspected or confirmed covid-19 within 6 weeks postpartum should be given thromboprophylaxis for the duration of inpatient stay and for at least 10 days after discharge. If significant morbidity consider extending to 6 weeks postnatal

8 Thrombophilia testing

Testing should only be done after discussion with Consultant Obstetrician or Haematologist with interest in obstetric haematology and only if the result would alter proposed management. Previous VTE or FH alone is not an indication for a thrombophilia test

The test should ideally be done before pregnancy.
The result should only be interpreted by a Consultant with knowledge of the effects of pregnancy on thrombophilia results
The woman should have counselling about the implications of the test for herself and other family members

Indications for testing include

- Previous unprovoked VTE – consider testing for APL antibodies
- Previous VTE and FH VTE or FH antithrombin 111 deficiency – test for antithrombin111 deficiency
- FH of unprovoked or oestrogen provoked VTE in first degree relative under the age of 50
- Where presence of a thrombophilia would alter pregnancy management

9 Care during labour and delivery for women on thromboprophylaxis

9.1 General advice

As pregnancy associated prothrombotic changes are maximal immediately following delivery it is desirable for those requiring antenatal anticoagulation to continue LMWH until labour and avoid prolonged interruptions in anticoagulation

- Low dose thromboprophylaxis with enoxaparin is not in itself a contraindication to spontaneous labour and the decision to induce labour should be based on other obstetric indications.
- In women on very high dose prophylactic or therapeutic regimes there may be an indication for induction of labour to help plan thromboprophylaxis around delivery and facilitate regional techniques. This decision should be made at Consultant level in consultation with the woman as prolonged durations off anticoagulation may confer greater risk
- Advise all women on antenatal thromboprophylaxis not to inject any further LMWH if they have bleeding, SROM or think they are in labour until they are admitted and

assessed by an Obstetrician. *Subsequent doses until discharge from hospital should be prescribed by medical staff.*

- Women on antenatal thromboprophylaxis who have attended the combined obstetric haematology clinic should have an individualised Consultant Management Plan for intrapartum and postpartum care documented in Lorenzo, and this should be followed in the absence of any contraindication
- Women with risk factors for VTE should be encouraged to remain as mobile as possible and to keep well hydrated, to include the use of intravenous fluids if necessary.

9.2 Anaesthesia / regional techniques

- Women on antenatal thromboprophylaxis should have been seen by an obstetric anaesthetist antenatally and have an anaesthetic plan in records. Inform Obstetric on call anaesthetist of admission
- Regional techniques should be avoided if possible until 12 hours after previous low prophylactic dose of enoxaparin or 24 hours after therapeutic doses to reduce the risk of epidural haematoma- discuss with senior anaesthetist
- If timing of LMWH in women in spontaneous labour precludes epidural analgesia alternative analgesic options, including remifentanil PCA can be offered according to anaesthetic plan
- LMWH should not be given for 4 hours after spinal anaesthesia or after removal of epidural catheter
- Epidural catheter should not be removed within 12 hours of the most recent injection

9.3 Induction of labour

- Low dose prophylaxis -Omit dose on day of IOL, book slot for IOL early in morning
- If the woman is on intermediate dose prophylaxis or therapeutic doses follow Consultant Management Plan from COH clinic.

9.4 Planned Caesarean Section

- Last dose low dose prophylaxis 12 hours prior to planned procedure
- Schedule as early as possible on theatre list to avoid prolonged durations off anticoagulation. This is especially true for women requiring higher dose anticoagulation.
- If anticipated delay of any significance ensure iv access and hydration with iv fluids
- First dose postnatal enoxaparin should be given 4 hours after spinal or removal of epidural catheter, if no surgical bleeding concerns. If GA and no regional technique give first dose as soon as possible postnatal depending on bleeding risk
- For women on intermediate dose prophylactic or therapeutic regimes refer to Consultant Management Plan from COH clinic.

- The increased risk of wound haematoma at C/S is around 2% and this should be reflected in the consent process.
- Women at high risk of haemorrhage e.g. PPH, surgical complications, coagulopathy, wound haematoma etc should have Intermittent pneumatic compression devices until LMWH can be commenced.

10 Thromboprophylaxis following birth

A risk assessment is required in all women immediately post birth using the postnatal specific risk assessment tool. (See appendix A)

Pregnancy associated prothrombotic changes are maximal immediately following delivery.

Thromboprophylaxis should be started or recommenced as soon as possible after birth once the immediate risk of haemorrhage is reduced

Those with PPH should be fitted with Class I thromboembolic stockings or Flowtron boots if high risk.
Those with regional analgesia: give first dose 4 hours after either insertion or removal or catheter.

10.1 Risk Factors and postnatal VTE risk assessment

Women who require postnatal thromboprophylaxis for 6 weeks include:

- All women who required antenatal thromboprophylaxis– unless otherwise indicated in Consultant Management Plan
- Previous VTE
- Asymptomatic thrombophilia and FH VTE as per COH plan
- Women identified during antenatal period as high risk for postnatal VTE needing extended thromboprophylaxis- see Consultant Management Plan
- Women with additional persistent risk factors lasting beyond 10 days postpartum eg prolonged admission, wound infection, surgery in puerperium. Thromboprophylaxis to be continued for 6 weeks or until risk factor no longer present

Women requiring thromboprophylaxis for 10/7

- BMI ≥40 irrespective of mode of delivery
- Women with 2 persisting risk factors – see risk assessment tool
- Delivery by emergency caesarean section
- Delivery by elective caesarean section if additional risk factor
- Intermediate risk for VTE – see postnatal risk assessment tool

10.2 Management

- The need for postnatal thromboprophylaxis, implications of VTE, safety for breast feeding and duration of treatment should be explained to the woman. Consent should be obtained before administration. If this is not possible due to temporary incapacity enoxaparin should be administered and consent obtained for continued use when the woman is able to have an informed discussion.
- A bleeding risk assessment should be carried out before each dose of enoxaparin to make sure there is no contraindication to administration. If unsure this should be discussed with an obstetrician
- The first dose of enoxaparin post birth should be prescribed as a stat dose to be given as soon as possible after birth provided there are no bleeding complications or anaesthetic contraindications. The aim should be to administer enoxaparin within the first few hours (or after 4 hours if regional technique) provided there are no concerns about haemorrhage
- Subsequent doses should be prescribed to coincide with the ward drug round times either in the morning or the evening
- As soon as is appropriate the woman should be taught self injection and safe disposal techniques so that she is capable of self administration and this does not delay discharge
- All women requiring postnatal enoxaparin should be given a patient information leaflet on reducing the risk of VTE
- Women delivered by Caesarean Section should be offered Anti embolism stockings in addition to LMWH (full length)
- The COCP should not be given to women with other risk factors for VTE in the first 3 months postnatally
- High risk of haemorrhage with risk factors for VTE: manage with TED stockings or pneumatic compression devices. LMWH to be commenced as soon as risk of haemorrhage reduced.

10.3 Admission to hospital within 6 weeks of pregnancy

For women who have given birth, had a Miscarriage or TOP within the last 6 weeks and are admitted to hospital:

- Risk assessment to be completed
- Offer LMWH if VTE risk > bleeding risk
- Start within 14 hours of risk assessment and continue until no longer at increased risk
- If immobilisation significantly reduced use intermittent prevention compression or TED's until normal mobility

11 Agents for Thromboprophylaxis

11.1 Low molecular Weight Heparin

Enoxaparin (Clexane) is the agent of choice for antenatal and postnatal prophylaxis, both short and long term.
Doses are based on weight at booking or the most recent weight if this is not available: see Table 2 below

Booking body wt	prophylactic dose
<50kg	20mg od
50-90 kg	40mg od
91-130 kg	60mg od
131-170kg	80mg od
>170kg	0.6mg/kg/day, may be given divided over 2 doses

Allergic skin reactions may occur and may require a change of heparin preparation – for dosing regimes for different LMWH's please refer to RCOG guidelines: Reducing the risk of Venous thromboembolism during pregnancy and the puerperium, GTG No 37a, April 2015 or discuss with haematology colleagues

Monitoring of platelet count is not required with thromboprophylactic doses unless previous exposure to unfractionated heparin

Women taking aspirin as well as low molecular weight heparin should be advised to reduce their dose of aspirin from 150mg od to 75mg od due to the synergistic effect of both preparations together

Doses may need reduction in women with severe renal impairment (Creatinine Clearance less than 30 ml/min, serum creatinine 200micromol/l)
Safe for breastfeeding

11.2 Warfarin

Warfarin crosses the placenta leading to a risk of warfarin embryopathy (nasal bridge hypoplasia, congenital heart defects, ventriculomegaly, agenesis of the corpus callosum, stippled epiphyses) in 5% of fetuses exposed between 6-12 weeks gestation. The incidence is dose dependent with a higher incidence in doses > 5mg/day.
There is also an association with spontaneous miscarriage, stillbirth, maternal and fetal haemorrhage.

There is limited data on the safety of DOACs in pregnancy and women who conceive on a DOAC should be advised to switch to LMWH as soon as possible similar to warfarin

Antenatal: Use restricted to a few situations where heparin is unsuitable eg women with mechanical heart valves

Postnatal: Women on long term anticoagulation prior to pregnancy can be converted back to Warfarin after Day 5-7 postnatal provided there is no ongoing risk of bleeding complications. If used before Day 3 there is a significant increased risk of bleeding complications. Refer to anticoagulation clinic on discharge for outpatient conversion.

Safe for breastfeeding

11.3 Unfractionated heparin

Can be considered peripartum in women at very high risk of thrombosis but should only be per advice of Obstetric Haematologist.

11.4 Antiembolism stockings

Full length Graduated compression stockings with a calf pressure of 14-15mmHg are recommended for the following:

- High risk for VTE where there is a contraindication to LMWH
- Post Caesarean Section (combined with LMWH)
- Long distance travel more than 4 hours (not just air travel)

Full length stockings are recommended as more DVT's in pregnancy are ileofemoral compared to non pregnant population and all the studies in pregnancy or postsurgical concern full length stockings. However their use postpartum can be difficult due to bloodstaining. Knee length stockings should be considered if full length stockings are ill fitting, heavily blood stained or compliance is poor.

11.5 Other agents

Aspirin is not recommended for thromboprophylaxis in obstetric patients

There is limited experience of the use of agents such as Danaparoid or Fondaparinux in patients intolerant of heparin and use should only be on the advice of a Consultant Haematologist

Dextran should be avoided because of the risk of anaphylactoid reaction

12 Contraindications/Cautions to Clexane

- LMWH's can increase bleeding if it occurs. Avoid, discontinue or delay where there is a bleeding risk, coagulopathy or platelets less than 75. Advice can be obtained from a haematologist if necessary
- Reduce aspirin dose to 75mg od from 150 mg od when taking both aspirin and LMWH
- Previous or current allergic reaction – offer alternative LMWH or alternative form of thromboprophylaxis
- Severe liver or renal disease (increased PT time, varices, reduced Creatinine clearance)
- Uncontrolled hypertension or recent haemorrhagic stroke

13 Documented risk assessment

Risk assessment in early pregnancy, on admission and postnatal should be done using the risk assessment tool on Lorenzo

Risk assessment on antenatal inpatients should be reviewed daily until discharge

Risk assessment done on admission in labour should be documented in the labour risk assessment tool

Once risk assessment scoring has been undertaken decisions about thromboprophyalxis should be made using the appropriate obstetric thromboprophylaxis management tool (antenatal or postnatal) (see Appendix A)

14 Monitoring Compliance and Effectiveness

An annual audit of compliance to aspects of this guideline is recommended. Examples of auditable topics include:

- Completion of VTE risk assessment and appropriate management of thromboprophylaxis in gynae service
- Completion of risk assessment at booking, on admission to ward or postdelivery
- Timing of postnatal thromboprophylaxis
- Avoidable/unavoidable HAT (ongoing through Trust Thrombosis Committee)
- Antenatal admissions thromboprophylaxis

15 References

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MRA

Please Specify Site QHB ☐ SJH ☐ SRP ☐ RDH ☐ FNCH ☐

NHS
University Hospitals of Derby and Burton
NHS Foundation Trust

VTE RISK ASSESSMENT - DURING AND UP TO 6 WEEKS AFTER PREGNANCY

patient sticker

Risk assessment completed at:

- ☐ Booking
- ☐ Admission:
- ☐ Post delivery
- ☐ Post TOP
- ☐ Post miscarriage
- ☐ Other (state):

PRE-EXISTING RISK FACTORS		
Previous VTE	4	
Previous VTE provoked by major surgery	3	
Known high risk thrombophilia	3	
Medical comorbidities (see list)	3	
BMI ≥40	2	
BMI ≥30 but <40	1	
Known low risk thrombophilia without VTE	1	
Family history VTE in first degree relative	1	
Age >35 years	1	
Parity ≥3	1	
Smoker	1	
Gross varicose veins	1	
CURRENT OBSTETRIC RISK FACTORS		
Caesarean section in labour	2	
Caesarean section - elective	1	
ART/IVF (first trimester risk only)	1	
Pre-eclampsia in current pregnancy	1	
Multiple pregnancy	1	
Prolonged labour >24 hours	1	
Mid-cavity or rotational operative delivery	1	
Postpartum Haemorrhage >1 litre or blood transfusion	1	
Preterm birth <37 weeks gestational age	1	
Stillbirth	1	
NEW ONSET/TRANSIENT FACTORS		
Surgical procedure in pregnancy or puerperium	3	
Hyperemesis	3	
Ovarian Hyperstimulation Syndrome (1st trimester)	4	
Current systemic infection	1	
Immobility, dehydration	1	
Covid-19 infection	1	
Cumulative VTE Risk Score		

Comorbidities include:
Significant cardiac disease
SLE or other autoimmune disease
Active IBD (Crohns or UC)
Nephrotic syndrome (>3g proteinuria/24 hours)
Type I diabetes with nephropathy
Sickle cell disease
Current intravenous drugs user
Cancer
Haemolytic anaemia
Previous splenectomy
Other: if unsure, consult COH

High risk thrombophilia:
Antithrombin deficiency
Protein C or S deficiency
Homozygous Factor V Leiden gene
Compound defects

Low risk thrombophilia:
Factor V Leiden gene (heterozygous)
Prothrombin gene mutation (heterozygous)
APL antibodies (without previous VTE)

Gross varicose veins defined as:
symptomatic, bilateral, above the knee or associated with phlebitis, oedema or skin changes

BLEEDING RISK ASSESSMENT	
Haemophilia or other known bleeding disorder	
Active antenatal or postpartum bleeding	
Considered increased risk of major haemorrhage	
Thrombocytopenia with a platelet count ≤75	
Acute stroke in previous 4 weeks	
Severe renal disease	
Severe liver disease	
Uncontrolled hypertension	
Considered risk of intra abdominal bleeding (e.g. PUL)	
Bleeding risk:	YES/NO
Hypersensitivity to Heparin/LMWH:	YES/NO

MANAGEMENT PLAN

Outpatient prophylaxis

Cumulative score		Thromboprophylaxis
≥4	Antenatal	Advise from first trimester
3	Antenatal	Advise from 28 weeks
≥2	Postnatal	Advise as soon as possible post birth for at least 10 days
≥4	Post TOP / miscarriage	Advise to start 4-8 hours following event and continue for at least 7 days

Inpatient prophylaxis

Cumulative score	Thromboprophylaxis
For all antenatal inpatient admissions, including gynae in pregnancy	Offer unless contraindicated
Admissions within 6 weeks of birth, TOP or miscarriage	Offer if VTE risk is higher than bleeding risk, within 14 hours of admission

Dosing regime - prophylactic LMWH

<50k	Consider 20 mg Enoxaparin once daily
50-90kg	Consider 40 mg Enoxaparin once daily
91-130kg	Consider 60 mg Enoxaparin once daily
131-170kg	Consider 80 mg Enoxaparin once daily
>170kg	Consider 0.6mg/kg Enoxaparin, may be given divided over 2 doses

If a bleeding risk is identified: discuss the balance of risks of bleeding and clotting in consultation with a Consultant

Date:	Name:
Time:	Designation:
	Signature:

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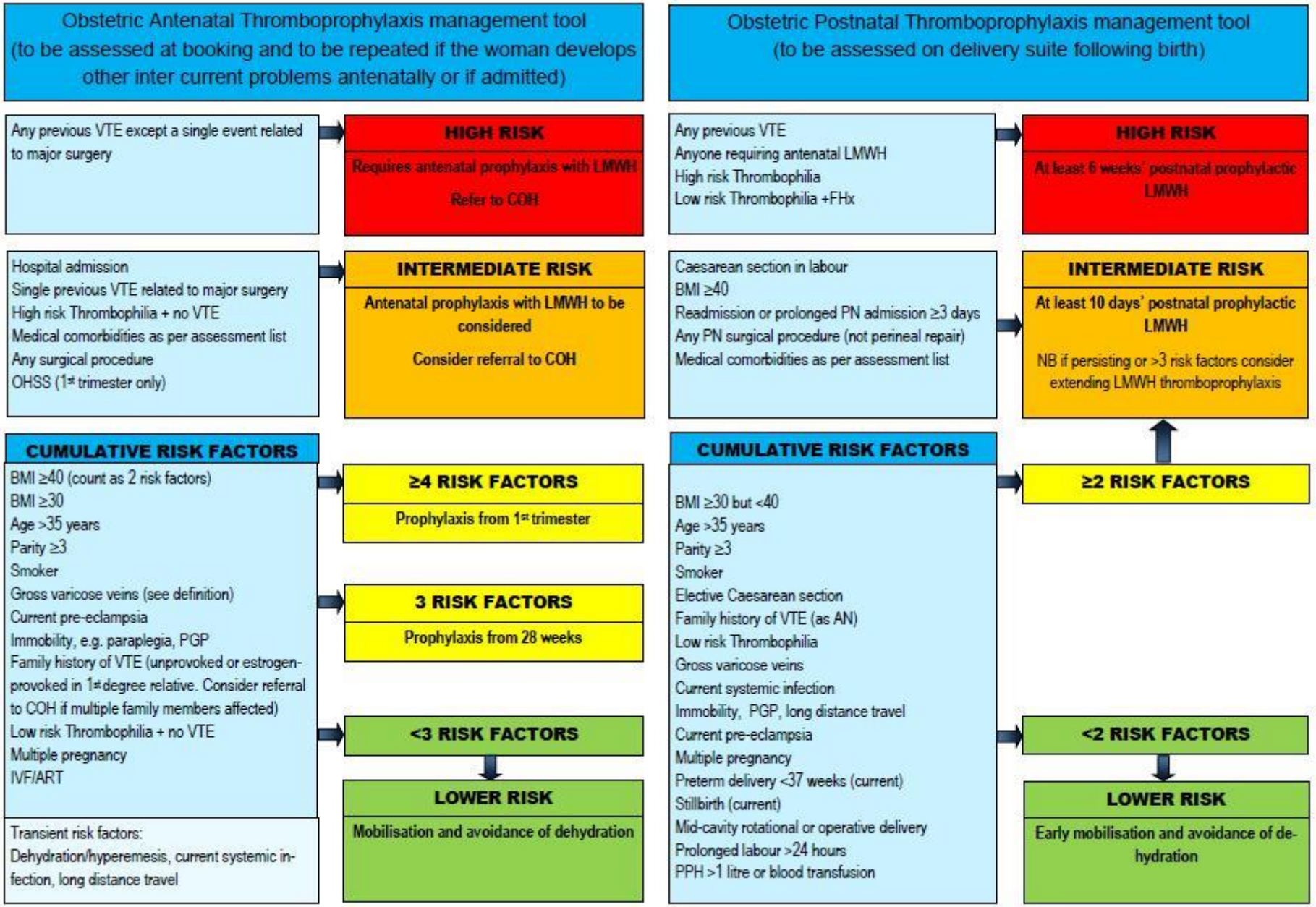
Derby campus WPH1799 lgtl


Obstetric Antenatal Thromboprophylaxis management tool
(to be assessed at booking and to be repeated if the woman develops other inter current problems antenatally or if admitted)
Any previous VTE except a single event related to major surgery
HIGH RISK
Requires antenatal prophylaxis with LMWH
Refer to COH
Hospital admission
Single previous VTE related to major surgery
High risk Thrombophilia + no VTE
Medical comorbidities as per assessment list
Any surgical procedure
OHSS (1st trimester only)
INTERMEDIATE RISK
Antenatal prophylaxis with LMWH to be considered
Consider referral to COH
CUMULATIVE RISK FACTORS
BMI ≥40 (count as 2 risk factors)
BMI ≥30
Age >35 years
Parity ≥3
Smoker
Gross varicose veins (see definition)
Current pre-eclampsia
Immobility, e.g. paraplegia, PGP
Family history of VTE (unprovoked or estrogen-provoked in 1st degree relative. Consider referral to COH if multiple family members affected)
Low risk Thrombophilia + no VTE
Multiple pregnancy
IVF/ART
Transient risk factors:
Dehydration/hyperemesis, current systemic infection, long distance travel
≥4 RISK FACTORS
Prophylaxis from 1st trimester
3 RISK FACTORS
Prophylaxis from 28 weeks
<3 RISK FACTORS
LOWER RISK
Mobilisation and avoidance of dehydration
Obstetric Postnatal Thromboprophylaxis management tool
(to be assessed on delivery suite following birth)
Any previous VTE
Anyone requiring antenatal LMWH
High risk Thrombophilia
Low risk Thrombophilia +FHx
HIGH RISK
At least 6 weeks' postnatal prophylactic LMWH
Caesarean section in labour
BMI ≥40
Readmission or prolonged PN admission ≥3 days
Any PN surgical procedure (not perineal repair)
Medical comorbidities as per assessment list
INTERMEDIATE RISK
At least 10 days' postnatal prophylactic LMWH
NB if persisting or >3 risk factors consider extending LMWH thromboprophylaxis
CUMULATIVE RISK FACTORS
BMI ≥30 but <40
Age >35 years
Parity ≥3
Smoker
Elective Caesarean section
Family history of VTE (as AN)
Low risk Thrombophilia
Gross varicose veins
Current systemic infection
Immobility, PGP, long distance travel
Current pre-eclampsia
Multiple pregnancy
Preterm delivery <37 weeks (current)
Stillbirth (current)
Mid-cavity rotational or operative delivery
Prolonged labour >24 hours
PPH >1 litre or blood transfusion
≥2 RISK FACTORS
<2 RISK FACTORS
LOWER RISK
Early mobilisation and avoidance of dehydration

Patient Information

Reducing the risk of venous thrombosis (blood clots) in pregnancy and after birth

This information is about reducing the risk of a venous thrombosis if you are thinking about having a baby, are already pregnant or have just had a baby. If you need information on the diagnosis and treatment of venous thrombosis during pregnancy or after birth, please see the RCOG information 'Diagnosis and treatment of venous thrombosis in pregnancy and after birth' (www.rcog.org.uk/en/patients/patient-leaflets/treatment-of-venous-thrombosis-in-pregnancy-and-after-birth).

What is venous thrombosis?

Thrombosis is a clot in a blood vessel (a vein or an artery). Venous thrombosis occurs in a vein. Veins are the blood vessels that take blood back to the heart and lungs, whereas arteries take the blood away. A deep vein thrombosis (DVT) is a blood clot that forms in a deep vein of the leg or pelvis.

How common is it in pregnancy?

Pregnant women are 10 times more likely to develop venous thrombosis than women that are the same age and not pregnant. You are at highest risk of getting a DVT just after the birth of your baby, but it can occur at any time during your pregnancy, including the first 3 months. Therefore it is important to see your midwife early in pregnancy.

Why is a DVT serious?

Venous thrombosis can be serious because the clot may break off and travel in the blood stream until it reaches another part of the body such as the lungs and block blood vessels. This is called a pulmonary embolism (PE) and can be life threatening. However, dying from a PE is very rare in women who are pregnant or who have just had a baby.

Symptoms of a DVT may include:

- A red and hot swollen leg
- Swelling in your entire leg or just part of it
- Pain and/or tenderness - you may only experience this when standing or walking or it may just feel heavy

Seek advice immediately from your doctor or midwife if you notice one or more of these symptoms. Diagnosing and treating a DVT reduces the risk of developing a PE.

During pregnancy, swelling and discomfort in both legs is common and does not always mean there is a problem. Always ask your doctor or midwife if you are worried.

The symptoms of pulmonary embolism (PE) may include:

- Sudden unexplained difficulty in breathing
- Tightness in the chest or chest pain
- Coughing up blood (haemoptysis)
- Feeling very unwell or collapsing

Seek help immediately if you experience any of these symptoms. Always ask your doctor or midwife if you are worried.

What increases my risk of DVT or PE?

Your risk of developing a venous thrombosis is further increased if any of the following apply to you:

Before pregnancy if you:

- Have had a previous venous thrombosis
- Are over 35 years of age
- Have already had 3 or more babies
- Have a mother, father, brother or sister who has had a venous thrombosis
- Have a condition called thrombophilia, which makes a blood clot more likely
- Have a medical condition such as heart disease, lung disease or arthritis - your doctor or midwife will be able to tell you whether any medical condition you have increases your risk of a DVT/PE
- Have severe varicose veins that are painful or above the knee with redness/swelling
- Are a wheelchair user

Lifestyle if you:

- Are overweight with a body mass index (BMI) over 30, are a smoker or if you use intravenous drugs

During pregnancy if you:

- Are admitted to hospital
- Are carrying more than one baby (multiple pregnancy)
- Become dehydrated or less mobile in pregnancy due to, for example, vomiting in early pregnancy, being in hospital with a severe infection such as appendicitis or a kidney infection or if you are unwell from fertility treatment (ovarian hyperstimulation syndrome)
- Are immobile for long periods of time, for example after an operation or when travelling for 4 hours or longer (by air, car or train)
- Have severe pre-eclampsia

After the birth of your baby if you:

- Have had a very long labour (more than 24 hours) or have had a caesarean section
- Had your baby before 37 weeks pregnancy
- Have lost a lot of blood after you have had your baby or receive a blood transfusion

Can I reduce the risk of getting a DVT or PE?

You may be able to reduce your risk, as most DVTs and PEs that occur during pregnancy and after birth are preventable.

You will have a risk assessment during pregnancy and after you have had your baby, during which your doctor or midwife will ask you whether you have any of the risk factors mentioned above. This helps to decide whether you would benefit from preventive treatment. This will depend on which risk factors you have and how many.

Some risk factors, such as a previous thrombosis, are significant enough on their own for preventative treatment to be recommended. Other risk factors may not be enough on their own for you to require treatment. Your doctor or midwife will talk with you about your risk factors and explain why treatment may be advised in your case.

If you are diagnosed with a DVT, your doctor will offer you treatment to reduce the risk of a PE occurring.

When will my risk be assessed?

Before pregnancy

If you have any of the risk factors listed above and are planning a pregnancy you should talk to your GP. You may need to see an obstetrician early in pregnancy to discuss starting treatment.

If you have previously had a DVT or PE or have thrombophilia, your GP can arrange a hospital appointment with a doctor who specialises in thrombosis in pregnancy.

If you are already taking **warfarin** to treat or prevent venous thrombosis, you may be advised to change to heparin injections. This is because warfarin can be harmful to your unborn baby. Most women are advised to change as early as possible in pregnancy (before 6 weeks). For some women, warfarin may be the only option. Talk to your doctor before you become pregnant so that any changes can be planned to keep you and your baby as healthy as possible.

During and after pregnancy

Your midwife will carry out a risk assessment at your first antenatal booking. This will be repeated if your situation changes during your pregnancy and/or if you are admitted to hospital. It will also be repeated after your baby is born.

Can my risk change?

Yes. Your risk can either increase or decrease.

Your risk can increase if you develop other factors, such as becoming unwell, developing severe varicose veins, travelling for over 4 hours or having a complicated birth. In this case you may be advised to start taking treatment.

Your risk can also decrease for example if you stop smoking. Treatment may then no longer be necessary.

How can I reduce my risk of getting a DVT or PE?

There are steps you can take to reduce your risk such as:

- ☑ Staying as active as you can and remain as mobile as possible
- ☑ Keeping hydrated by drinking normal amounts of fluids
- ☑ Stopping smoking if you smoke
- ☑ Losing weight before pregnancy if you are overweight

Some women may benefit from wearing special stocking and your doctor or midwife will suggest these if they think they are appropriate for you (it is not advisable to use them if not prescribed).

You may be advised to start treatment with injections of heparin (an anticoagulant) used to thin the blood. There are different types of heparin. For most women, the benefits of heparin are that it reduces the risk of a venous thrombosis or a PE developing.

What does heparin treatment involve?

Heparin is given as an injection under the skin (subcutaneous) at the same time every day (sometimes twice daily). The dose is worked out for you depending on your risk factors and your weight in early pregnancy or before you became pregnant.

You may be on a low dose or a high dose regime. You/a family member will be shown how and where in your body to give the injections. You will be provided with the needles and syringes (already made up) and will be given advice on how to store and dispose of these.

Are there any risks to my baby and me from heparin?

Heparin does not cross the placenta to the baby and so is safe to use when you are pregnant. Heparin is also safe to use when breastfeeding.

There may be some bruising when you inject, this will usually fade in a few days. One or two women in every 100 will have an allergic reaction. If you notice a rash after injecting, inform your doctor so that the type of heparin can be changed.

How long will I need to take heparin?

The length of time you will be advised to stay on heparin depends on your risk factors and whether your situation changes. Treatment may be recommended for only a few days to cover long-distance travel, or may be recommended for the 10 days after delivery. Sometimes, treatment may be recommended for the whole of your pregnancy and for up to 6 weeks after the birth.

What should I do when I am on heparin treatment and labour starts?

If you think you are going into labour, do not have any more injections. When you call the hospital in (early) labour, or because you think your waters have broken always tell them that you are on heparin treatment. They will advise you what to do.

An epidural injection (a regional anaesthetic injection given in the space around the nerves in your back to numb your lower body) cannot be given until 12 hours (24 hours if you are on a high dose) after your last injections. You will have the option of alternative pain relief.

If the plan is to induce labour or you are having a planned caesarean birth, you should stop your injections 12 hours before the planned date. You may be advised to stop 24 hours before if you are on a high dose, ask your doctor or midwife if you are not sure.

If your baby needs to be born by emergency caesarean section within 12 hours (or 24 if you are on a high dose) of your last injection you will not be able to have an epidural or spinal injection and instead will need a general anaesthetic.

What happens after birth?

It is important to be as mobile as possible after you have had your baby and to avoid becoming dehydrated.

A risk assessment will be carried out after the birth of your baby. If you were on heparin before the baby's birth, you will usually need to continue this for 6 weeks afterwards. Even if you weren't having injections in pregnancy, you may need to start having them for the first time after birth, but usually for a shorter duration.

If you were taking warfarin before pregnancy and have changed to heparin during pregnancy you can change back to warfarin usually within a week after birth. The timing will be recommended by your obstetrician. Heparin and warfarin are both safe during breastfeeding.

Contraception that contains oestrogen such as the combined pill can add to your risk of DVT. If you have needed heparin treatment because you were considered to have a high risk of DVT, you are advised **not** to use oestrogen for at least 3 months following birth. Your GP/obstetrician can advise you on other options for birth control.

This leaflet is based on the RCOG Patient Information leaflet: Reducing the risk of thrombosis and embolism during pregnancy and the puerperium. The information has been amended to reflect local clinical practice and guidelines at the University Hospitals of Derby and Burton NHS Foundation Trust.

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Documentation Control

Reference Number: UHDB/Obs/07:23/T1	**Version:** **UHDB version 2**		**Status: FINAL**	
Version Amendment	Version	Date	Author	Reason
	1	Dec 2009	Miss RJ Hamilton	New guideline
	2	Nov 2011	Miss RJ Hamilton - Consultant Obstetrician	Updated in line with NICE/RCOG recommendations And merge of the 2 guidelines: • Thromboprophylaxis during pregnancy, labour and after vaginal delivery • Prophylaxis against thromboembolism in Caesarean Section.
	3	Oct 2017	Miss RJ Hamilton - Consultant Obstetrician	Updated in line with RCOG recommendations
UHDB Version	1			NO DOCUMENT CHANGES QHB ADOPTED
UHDB	1.1	May 21	Miss RJ Hamilton - Consultant Obstetrician	Covid-19 VTE guidance added
	2	March 2023	Miss RJ Hamilton - Consultant Obstetrician	Updated in line with RCOG Dec 2022. (miscarriage/TOP; Covid admission in 6 weeks PN period; aspirin dose when taking LMWH; DOACs)

Intended Recipients: All staff with responsibility for caring for women in the Antenatal period	
Training and Dissemination: Cascaded through lead midwives/doctors / Published on Intranet NHS mail circulation / Article in BU newsletter	
To be read in conjunction with: Acute management of VTE during pregnancy (T1) Caesarean Section Guidelines (C7) Covid in Maternity	
Consultation with:	Dr A McKernan – Consultant Haematologist
Business Unit Sign off:	02/05/2023: Maternity Guidelines Group: Miss S Rajendran – Chair 19/06/2023: Maternity Governance Group – Mr R Deveraj
Notification Overview sent to TIER 3 Divisional Quality Governance Operations & Performance: 20/06/2023	
Implementation date:	10/07/2023
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Key Contact:	Joanna Harrison