Investigation and Management of VTE in Pregnancy and Puerperium

University Hospitals of Leicester NHS
NHS Trust

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Related documents

Thromboprophylaxis in Pregnancy Labour and Vaginal Delivery UHL Obstetric Guideline

Pulmonary Embolism (PE) Suspected or Confirmed UHL Policy

Direct Oral Anticoagulant (DOAC) for Deep Vein Thrombosis (DVT) or Pulmonary Embolism (PE) UHL Guideline

Oral Anticoagulation with Warfarin and Coumarins UHL Guideline

Assessment and Treatment of Patients with Suspected - Confirmed Deep Vein Thrombosis (DVT) UHL Guideline

Thromboprophylaxis for Venous Thromboembolism UHL Guideline

Pregnant Women Admitted Outside the Maternity Unit UHL Obstetric Guideline
VTE Prophylaxis Investigation Management and Anticoagulation UHL Guidelines

1. Introduction and Who Guideline applies to

This guideline is intended for the use by Staff groups involved in the care of women with a suspected VTE in pregnancy (after 16 weeks gestation) or puerperium, who are under the care of UHL Maternity Services.

For women presenting with suspected VTE prior to 16 weeks gestation, please refer to the Pregnant Women Admitted Outside the Maternity Unit UHL Obstetric Guideline UHL Ref: B32/2011

This guideline is NOT intended for use in the treatment of acute massive Pulmonary Embolism (Please see Unexplained Intra or Postpartum Collapse UHL Obstetric Guideline UHL Ref: C44/2011).

Background:

Venous thromboembolism (VTE) remains one of the leading causes of maternal mortality. However, the increase identification of women at risk of VTE, and use of thromboprophylaxis has reduced the mortality rate which is currently 0.8:100,000.VTE is up to ten times more common in pregnant than in non-pregnant women of the same age. The UHL maternity services would expect to see approximately one confirmed diagnosis per month, with many more patients being investigated on the grounds of clinical suspicion. VTE can occur at any time but the puerperium is the time of highest risk, with estimates of the relative risk approximately 20 fold. 50% of VTE occur in the first postpartum week[2].

The diagnosis remains a clinical and radiological

challenge. Pregnancy increases the risk of VTE.

When assessing patients, it is important to be aware of the normal physiological changes that occur in pregnancy and use this knowledge to accurately interpret the history and clinical examination.

Common physiological changes include:

- Lower leg swelling
- 60% of women will report a feeling of breathlessness at some point during pregnancy, this is classically described as “a hunger for air” [4]

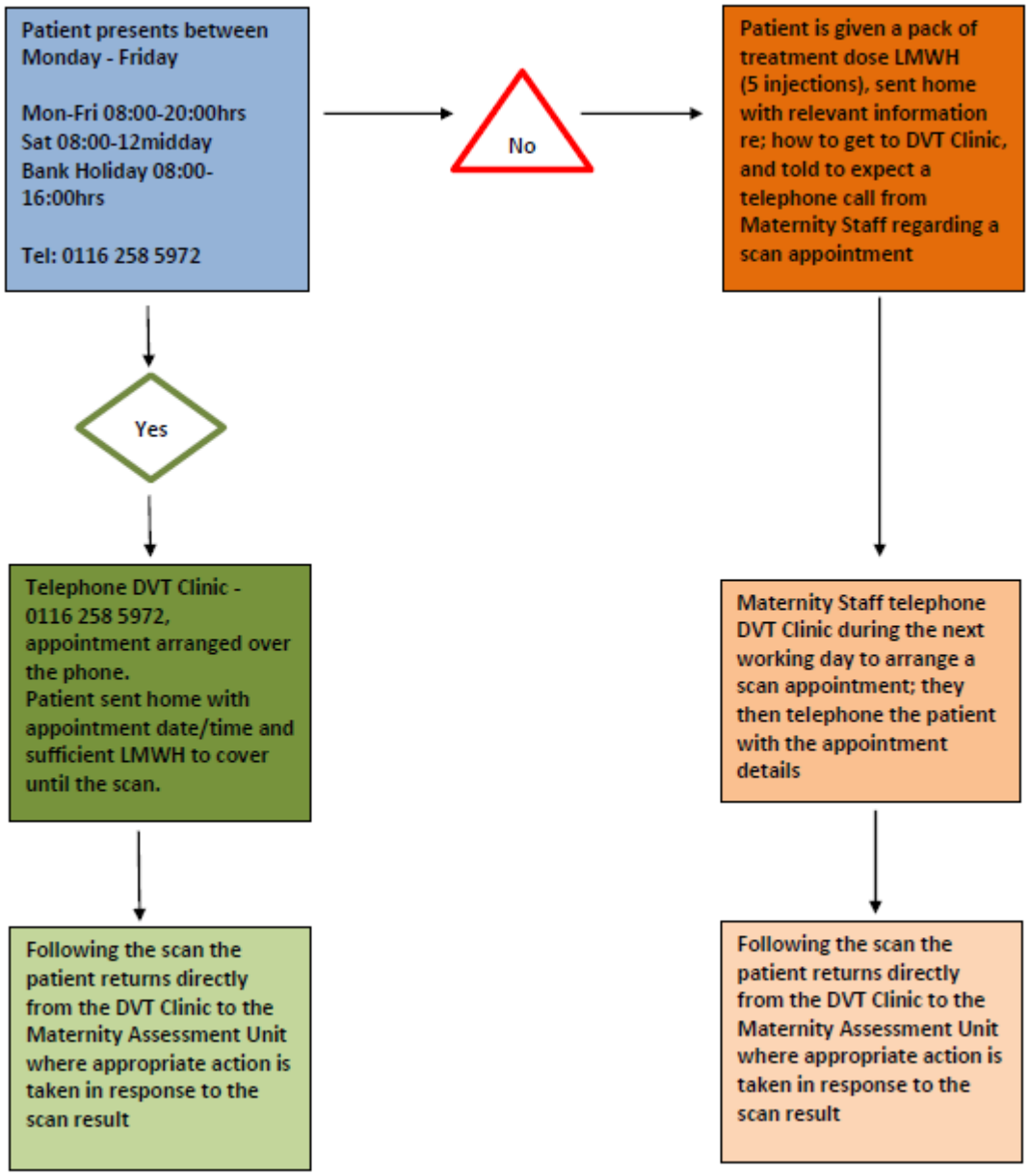
Full history, clinical examination and appropriate interpretation of investigations are essential to minimize the use of ionizing radiation during pregnancy and lactation.

These guidelines have been produced to help give clear direction for clinicians investigating suspected VTE in pregnancy.

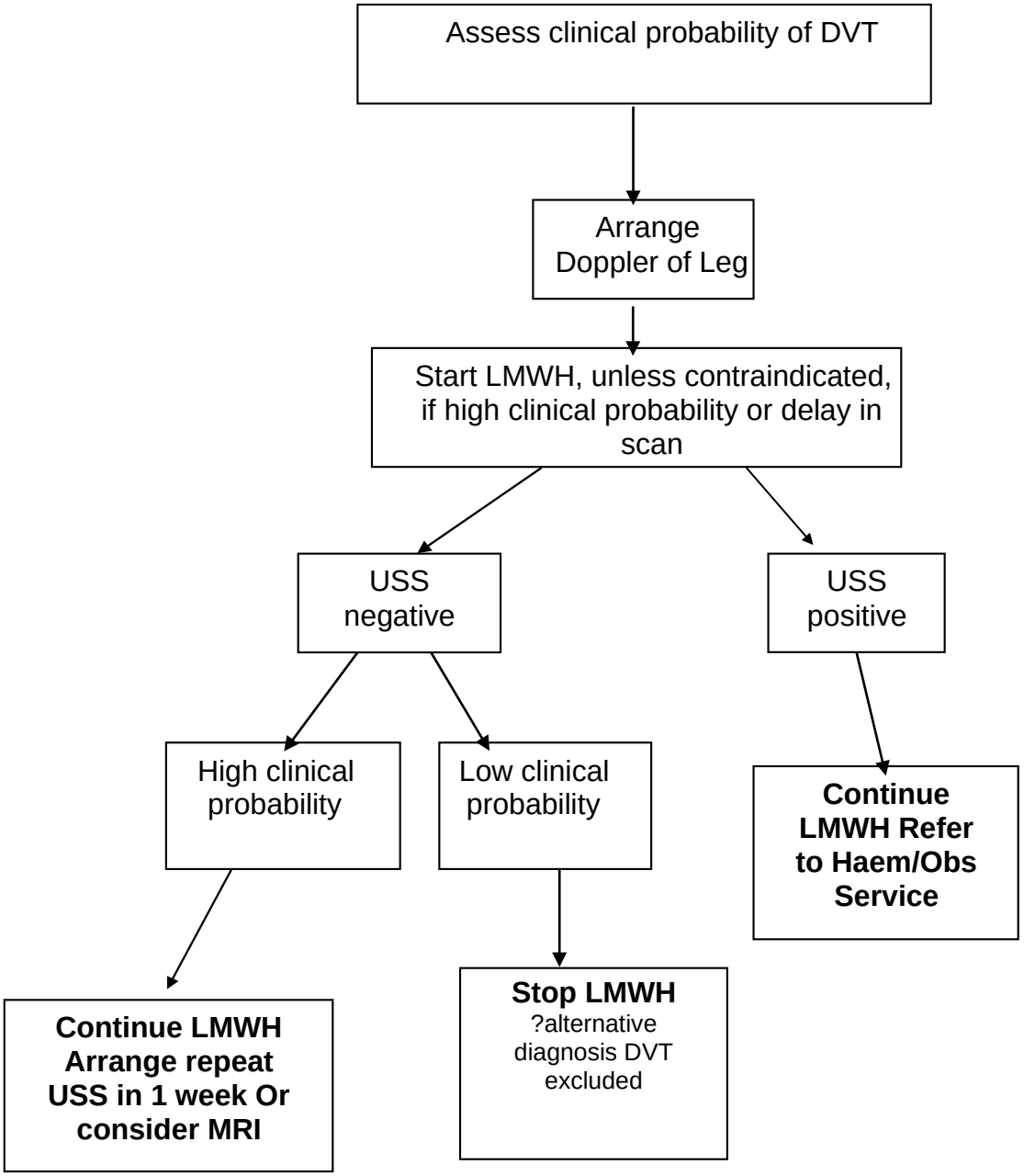
What’s new

- LMWH of choice changed from Dalteparin to Enoxaparin throughout the document

DVT referral & initial assessment



DVT ALGORITHM (≥16/40 gestation)



2. Guideline Standards and Procedures

Summary Recommendations

1. All patients with suspected VTE should be thoroughly assessed and investigated appropriately.
2. As part of the history, risk factors for VTE should be identified and a risk score should be documented.
3. There is no role for D-dimer in the investigation of pregnant patients with suspected VTE as D- dimer rises physiologically in pregnancy.
4. Suspected DVT should be investigated as in non-pregnant patients with compression duplex ultrasonography.
5. Treatment with low molecular weight heparin (LMWH) should be started prior to diagnosis if high clinical probability or when there is a delay in diagnostic imaging, unless anticoagulation is strongly contraindicated.
6. Where there is clinical suspicion of acute PE, a chest X-ray and ECG should be performed in the first instance.
7. Women should be involved in the decision to undergo CTPA or VQ scanning. Informed consent must be obtained before these tests are requested and undertaken and a sticker placed in the notes confirming acquired consent.
8. Ventilation and Perfusion scan (VQ) should be the investigation of choice if all the following criteria are met:
    a. normal CXR
    b. absence of cardio-respiratory disease
    c. no previous history of PE
9. CTPA should be used if any one of the following criteria are met;
    a. suspected massive PE
    b. indeterminate V/Q scan
    c. Significant cardio-respiratory disease or abnormal CXR In the case of renal failure (eGFR <45), discuss with the duty radiologist as to which test to perform.
10. Echocardiography reliably identifies massive PE and may be appropriate if the patient is on the Delivery Suite
11. Breast milk should be expressed and discarded for 24 hours after the CTPA or VQ scan due to the presence of Iodine in CTPA contrast and radioactivity from the V/Q scan.

Investigation of suspected DVT in pregnancy

1. All imaging requests must be completed on ICE and where there is urgency or uncertainty of the type of investigation should be discussed with the duty radiologist.
2. **All patients with suspected DVT should have the risk factors for VTE identified.** A

formal VTE risk assessment should be performed using the scoring system on the MEOWS chart and clearly recorded in the patient's notes.

3. **Suspected DVT should be investigated with compression duplex ultrasonography**. A clinical examination of the legs should be documented including measurement of both calves. If Iliofemoral DVT (symptoms are back/abdominal pain and whole leg swelling) is usually diagnosed by duplex ultrasonography but if this is negative and there is persistent high clinical suspicion magnetic resonance venography or contrast venography should be considered.
4. **There is no role for D-dimer assay in the investigation of suspected DVT in pregnancy.** D- dimers are elevated during normal pregnancy and delivery by caesarean section, PPH and pre- eclampsia cause further increase in levels, making it difficult to interpret results.
5. **If high clinical probability of DVT or delay in diagnostic imaging of more than 6 hours, start LMWH (treatment dose).** This should be following discussion with the patient about the risks and benefits of commencing treatment. If the patient has other medical complications e.g. renal disease, significant hypertension it is good practice to ensure renal and hepatic function are normal prior to starting LMWH
6. **If patients are stable and their symptoms are mild, it is appropriate to manage them as outpatients (see algorithm).** If patients are >36 weeks pregnant, caution must be used when managing as an outpatient with a full analysis of the risk of going into labour whilst on treatment doses of LMWH.
7. **In cases of suspected DVT:**

In low clinical probability patients;

a. **If ultrasound scan is negative, stop LMWH and consider alternative diagnosis.** DVT excluded
b. **If ultrasound scan is positive, continue LMWH and refer to Haematology/Obstetric clinic**

In high clinical probability patients;

a. **If ultrasound scan is negative, continue LMWH and repeat scan in one week or consider MRI of leg**. Caution with MRI scanning in first trimester.
b. **If ultrasound scan is positive, continue LMWH and refer to Haematology/Obstetric clinic**

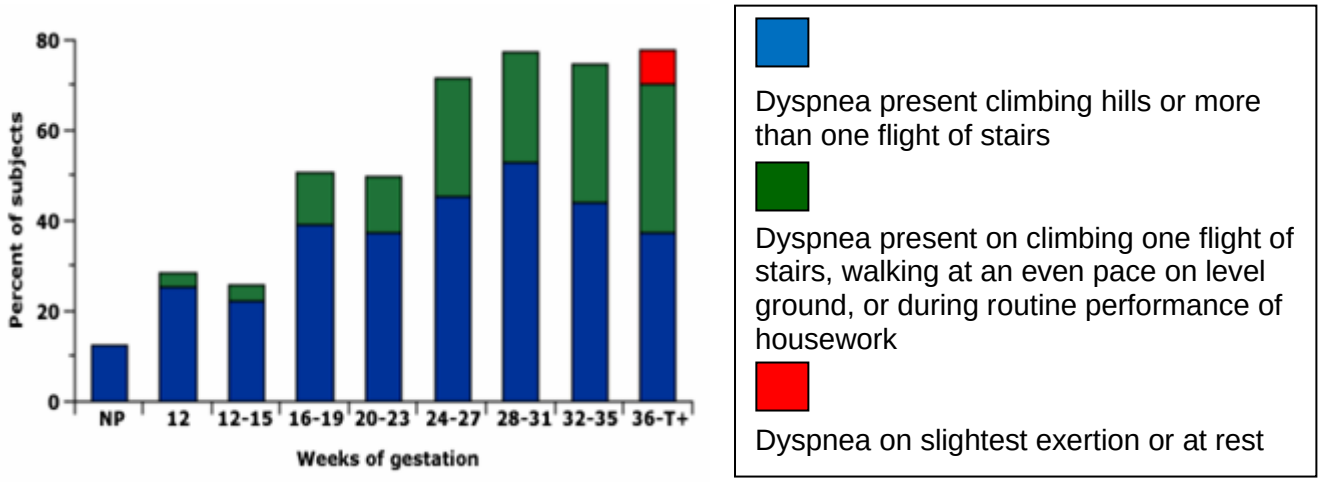
All women who are managed as outpatients should return to MAU at LRI following compression duplex ultrasonography for a review, even if the scan is negative.

8. Ultrasound scanning may diagnose superficial venous thrombosis or superficial thrombophlebitis. Please see Appendix V for the management algorithm.

Investigation of suspected PE in pregnancy

60-70% of women experience dyspnea (shortness of breath) during the course of a normal pregnancy. This can start in the first trimester can increases in frequency in the second trimester and is then stable during the third trimester.

Graph showing frequency of dyspnea in pregnancy [5]



1. **All patients with suspected PE should have their risk factors for VTE identified**. A formal VTE risk assessment should be performed using the scoring system on the MEOWS chart and clearly recorded in the notes.

2. The shortness of breath associated with normal pregnancy changes, has a gradual onset. In contrast, dypnea associated with pulmonary embolism is sudden in onset and can be associated with increased respiratory rate, pleuritic chest pain and haemoptysis.

3. **Where there is clinical suspicion of an acute PE, a chest X-ray should be performed.** The chest X-ray may identify other pulmonary disease such as pneumonia, pneumothorax or lobar collapse.

4. **Where there is clinical suspicion of acute PE an ECG should be performed**. In the pregnant population, ECG abnormalities are more common. One study reported ECG abnormalities in 41% of women with acute PE [3].The most common abnormalities were T wave inversion (21%), S1Q3T3 pattern (15%) and right bundle branch block (18%).

5. **Arterial blood gases are indicated if oxygen saturation is ≤96%.** A mild, compensated respiratory alkalosis is normal in pregnancy, with a higher pO2 and a lower pCO2.

6. **There is no role for D-dimer assay in the investigation of suspected PE in pregnancy**. D- dimers are elevated during normal pregnancy and delivery by caesarean section, PPH and pre- eclampsia cause further increase in levels, making it difficult to interpret results.

7. **If the patient has signs consistent with both a DVT AND PE, investigate according to the DVT pathway.** If confirmed DVT on ultrasound in presence of symptoms consistent with PE, then assume the patient has a PE without further investigation. This reduces the need for imaging involving additional radiation without adversely affect the patient's management.

8. **Patient should be reviewed after chest X-ray, ECG +/- Arterial blood gas by an ST4 or above.** This review is important to collaborate the history, examination findings and investigation results to assess if PE is a likely diagnosis or another diagnosis is more likely.

9. **Women should be involved in the decision to undergo CTPA or VQ scanning. Informed consent must be obtained before these tests are undertaken and the**

relevant sticker placed in the notes. Ventilation/Perfusion (V/Q) scanning is associated with reduced radiation to the maternal breasts but increased radiation risks to the fetus, particularly in early pregnancy. The estimated risk of fatal cancer to age 15 is 1/280,000 following in utero exposure by V/Q scanning. In contrast, CTPA whilst reducing the radiation risks to the fetus to around 1/1,000,000 of fatal cancer up to the age of 15 increases the radiation to the maternal breasts. 10 mGy of radiation is estimated to increase the risk of breast cancer by 13.6% above the background risk of around 0.5%. An average CTPA is 20 mGy. Breast tissue is especially sensitive to radiation exposure during pregnancy. In addition, special consideration should be given to women with a family history of breast cancer. V/Q scanning has a high negative predictive value. CTPA scans however have a better sensitivity and specificity and in addition may detect other pathology e.g. dissection but may miss peripheral PEs. Iodine based IV contrast is given during CTPA. The effects of iodine on the fetus is still uncertain.

10. **Ventilation and Perfusion scan (VQ) should be the investigation of choice if all the following criteria are met:**
    a) normal CXR
    b) absence of cardio-respiratory disease
    c) no previous history of PE

11. **CTPA should be used if any one of the following criteria are met;**
    a) suspected massive PE
    b) indeterminate V/Q scan
    c) c. Significant cardio-respiratory disease or abnormal CXR In the case of renal failure (eGFR <45), discuss with the duty radiologist as to which test to perform.
    d) Positive COVID test in the last 6 months

12 Echocardiography reliably identifies massive PE and may be appropriate if the patient is on Delivery Suite

13 Treatment with LMWH should be started prior to diagnosis if high clinical probability or delay in diagnostic imaging, unless strong contraindication to this treatment. This should be following discussion with the patient about risk and benefits of commencing treatment. This discussion should be documented in the patient's notes. Prior to starting LMWH it is good practice to ensure renal and hepatic function are normal, this is especially important in women with co-morbidities such as diabetic nephropathy.

14 Breast milk should be discarded for 24 hours after either CTPA or VQ scan.

Management of VTE in Pregnancy, Intrapartum and Puerperium

Prompt and adequate treatment of confirmed VTE in pregnancy and puerperium is essential to reduce further morbidity as well as mortality.

Once a diagnosis has been confirmed inform the Haematology Nurse/Midwife. The Haematology Nurse/Midwife will see the patient on the next working day.

Summary Recommendations

1. **In the absence of contraindications, treatment is with subcutaneous Low Molecular Weight Heparin (LMWH).**

2. **Anticoagulation for the remainder of the pregnancy is with subcutaneous LMWH.** Grade II compression stockings should be prescribed and advice on leg-care given.

3. **An intrapartum care plan should be documented in the patient's notes.** This should be discussed in detail with the patient.

4. **Patients should complete at least 3-6 months of full anticoagulation. This should include anticoagulation during the 6 week post-partum period.**

5. **If the event of massive PE;**
    a. **IV unfractionated heparin is the treatment of choice if there is cardiovascular compromise. This should be initiated by a bolus of 5000 units of IV unfractionated heparin.**

    b. **An ECHO or CTPA should be arranged within 1 hour**

    c. **Consider thrombolysis if there is severe hypotension or shock**

Management of VTE in pregnancy (≥16/40 gestation)

In the absence of contraindications treatment is with subcutaneous Low Molecular Weight Heparin (LMWH). Please see Appendix 2 for choice of LMWH in pregnancy.. None of the LMWHs are licensed for use in pregnancy however the updated Green Top Guidelines from the RCOG state that 'More recent studies provide further evidence for the safety and efficacy of dalteparin, enoxaparin and tinzaparin for prophylaxis in pregnancy'.

1. If there is a contra-indication to treatment with LMWH, such as a previous history of allergy, discuss with a Consultant Haematologist.

2. **Dosing of LMWH is weight-related, based on booking weight**. Document booking weight on drug chart and refer to the Treatment Schedule, (Appendix II) to calculate dose required. Prescribe LMWH on the patient's drug chart.

3. **Routine monitoring of LMWH is not required. Circumstances where this may be necessary include;**

    a. **Extremes of weight**; both underweight and obese
    b. **Renal failure**

If required, monitoring is performed using heparin assays. These are performed on all 3 sites in the fast track laboratory but samples must be hand delivered and arrive within 2 hours of sampling. Levels should be taken 3 hours after the 3rd dose of LMWH, using a single green topped bottle and avoiding use of the vacuum. Advice on interpreting levels is provided on the report, but further advice can be sought from the haematology team if required.

4. **It is not necessary to recheck the platelet count after commencing LMWH** as the risk of HIT is very small.

5. **Anticoagulation for the remainder of the pregnancy and at least 6 weeks postnatal is with LMWH.**The Haematology Nurse/Midwife will provide a link with the Obstetric/Haematology Team for advice on anticoagulation for the remainder of the pregnancy and will ensure that follow-up appointments are made as necessary at the Obstetric Haematology Clinic.

6. **If there is a clinically apparent acute massive PE the administration of intravenous unfractionated heparin is preferable** (see UHL Adult Anticoagulation Policy). A Consultant Obstetrician and Consultant Anaesthetists should also be informed and involved in the ongoing management.

7. **Intravenous unfractionated heparin may be the most appropriate treatment in patients with a strong clinical suspicion of DVT/PE during induction of labour or while in active labour.**

8. **Decisions to use intravenous unfractionated heparin should be discussed at Consultant level**. If a decision is made to use unfractionated intravenous heparin as first line therapy this must be documented in the notes with explanation and grade of staff making the decision. Please seek Pharmacist advice immediately (via bleep) for correct dose schedule and monitoring requirements and use the Treatment Schedule documentation as at Appendix II.

9. **Leg care must be discussed with the patient and compression stockings must be prescribed. Class II Graduated elastic compression stockings should be worn on the affected leg for two years after the acute event to reduce the risk of post-thrombotic syndrome.** These can be removed at night but should be worn throughout the day. Patients should be re-measured for this once the initial swelling associated with the acute event has reduced. In addition, these should be replaced every 3 months to ensure they maintain their elastic compression properties. Women who develop a DVT in pregnancy are at greater risk of post-thrombotic leg symptoms than those who develop a DVT outside pregnancy. The use of compression stockings reduces post-thrombotic leg symptoms by around 50%. Below knee socks may be used if stockings are unsuitable, ill-fitting or if there is poor patient compliance with them. It is appropriate to also advise the patient to avoid standing for long periods, to elevate feet (straight legs) when sitting, to massage the affected leg with cream or oil and to continue to take gentle exercise such as swimming. An entry must be made in the notes of advice given.

10. **When the women are discharged home, arrangements must be made to allow for the safe disposal of needles & syringes.**

11. **Injections may be reduced to once daily (with a reduction in total dose to 60-70%) after about 10 days, providing there has been complete resolution of symptoms.**

Intrapartum management of patients with VTE

There is very little research about the management of labour and delivery in anticoagulated women and the risks and benefits of regional analgesia and anaesthesia need to be carefully considered for each woman.

1. **An intrapartum care plan should be documented in the notes (see Appendix III).** A delivery plan must be worked out on an individual basis with each patient, involving as necessary the Consultant Obstetrician, Consultant Haematologist and Consultant Anaesthetist. This plan should be made in full consultation with the patient, either during the first hospital admission or at the subsequent Clinic visit. The delivery plan should be an evolving document, which can be updated in the light of changing events.

2. **Patients should be informed to stop the LMWH at the first signs of** labour and

seek advice from delivery suite. This should be documented in the notes.

3. **Anticoagulation during labour needs to be a careful balance between bleeding risk and thrombosis risk.** This will depend on the current dose of anticoagulation and when this was last given as well as the severity of the VTE and when the event occurred. Mostly, there is no need for IV unfractionated heparin during labour. However, if labour or induction is prolonged and the patient is considered to be at high risk of thrombosis without anticoagulation then consider a bolus of 5000 units of IV unfractionated heparin.

4. **Instructions regarding the following should be considered:**
    a. Group and Save (G&S) sample and Full Blood Count (FBC) on admission.
    b. Inform Anaesthetist on admission to Delivery Suite.
    c. TEDs +/- flotron boots during labour and after.
    d. Instrumental vaginal delivery to be performed by ST3 or above
    e. Active management of third stage after vaginal delivery:
        - Intramuscuslar injections should be avoided in anticoagulated patients
        - Intravenous oxytocin (3-5 units oxytocin)
        - Intravenous infusion of oxytocin 40IU in 36 ml 0.9% sodium chloride over 4 hours after delivery of placenta.
    f. Early suturing of perineal tears/episiotomy – with close attention to haemostasis.
    g. Following delivery inform Haematology Nurse/Midwife (ext. 17643)/haemobs mailbox out of hours.
    h. Careful attention to VTE risk factors during labour including mobility and hydration.

5. **For women who are admitted for planned delivery;**
    a. Instruct that the last subcutaneous heparin dose should be administered 24 hours prior to admission; usually this is the morning of the day before admission.
    b. Ensure results of recent anti-Xa are available if required (extremes of weight, renal impairment).
    c. G&S and FBC and Clotting Screen to be taken on admission and results made available as soon as possible.

6. **For women who are admitted in spontaneous labour;**
    a. Confirm when last dose of LMWH was given
    b. G&S, FBC and Clotting Screen on admission, and obtain results of recent anti-Xa level if indicated (extremes of weight, renal impairment).

7. **For women who are considered to be at high risk of further thrombotic events conversion to intravenous, unfractionated heparin may be considered for a planned delivery** – this provides a more flexible means of controlling anticoagulation to minimize the possible time with trough anticoagulation levels. This should be discussed at consultant level and requires careful monitoring on the ward.

8. **Refer to Appendix III –** **Guidance for an Emergency Delivery Plan –if the woman is admitted in labour and has no agreed and documented plan.**

9. **The Consultant Anaesthetist must be involved in care during labour.** Recent anti-Xa levels will often be useful, but where abnormal clotting / recent heparin administration contra-indicate regional analgesia other alternatives for pain relief during labour including Patient Controlled Analgesia (PCAS) can be considered.

10. **No regional anaesthesia should be given with 24 hours of a treatment dose of LMWH.** Spinal anaesthesia is preferred to epidural in anticoagulated patients. A general anaesthetic may have to be considered for a Caesarean Section. This should be explained during the 'planning delivery' stage.

11. Removal of epidural catheters should be specifically planned after discussion with anaesthetist. The epidural catheter should not be removed within 12 hours of last dose of LMWH and the subsequent dose should not be given for 4 hours after removal of epidural catheter.

12. **Restart LMWH** (dose as prior to delivery) **four hours following a vaginal delivery with no epidural unless there are complications** such as bleeding, need for theatre, etc. If LMWH is not restarted seek Consultant Obstetric opinion.

13. **Restart LMWH four hours after caesarean delivery at prophylactic dose unless there are complications such as bleeding.** Administer treatment dose 8 -12 hours later. The rate of wound haematomas following caesarean delivery is around 9% in anticoagulated patients. Consideration should be given to this during the procedure including considering the use of interrupted sutures and the need for drain placement.

14. **Seek immediate Consultant Haematologist and Anaesthetist assistance if major bleeding occurs in anticoagulated women**. Bleeding should be considered to be secondary to anticoagulation use if occurring within 8 hours of last dose of LMWH. In this case administer protamine (Protamine 50mg (max) should be given slowly 5mg/min. This is alongside current guidance for management of postpartum haemorrhage (See PPH guideline).

Postpartum management of patients with VTE

1. **Following delivery, anticoagulation should be continued for a minimum of six weeks.** A follow-up plan must be documented in the notes.

2. **Women who have had a DVT or PE in pregnancy need at least a three to six-month course of full anticoagulation.** Women who have already completed a six-month course of heparin treatment prior to delivery need only a further six weeks of anticoagulant prophylaxis during the post-partum period.

3. **Breastfeeding is safe whilst on both heparin and warfarin** as they are both found in breast milk in only insignificant quantities. Breastfeeding is not safe with the non-Vitamin K anatagonist oral anticoagulants (DOACs e.g. rivoroxiban, apixaban)

4. **LMWH should be continued as indicated in the intra-partum care plan**. For those on prophylactic doses, the full six weeks' supply should be provided on discharge. If the woman's GP has prescribed antenatally, supply 14 days and request woman to obtain the remaining four weeks from her GP. For those women continuing on full treatment doses of heparin, arrangements should be made to perform a heparin assay on a Wednesday morning 7-10 days postpartum if indicated. Initial discharge prescription should be for 2 weeks and a further 5 weeks supplied after reviewing the heparin assay result (or obtained from GP if GP has been happy to prescribe for the woman antenatally).

5. **If VTE is diagnosed in the post-partum period, the dose of LMWH could be changed to once daily after the 1st week.**

6. **Anticoagulation can be converted to warfarin or a DOAC from LMWH at two to three weeks postpartum.** This is because the INR is often unstable and dosing difficult if converted before this. LMWH should be continued when warfarin has been started until the INR is in therapeutic range on 2 separate consecutive readings. Warfarin induction

can be performed by the anticoagulant clinics this should be arranged by the lead team caring for the woman.

It is possible to change to a NOAC with the advantage that no blood test monitoring is required, but this is contraindicated in breastfeeding mothers.

7. **Warfarin is teratogenic; it must be recorded in the notes that this information has been given. Reliable contraception should be advised and prescribed with full documentation in the notes**. The name and grade of staff that provides contraceptive counselling should be clearly indicated.

    - The Combined Oral Contraceptive pill is contraindicated with a history of thromboembolism (and also unpredictably inhibits warfarin metabolism).
    - Depo-provera is a possibility though it is associated (in long term use) with osteoporosis and can cause erratic bleeding which may be problematic directly after delivery. Depo-provera is contra-indicated in women who are fully anticoagulated.
    - The Progesterone Only Pill and progesterone containing IUDs (MIRENA) are safe and suitable for use.
    - If condoms alone are chosen then the addition of a spermicide makes their use more reliable.

8. **Prior to discharge ensure that appropriate follow up has been arranged via the Haematology Nurse/Midwife.** Further appointments will provide an opportunity for review of management of the pregnancy and delivery. In addition, thrombophilia screening can then be arranged if appropriate as well as advice given for future pregnancies.

9. **There is a high risks of secondary postpartum haemorrhage in these women.** *Women should be advised to inspect any wounds daily and have a low threshold to report to Maternity assessment unit if concerned for urgent medical review.*

3. Education and Training

None

4. Supporting References

1. RCOG Reducing the risk of Thrombosis and Embolism during pregnancy and the (No: 37a) January 2023 rcog.org.uk/gtg-no37a-2015_amended-2023.pdf
2. Jacobsen AmJOG 2008;198(2):233
3. Blanco-Molina A, Rota LL, Di Micco P, Brenner B, Trujillo-Santos J, Ruiz-Gamietea A et al.; RIETE Investigators.Venous thromboembolism during pregnancy, postpartum or during contraceptive use.ThrombHaemost 2010;103:306-311
4. Milne JA, Howie AD, Pack AI: Dyspnoea during normal pregnancy. Br J ObstetGynaecol 1978 85:260-263
5. Redrawn from Milne, JA Postgrad Med J 1979; 55:318.

5. Key Words

VTE, PE, LMWH, pregnancy

The Trust recognises the diversity of the local community it serves. Our aim therefore is to provide a safe environment free from discrimination and treat all individuals fairly with dignity and appropriately according to their needs.
As part of its development, this policy and its impact on equality have been reviewed and no detriment was identified.

DEVELOPMENT AND APPROVAL RECORD FOR THIS DOCUMENT			
Author Original Working Party; Consultant Obstetricians, Consultant Haematologists and Specialist Midwives			**Executive Lead:** Chief Medical Officer
Date	**Issue Number**	**Reviewed By**	**Description Of Changes (If Any)**
January 2017	V2	H Maybury	D Dimers removed from pathway and focus to be more on thorough clinical
January 2018	V3	H Maybury and R Ganatra	Imaging guidelines. General update.
April 2021	V4 V4.1	N Archer, A Webster and I Das N Archer	COVID specific issues, update to the treatment regime in line with RCOG guidance, addition of management of superficial thrombosis and thrombophlebitis
December 2021	V4.2	N Archer	Clarified gestation that this guideline applies to i.e. ≥16/40 Post-natal clinic follow-up now sign posts to being
August 2024	V5	A Webster L Taylor Clinical risk & Quality standards midwife	LMWH of choice changed from Dalteparin to Enoxaparin. Updated appendix 4 in line with PPH management.

Appendix 1 – CTPA in pregnancy

CTPA (Computer Tomography Pulmonary Angiography) in Pregnancy

Benefit: to diagnose or exclude pulmonary embolism (blood clot in the veins of the lungs). This is potentially life threatening if left untreated. If no clot is found blood thinners (thromboprophylaxis) can be stopped/reduced.

CTPA has been judged to be the most appropriate radiological investigation to identify clots or other problems that could be causing the symptoms

Risks of CTPA in pregnancy:

Small increased lifetime risk of breast cancer in the pregnant woman from a background risk of 10 in 2000 increased to 11.4 in 2000.

There is no proven increased risk of childhood cancer (under 15y) in the baby being carried above the background risk of 1 in 300,000

Alternative investigation:

VQ (ventilation/perfusion study) (This test does not always give an answer; CTPA may also be needed if VQ scan can not rule out a blood clot)

Increased risk of childhood cancer to 1 in 280,000 under age of 15y

No proven increased risk of breast cancer in the woman having the test.

Doctors Name : ..... Signature: ..... Date: .....

Patient cannulated ☐ Urea: ..... Creatinine: ..... Date of sample: .....

Patient's Statement

I consent to undergo a (delete as appropriate):
VQ examination
CTPA examination
I undertsaand the above risks and benefits.

Patient's Name : ..... Signature: ..... Date: .....

Appendix 2 – Anticoagulation treatment schedule

MATERNITY SERVICES
WOMEN'S PERINATAL AND SEXUAL HEALTH
ANTENATAL AND POSTNATAL

University Hospitals of Leicester NHS Trust

ANTICOAGULATION TREATMENT SCHEDULE LMWH- ENOXAPARIN

Patient's Label

Ward: LRI/LGH/GH

SUBCUTANEOUS LMWH (ENOXAPARIN) SCHEDULE
Initial dose = 1mg/kg BD (rounded as per weight chart below)
1. Follow chart below regarding weight based dosing 2. **DO NOT** give by IV or IM injection 3. Monitor **HEPARIN** assay levels **NOT APTT** 4. Enoxaparin **MUST** be prescribed on NerceCentre.

Dosing of Enoxaparin is weigh-related

Document Booking weight on drug chart

Weight Chart and Dosing						
Booking Weight	**< 50kg**	**50 – 69kg**	**70 – 89kg**	**90 – 109kg**	**110 – 125kg**	**>126kg**
Initial treatment dosage regime	**40mg BD**	**60mg BD**	**80mg BD**	**100mg BD**	**120mg BD**	**120mg AM and 150mg PM** with heparin assay taken after 3rd dose*
If severe renal impairment, seek haematology advice regarding dose reductions						
If VTE confirmed, refer to haematology obstetric clinic for ongoing review and considerations of once daily dosing						

BLEEDING WHILST ANTICOAGULATED
LMWH: If bleeding is severe refer to haematologist. Consider reversal with IV protamine as follows: 1. 0-3 hours post LMWH. For every 100 units LMWH: 1mg protamine up to a **maximum dose if 50mg** 2. >3 hours post LMWH. For every 100units LMWH: Reduce protamine dose by at least half – refer to Haematologist
NB: 1. Administer protamine slowly. Rate= 5mg/min by intravenous injection. Maximum dose at any one time = 50mg 2. Further protamine may be required as A) It has a short shelf life and B) LMWH will continue to be absorbed from the SC depot. Suggested timescales for injection = 60 minute intervals (protamine is high doses is itself an anticoagulant). 3. Protamine will only partly (65% - 80%) neutralise the anti-Xa activity of LMWH.

Appendix 3 – Personal Intrapartum Care Plan

Appendix III: Personal Intrapartum Care Plan

Personal Intrapartum Care Plan

DEMOGRAPHICS

PLACE PATIENT STICKER HERE

EDD

TEAM

CLINICS

DATE PLAN MADE

MADE BY

PLAN FOR DELIVERY

PLAN FOR 3RD STAGE

PLAN FOR BABY & POST PARTUM ON D/S

Signatures

Signature of woman
Signature of delivery planner

Appendix 4 – Guidance for an Emergency Delivery Plan

This emergency delivery plan is intended for use by staff involved in managing the delivery of a woman or birthing person who has been anticoagulated following a DVT or PE during the current pregnancy and who arrives on Delivery Suite with no agreed plan documented.

Inform Consultant Obstetrician, Consultant Haematologist and Consultant Anaesthetist.

Take Full Blood Count (FBC), Group and Save sample (G&S), and Clotting Screen (request APTT if on unfractionated heparin. If patient is on Enoxaparin and a heparin assay is required, special arrangements need to be made with the Haemostasis/Coagulation laboratory (ext.16619) – see page 4 of Guideline). Send all of these samples marked 'urgent'.

Document carefully current dose of anticoagulant therapy, and time and quantity of last dose administered.

Supply and fit Thromboembolic Deterrent Stockings (TEDs).

A delivery plan should be made in the light of individual patient's history, gestation and progress in labour, and in consultation with senior staff of the relevant specialities. Consider the following:

1. **TEDs +/- floatation boots during labour and after**

2. **If assisted vaginal birth is required this should be performed by SpR / Consultant**

3. **Active management of third stage after vaginal delivery – give bolus dose of intravenous oxytocin (3-5 units oxytocin) and administer intravenous 40 units oxytocin in 36ml sodium chloride 0.9% over 4h after delivery of placenta**

4. **Early suturing of perineal tears/episiotomy**

5. **If excessive bleeding occurs consider the use of protamine. Seek advice from Consultant Anaesthetist and Consultant Haematologist**

6. **When feasible inform Haematology Nurse/Midwife of admission/delivery**

As part of the delivery plan ensure instructions are given for re-commencing anticoagulation after delivery.

Women at high risk of further veno-thrombotic event

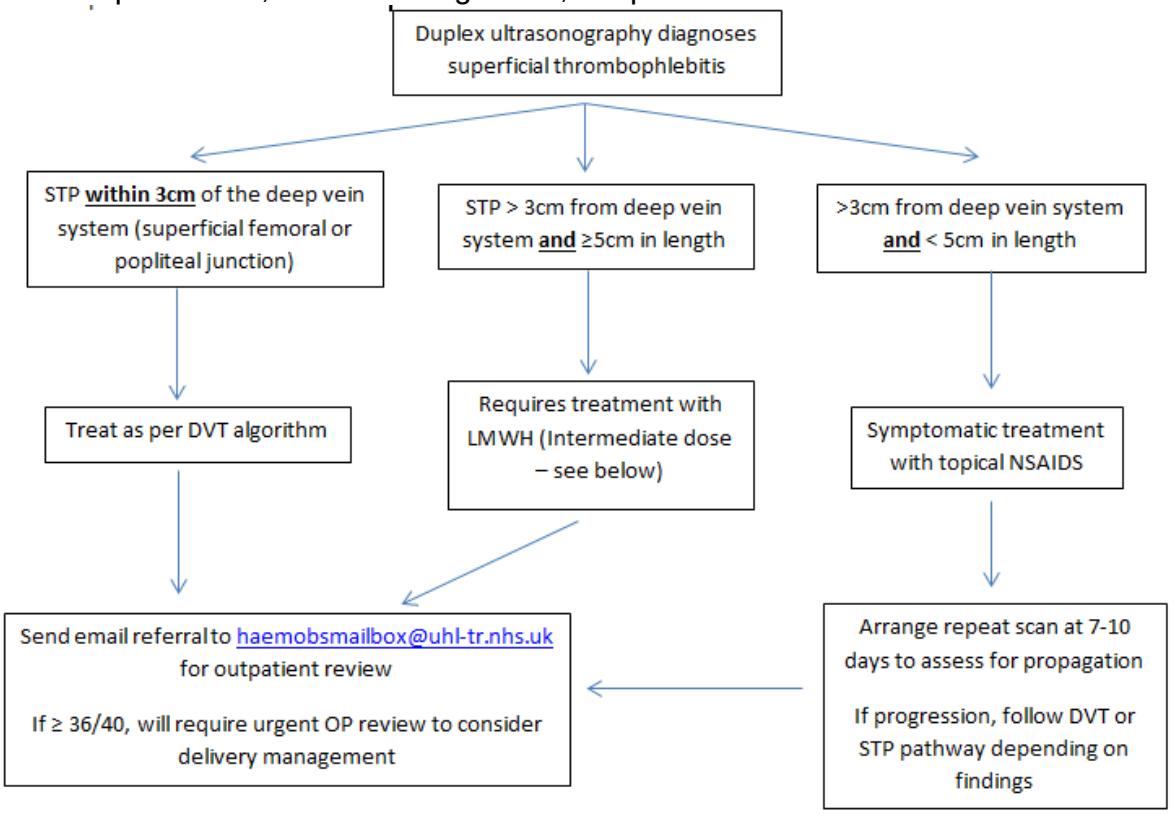
Where a woman is considered to be at high risk of a further veno-thrombotic event conversion to intravenous, unfractionated heparin may be appropriate. This decision needs to be made in the light of previous history, progress in labour, clotting screen results/most recent anticoagulant therapy dose and should be taken at Consultant level.

At all stages of management and planning ensure that the patient is fully involved and informed.

Appendix 5 - Superficial Thrombophlebitis (STP)

Superficial thrombophlebitis or superficial vein thrombosis occurs when the clot is confined to the superficial venous system, most commonly the long saphenous vein. It is commonly associated with the presence of varicose veins, which are found in 80% of cases. It is increasingly recognised that the presence of superficial thrombophlebitis is associated with increased risk of DVT and PE. It is therefore important to diagnoses and treat in pregnant women, who are at increased risk of venous thromboembolic events.

Women with suspected STP should be assessed and managed initially in line with the DVT algorithm with regards to initial treatment and investigation. Once duplex ultrasonography has been performed, and STP diagnosed, the process should be as followed:



Enoxaparin dosing for superficial thrombophlebitis (booking weight)	
<50kg	60mg OD
50-69kg	80mg OD
70-89kg	100mg OD
90-109kg	150mg OD
110-125kg	80mg BD
>125kg	100mg BD

Comments:

- Women who require LMWH treatment in pregnancy for STP should be advised that LMWH will continue throughout pregnancy and for 6 weeks postpartum.
- Dosing will be reviewed and may be reduced to prophylactic dose dependent on progress