Aneurin Bevan University Health Board

Guideline for the Prevention and Treatment of Thrombosis in Pregnancy and the Postpartum Period

N.B. Staff should be discouraged from printing this document. This is to avoid the risk of out of date printed versions of the document. The Intranet should be referred to for the current version of the document.

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Contents:

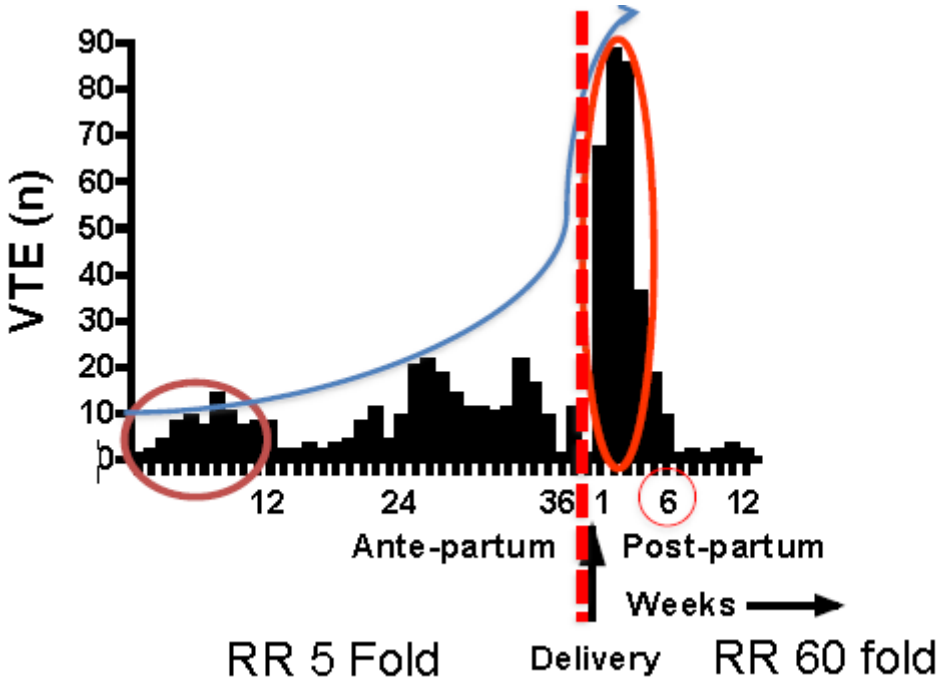
1. Executive Summary

This document aims to highlight women at risk of venous thromboembolism and give guidance during pregnancy as to which patients are at highest risk.

Venous thromboembolism (VTE) is currently the leading direct cause of maternal death in the UK. In the latest MBRACE review from 2013-15 published in Dec 2017, there were 26 maternal deaths due to VTE. The overall incidence of pregnancy related VTE is 1-2/1000. The risk is present throughout the pregnancy – with a bimodal distribution. Most cases occur in the first and third trimesters, with the majority of maternal deaths occurring in the first trimester. Postpartum, the incidence is 5 x higher than in pregnancy. DVT occurs in 85% of all VTE antenatally. Postnatally PE is more predominant.

12 women in the recent review died from VTE in the first trimester, often before any formal booking and risk assessment could be carried out. This has highlighted the importance of educating pregnant women about their personal risk of recurrence if they have had a previous VTE, and also alerting medical professionals of this risk should women present with symptoms of VTE.

Risk of VTE throughout pregnancy and the post-partum period



Increased coagulation factors, stasis and vascular damage all heighten the thrombotic risk, and diagnosis of VTE in pregnancy is often difficult as the symptoms may mimic those of pregnancy.

DVT in pregnancy is more frequently proximal and 90% + cases affect the left leg compared to 55% outside of pregnancy. This is due to compression of the Left iliac vein the gravid uterus and the common iliac artery. There are often other risk factors –

Non pregnancy related	Pregnancy related
Previous VTE	Multiple gestations
Heart disease	Assisted reproduction
Diabetes	Hyperemesis
Smoking	Pre eclampsia
Obesity	Prolonged labour
Age >35 years	Caesarean section, esp emergency
Sickle cell disease	

All women dying from VTE following vaginal delivery in the 2011 Confidential Enquiry were either overweight or over the age of 35 years. Only one of the ten deaths involved operative vaginal delivery. This enquiry concluded that 'there is a clear need for the development of national guidelines on thromboprophylaxis after normal delivery'.

This document has been formulated in response to this report to ensure pregnant women have a high standard of care and that all risk factors for VTE have been considered at regular intervals preconceptually if appropriate, throughout pregnancy and the puerperium, and appropriate action and treatment taken.

1.1 Scope of policy

This policy applies to all members of staff including midwives, Obstetric medical staff and nursing staff on the early pregnancy assessment unit and gynaecology ward.

1.2 Essential Implementation Criteria

Risk assessment of the pregnant women at all stages of pregnancy from

- Initial visit to midwife (may be community midwife)/GP
- Booking visit
- Subsequent visits to antenatal clinic
- Any inpatient admission
- Presenting in labour

- Postpartum

This assessment can be carried out by a midwife, nurse or doctor using the Thromboprophylaxis risk assessment tool for pregnant women – see appendix 1.

2. Aims

This document aims to ensure every woman presenting in pregnancy has ongoing risk assessment for venous thromboembolism, and to treat risk factors appropriately with TED stockings and LMW heparin as needed at any stage of pregnancy and the postpartum period, giving the best possible treatment to these women to prevent VTE and hence serious complications.

3. Responsibilities

All health professionals involved in caring for women in pregnancy and the puerperium are responsible for implementing the policy including

- Midwives
- Doctors (Obstetrics, ACU physicians, A and E doctors)
- Nurses / midwives in EPAU
- Nurses on gynaecology ward (caring for gestation < 20 weeks)

4. Training

The Directorate will cascade training to both medical and midwifery staff on the use of this guideline and the associated risk assessment tools.

5. Monitoring and Effectiveness

A commitment to audit this policy annually will be undertaken, and the results will be reported back to the Obstetrics and Gynaecology Directorate, and to the clinical governance committee who will act on them. The assessment tool (Appendix 1) will be audited as part of the departmental audit, as well as looking at outcome (review of women presenting with venous thrombosis in pregnancy and postnatally).

6. References

1. How I manage venous thromboembolism in pregnancy – Roopen Arya state of the art review, BJH 2011 153, 698-708

2. Thrombosis in pregnancy : updates in diagnosis and management Ian Greer ASH guidelines 2012 p203-206
3. Haemostasis and Thrombosis Task Force, British Committee for Standards in Haematology. Testing for inheritable thrombophilia 2009
4. The Royal College of Obstetricians and Gynaecologists. Guideline No.37a. Thrombosis and Embolism during pregnancy and the Puerperium, Reducing the Risk 2015
5. Royal College of Obstetricians and Gynaecologists Guideline No.37b Diagnosis and management of acute VTE in pregnancy 2015
6. British Committee for Standards in Haematology. Guidelines on the investigation and management of the antiphospholipid syndrome. British J of Haematol 109:704-715, 2000.
7. Toglia MR and Weg G. Venous thrombosis during pregnancy. New Engl J Med 335:108-114, 1996.
8. Cavenagh JD and Colvin BT. Guidelines for the management of thrombophilia. Post Graduate Medicinal Journal 72:87-94, 1996.
9. Dolenska S. Neuroaxial blocks and LMWH thromboprophylaxis. Hosp Medicine 59:940-943, 1998.
10. Management of thrombophilia in pregnancy: consensus of South and West Wales haematologists (2001).
11. MBRACE review 2013-15 published 2017
12. VTE, thrombophilia, antithrombotic therapy and prevention of thrombosis ACCP recommendations Chest 2012 Feb supplement141/2

This policy has undergone an equality impact assessment screening process using the toolkit designed by the NHS Centre Equality & Human Rights. Details of the screening process for this policy are available from the policy owner.

Guideline for ***Prevention*** of Thrombosis in Pregnancy and Postpartum Period (thromboprophylaxis)

Patients with personal history of VTE

If the woman has a personal history of VTE, as soon as she finds out she is pregnant, she needs to be urgently referred to the Early Pregnancy Assessment Unit to start thromboprophylaxis immediately, and for an early viability scan. These women will then be referred onto the joint obstetric clinic run by Dr Lewis and Mrs Parveen – **see pathway in appendix 1**

Women of childbearing age within ABUHB who are diagnosed with a DVT/PE are counselled at the time of the thrombosis, with regards their increased thrombotic risk in pregnancy, and given written information. They are seen in the haematology clinic to ensure they are aware of their own personal risk of VTE.

1. Antenatal assessment

All women should be assessed for risk of VTE at every antenatal visit and a decision made regarding the need for:

1) Post partum venous thromboprophylaxis
2) Antenatal venous thromboprophylaxis throughout pregnancy
3) Antenatal venous thromboprophylaxis at times of high risk
4) Therapeutic anticoagulation throughout pregnancy

A personal and family history of VTE should be sought in all women. The Risk Assessment Tool for use through pregnancy and the post natal period is enclosed in Appendix 1 and can be printed for use in all clinic / ward settings.

2) Antenatal thromboprophylaxis

- The need for thromboprophylaxis during pregnancy will depend on the woman's medical history, personal and family history of venous thrombosis and inherited and acquired risk factors.

- Women who have an increased risk of VTE but do not require prophylactic LMWH throughout pregnancy will need VTE prophylaxis if immobilised, admitted to hospital or dehydrated.

- **All women with an increased risk of venous thrombosis should wear graduated support stockings throughout pregnancy and for 6 weeks post partum.**

- **Midwives should dispense LMWH from ANC via the ABUHB maternity services outpatient dalteparin prescription form (see appendix 5). All dispensing should be in line with the TTH/discharge supply by nurses and midwives policy.**

Antenatal prophylactic doses dalteparin (Fragmin)

- Check **FBC**, **U+E** and **Coagulation screen** prior to commencing dalteparin
- Suggested prophylactic doses of dalteparin by body weight

Booking Weight	Dose of Dalteparin
< 50 kg	**2500 units once daily**
50-100 kg	**5000 units once daily**
100 – 130kg (BMI > 40)	**7500 units once daily**
>130kg	**10,000 units once daily**

- Anti Xa monitoring should be carried out on all women on ≥ 7500 units of dalteparin :
- Please check Anti Xa level after 2 weeks : **14 weeks gestation**
- This should be taken 4 hours post injection in a **blue top** citrated vacutainer. Please ensure the bottle is properly filled
- Range for thromboprophylaxis **0.05-0.15 IU**
- If levels are within this range, please repeat each trimester **at 28 weeks and 36 weeks gestation**
- If levels outside of this range, please contact Dr Lewis for guidance regarding dose adjustment

3. Delivery

- Women on any form of heparin should have an agreed delivery plan, involving obstetrician, obstetric anaesthetist and haematologist. For patients not attending the haematology clinic, a birth plan proforma is available

- Graduated support stockings should always be worn during this period.

- The pregnant woman should be advised that once she thinks

she is in labour she must contact the labour ward for advice and should not inject any further heparin until she has been assessed.

4. Caesarean section

- All women should wear graduated support stockings.
- Continue prophylactic heparin once haemostasis is secure.

5a. Thromboprophylaxis in the post-operative period for women not already on antenatal heparin

- Graduated support stockings should **always** be worn during this period
- **All** women should receive thromboprophylaxis after Caesarean section
- **At risk** women should be given dalteparin daily for at least 10 days according to their weight. Early mobilisation and good hydration should be encouraged

Suggested
Prophylactic Doses of Dalteparin by Body Weight

Booking Weight	Dose of Dalteparin
< 50 kg	**2500 units once daily**
50-100 kg	**5000 units once daily**
100 -130kg (BMI > 40)	**7500 units once daily**
>130 kg	**10000 units once daily**

5b. Duration of Post Partum Thromboprophylaxis

- Transient risk factors – **10 days** dalteparin
- Previous DVT/PE, or family history of VTE, APLS – **6 weeks** prophylaxis with dalteparin
- Dalteparin is safe during breastfeeding
- The combined oral contraceptive pill should not be prescribed

for the first three months post partum for women with risk factors for VTE

6. Epidural and spinal anaesthesia

- All women on heparin prophylaxis with complicating circumstances should be reviewed in the anaesthesia antenatal clinic.

- Always inform the on-call consultant anaesthetist when a pregnant woman on anticoagulation therapy is admitted in labour or with antenatal complications likely to result in imminent delivery.

- **Full anticoagulation is a contra-indication to spinal or epidural anaesthesia.**

- There is a risk of spinal haematoma when an epidural is inserted or removed. Early diagnosis improves outcome. To minimise the risk, the following guideline should be followed:

Patient group	Action
"Low risk"/ "intermediate risk" prophylactic LMWH (5000 units)	Ensure a delay of 12 hours from the last dose before inserting or removing an epidural.
Therapeutic dose LMWH (more than 5000 units daily)	Ensure a delay of 24 hours from the last dose before inserting or removing an epidural.

- **LMWH should not be given for 4 hours after use of spinal anaesthesia or after the epidural catheter has been removed.**

- The catheter should not be removed within 12 hours of the most recent injection

These times are a guide and a risk benefit ratio assessment regarding regional or general anaesthesia should be made for each individual patient dependent on the specific clinical circumstances.

- **Renal impairment : LMWH is cleared more slowly and the above recommended times may not be sufficient. Discuss with haematologist and perform an urgent anti-Xa level prior to insertion or removal or an epidural.**

- If an epidural has to be removed before these times have elapsed or falls out accidentally then documented regular assessment of changes in either motor or sensory function is recommended to ensure that a spinal haematoma is detected early. In addition it is noted that deep-seated back pain may be symptom of a spinal haematoma.

Reactions to LMWH

- Occasionally women may react to dalteparin.
- In this situation firstly try and alternative LMWH – enoxaparin
- If there is a persistent reaction then prophylactic fondaparinux should be used as per patients weight

Weight	Fondaparinux Dose (prophylactic)
>50kg	2.5mg
>100kg	Discuss with haematology – unlicensed

- The washout needed for epidural analgesia is 72 hrs which must be explained to the patient
- They also must have a referral to the anaesthetist as the options for analgesia in labour will be different

Guideline for *Investigation and Treatment* of Thromboembolic Disease in Pregnancy and the Postpartum period

Acute Management

Background

VTE continues to be a major cause of maternal death in the UK. VTE is 10 times more common in pregnant than no-pregnant women of the same age. VTE can occur at any stage in a pregnancy including the first trimester but is more common in the puerperium. If a women presents with any symptoms or signs suggestive of a VTE particularly if there is a personal or family history then she will require urgent investigation and treatment.

Symptoms and Signs of VTE

Leg pain and swelling (especially if unilateral)
Lower abdominal pain
Low grade pyrexia
Chest pain
Haemoptysis
Dyspnoea
Collapse

However, these symptoms and signs may be subtle.

Diagnosis of Acute VTE

Any woman presenting with signs and symptoms suggestive of a VTE should commence treatment with therapeutic doses of low molecular weight heparin (LMWH) until the diagnosis is excluded by objective testing, unless treatment is strongly contraindicated.

Who Should Care for a Pregnant or Recently Pregnant woman with a VTE?

Pregnant women should be promptly investigated and managed by a specialist team of senior physicians, senior obstetricians and in a place appropriate to their gestation. This should ideally be in the medical admissions unit if early in pregnancy or on the obstetric unit if later in pregnancy **(>24 weeks),** under Joint Care (Obstetric/Medical).

The approach to the management of these women should be multidisciplinary and involve Senior Obstetricians, Physicians, Radiologists and Haematologists. These women will be reviewed by an Acute Care Physician or Consultant Physician, as well as the responsible Consultant Obstetrician:

All antenatal women admitted through any other department or speciality within the Health Board **must** be reviewed by a Senior Obstetrician, and any care undertaken must then be in conjunction with the woman's obstetric plan of care.

If patients present via A and E, please ensure that the patient is referred immediately to the on call Obstetric/Gynae team, and the medical assessment unit. These women are NOT managed via the Nurse led DVT clinic, but by the above senior team.

Investigations for Diagnosis of an Acute DVT

Compression duplex ultrasound should be undertaken. If the ultrasound is negative, anticoagulant treatment may be discontinued. If the clinical suspicion is high then anticoagulation should be continued and the scan repeated in 1 week.

When there is a suspicion of iliac vein thrombosis (whole limb swelling and back pain) magnetic resonance venography or conventional venography may be considered.

Investigations for Diagnosis of an Acute Pulmonary Embolism

A chest x ray should be performed and compression duplex Doppler if the x ray is normal. If both tests are negative, with persistent clinical suspicion, a perfusion scan or a computed tomography pulmonary angiogram (CTPA) should be considered. VQ scan is safest in the first trimester due to the radiation dosage although please discuss each case individually with a consultant radiologist.

Informed consent should be obtained and the patient made aware of the risk of an undiagnosed PE and subsequent morbidity and mortality is greater than that from the radiation.

If the perfusion scan or CTPA is normal and there is no evidence on ultrasound of a DVT and clinical suspicion of a PE remains high then anticoagulant therapy should be continued until a PE is definitely excluded – this decision should be made by senior medical staff. If

the x ray is abnormal and there is a high clinical suspicion of a PE then a CTPA should be performed.

If the CTPA is inconclusive/suboptimal, please discuss the use of VQ scanning as a diagnostic tool with consultant radiologist. (Lead = Dr Brian Huey). It is vitally important to establish a correct diagnosis as therapeutic anticoagulation particularly around delivery has significant implications for the woman.

D-DIMER TESTING SHOULD NOT BE PERFORMED TO DIAGNOSE ACUTE VTE IN PREGNANCY. It should be remembered that the d dimer may be raised in pregnancy due to the natural changes in haemostasis during pregnancy. The negative predictive value of D dimer is not sufficient to exclude DVT with a negative result in pregnancy. Wells scoring is also not validated in pregnancy and should not be used.

Investigations to Perform Before Initiating Heparin Therapy

Full Blood Count
Coagulation Screen
U&E's
LFT's

Additional Therapies in the Management of VTE in Pregnancy

Full length, correctly fitted, graduated elastic compression stockings should be encouraged. If the woman is particularly obese, early consideration should be given to ordering appropriate sized compression hosiery.

Under the guidance of a Haematologist & Vascular Surgeon, in the presence of an iliac thrombosis consideration should be given to the use of an inferior vena caval filter if the paitent presents peri delivery (36 weeks onwards)

Maintenance Treatment of VTE

Therapeutic doses of subcutaneous LMWH should be prescribed for the remainder of the pregnancy (100 units/kg twice daily dalteparin)

Recommended treatment doses of dalteparin based on early pregnancy weight for PE and DVT

Initial dose (kg)	Early pregnancy weight			
	<50	50-69	70-89	>90
Dalteparin	5000 units bd	6000 units bd	8000 units bd	10, 000 units bd
bd = twice daily				

Platelet counts and anti-Xa levels should be monitored under the guidance of a Consultant Haematologist. This assay should be performed 4 hours post dose of morning dalteparin.

Arrangements should be made to allow safe disposal of needles and syringes and out-patient specialist follow-up should be arranged in the haematology obstetric clinic at either NHH or RGH.

Oral anticoagulants should not be used in the management of VTE in the antenatal period except in certain circumstances for example extension of a venous thrombosis on therapeutic twice daily dalteparin. This should only be initiated after the teratogenic period of 6 - 12 weeks gestation has passed. This should always be done under the close guidance of a consultant haematologist with a specialist interest in obstetrics.

LABOUR and DELIVERY

Where Induction of labour or delivery is planned, LMWH should be discontinued 24 hours before. The aim should be as far as possible to maintain normality through labour and birth and reduce interventional procedures that will increase the risk of VTE. Women taking therapeutic doses of dalteparin should be managed on a case by case basis after careful discussion with the multi-disciplinary team.

A plan should be clearly made in the Obstetric notes by 36 weeks gestation by the Obstetric Haematolgoy clinic team. The risks of haemorrhage from continued anti-coagulation should be balanced against the risks of a further thrombo-embolic episode. All these women must have correctly fitted, graduated elastic compression stockings on admission.

The woman taking LMWH maintenance dose who goes into spontaneous labour should be advised to discontinue immediately until post delivery.

If delivery is by elective caesarean section, the treatment doses of LMWH should be omitted for 24 hours before surgery. A thromboprophylactic dose of LMWH (dalteparin 5000 units) should be given in the evening post operative delivery.

Anaesthesia

Involvement of a senior anaesthetist during the antenatal period is imperative. All eventualities should be discussed early in with reference to analgesia and anaesthesia with an antenatal documented plan of care. A senior anaesthetist should be contacted when the woman is admitted in labour or delivery planned.

Regional anaesthetic should not be undertaken for at least 24hours after the last dose of therapeutic LMWH.

The epidural catheter should not be removed within 12 hours of prophylactic LMWH injection and 24hours after therapeutic LMWH injection.

Surgery

A senior obstetrician should be in attendance at time of caesarean section for all women receiving therapeutic LMWH. Attention should be given to haemostasis before closure and a sheath drain as well as an intraperitoneal drain given consideration. Interrupted sutures for skin closure should be used.

The use of a Syntocinon infusion 10units/hour should be considered following placental delivery.

Post Partum Management

Once haemostasis is secure, give prophylactic dalteparin within 12hrs of delivery. After 24 hrs restart therapeutic dose according to the patients weight – see below

Recommended dosage of dalteparin for adults

Weight (kg)	Dose
<45	7 500 units
46-56	10 000 units
57-68	12 500 units
69-82	15 000 units
83 and over	18 000 units

Once daily administration 200 units/kg body weight according to weight ranges. The single daily dose should not exceed 18 000 units. Single dose syringes are available.

Standard duration of treatment of DVT or PE in pregnancy is for the duration of the pregnancy and for at least 6 weeks post natally. Some patients may require three months of treatment post delivery if they present close to term. These patients should all be referred to the haematology clinic for counselling and further investigation post delivery

The Woman who is at a High Risk of Bleeding but requires Anticoagulation

- When continued heparin treatment is considered essential, unfractionated IV heparin should be used.

- **Protamine sulphate can be used to reverse the effects in discussion with the Haematologist.**

- Involvement of a senior haematologist is essential and consideration given to referral to a tertiary unit

Post Natal Anticoagulation

- Post delivery restart IV heparin until the risk of bleeding is reduced. Once haemostasis is secure, convert to therapeutic dalteparin once daily for at least 6 weeks. Follow up in a specialist Haematology Clinic should be arranged on completion of treatment. Warfarin can be considered and both LMWH and Warfarin are safe in breastfeeding mothers. Warfarin should be commenced on the recommendation of the Haematologist and dalteparin continued until therapeutic doses are reached.

Management of Life-Threatening Pulmonary Embolism

CONTACT CONSULTANT ANAESTHETIST, CHEST PHYSICIAN AND HAEMATOLOGIST IMMEDIATELY FOR ADVICE

Massive PE?
If suspect massive PE (definition: one so severe as to cause circulatory collapse (BP<90 systolic, HR >120) or signs of shock:

Airway, Breathing, Circulation

Arrange EMERGENCY CTPA with radiologists (contact duty radiologist within normal working hours, or out-of-hours contact the radiology consultant on call via switchboard).
Imaging should be performed as soon as possible, ideally within an hour.
If collapsed patient/ too unwell for CTPA: consider emergency referral to cardiologists for urgent echocardiogram/ consider thrombolysis on clinical grounds.

- All patients should have FBC, coagulation screen, urea and electrolytes, liver function tests, ECG, CXR and arterial blood gases performed.
- Patients on oral anticoagulants or LMWH (prophylactic or therapeutic doses) should proceed directly to imaging investigations.

Patients in whom investigations show an alternative cause for the symptoms ie pneumothorax, heart failure, rib fracture do not need further investigations to exclude a PE.

Massive PE:
- Bolus UFH (5000IU) followed by maintenance infusion when diagnosis considered pending results of investigations.
- Appropriate resuscitation if shocked.
- IF CARDIAC ARREST IS IMMINENT: CONSIDER THROMBOLYSIS ON CLINICAL GROUNDS
- Diagnosis confirmed and BP <90 mmHg: THROMBOLYSE
- If cardiac arrest seems imminent and thrombolysis is either failing or contraindicated, consider mechanical thrombectomy - contact UHW
- If uncertainty regarding thrombolysis contact physician on call
- Patients should be managed on a Level 2 Unit
- High flow oxygen to maintain O_2 saturations >94%; 28% O_2 if patient known to have COPD- monitor arterial blood gases

Submassive PE (PE with evidence of right heart strain but without hypotension):

- Current evidence does not support the use of thrombolysis in these patients. Thrombolysis has been shown to improve haemodynamic parameters more rapidly than heparin, but does not reduce mortality or morbidity.
- Recurrent PE is the principle cause of death in haemodynamically stable patients with PE: thrombolysis does not reduce the rate of recurrent PE when compared with heparin
- Consideration should be given to managing patients with submassive PE in a closely monitored environment (at least level 1) so that emergency thrombolysis can be given if clinical condition deteriorates.
- Anticoagulate as below for 'Haemodynamically stable patients with PE'.

Thrombolysis in pregnancy is likely to induce termination: discuss with obstetricians and consider caesarean section.

- Patients at high risk of bleeding, (or if anticoagulation may have to be rapidly reversed) should be given a bolus of unfractionated heparin (5000IU) followed by maintenance UFH infusion (monitor APTT ratio 4 hrly until stable).

- Consider IVC filter if episode of VTE close to due date (discuss with interventional vascular radiologists).

- All patients should be under joint consultant obstetric/medicine consultants. Consider discussing with respiratory physician and/or haematologists if concern.

- All women with negative investigations should be reviewed in the antenatal clinic a week after the investigations, by their own team. This is regardless of whether clinical suspicion is high or low.

Appendices

Appendix 1 – Risk Assessment Tool for Obstetrics

Appendix 2 - Flow Chart for Obstetric Patients with Previous Venous Thromboembolism (DVT/PE)

Appendix 3 - Antenatal Clinic ABUHB: Management of Obstetric patients prescribed antenatal thromboprophylaxis for BMI > 45

Appendix 4 – Patient information leaflet – CTPA screening

Appendix 5 – Maternity Services Dalteparin Prescription in ANC

THROMBOPROPHYLAXIS RISK ASSESSMENT FOR PREGNANT WOMEN:

Assess all women at their first hospital visit and at each antenatal admission

Indications for outpatient antenatal thromboprophylaxis (continue through any inpatient admission)
Tick if no risk factors identified ☐ Date…… Signature……..

	Tick if present		Tick if present
Previous DVT/PE Refer to joint haem clinic		**Antithrombin deficiency** Refer to joint haem clinic	
Systemic Lupus Erythematosis Refer to joint haem clinic		**Sickle cell disease** Refer to joint haem clinic	
Antiphospholipid Syndrome Refer to joint haem clinic		**Myeloproliferative disorder** Refer to joint haem clinic	
BMI > 45kg/m2 Consider AN thromboprophylaxis and refer to anaesthetic clinic at 32/40		**Assessed by**	**Date**

Consider postnatal thromboprophylaxis for 6 weeks if there is a strong family history of venous thromboembolism, particularly related to pregnancy

Indications for thromboprophylaxis whilst antenatal inpatient (IF one criteria is ticked – Patient requires thromboprophylaxis)

Date				
Indication	✓ Tick if present	✓ Tick if present	✓ Tick if present	✓ Tick if present
Hyperemesis				
BMI≥35				
Dehydration haematocrit >.45				
Sepsis				
Immobility – >3 days bed rest				
Acute / chronic disease –Rh Arthritis Nephrotic syndrome				
Varicose veins with phlebitis				
Active cancer / cancer treatment				
Ongoing antenatal thromboprophylaxis				
Signature				

Booking Weight	Dose of Dalteparin
< 50 kg	**2500 units once daily**
50-90 kg	**5000 units once daily**
91 – 130 kg	**7500 units once daily**
130 + kg	**10 000 units once daily**

Contraindications to pharmacological thromboprophylaxis?

Birth anticipated within next 12 hrs	**Spinal or epidural anaesthesia is to be performed within 12 hrs of administration**
Platelet count < 70 x 10^{-9} /l	**Epidural Catheter has been removed within 4 hrs**
Active bleeding	**DIC**
Already having therapeutic anticoagulation	**Severe Liver disease**
Renal Impairment – if e GFR <30ml/min or evidence of acute renal failure please use unfractionated heparin 5000 u bd	**Previous heparin induced thrombocytopenia (discuss with haematologist)**

Consider TED stockings if LMWH is contraindicated.
Avoid stockings if pedal pulses are impalpable, peripheral vascular disease, severe dermatitis, peripheral neuropathy, recent skin graft

Postnatal Thromboprophylaxis

Indications for 10 days of thromboprophylaxis following birth	**Tick if present**
PPH > 1500 mls	
Red cell transfusion or transfusion of coagulation factors (FFP)	
Caesarean section (elective or emergency)	
Stillbirth	
BMI > 40kg/m2	
Sepsis	
Complex vaginal delivery	
Antenatal thromboprophylaxis for recurrent miscarriage in absence of personal history of VTE	
SIGNED	

If any indication ticked then please prescribe dalteparin on the drug chart and TTH

Indications for 6 weeks of thromboprophylaxis following birth	**Tick if present**
Previous antenatal thromboprophylaxis for VTE prevention	
Family History of VTE particularly pregnancy or hormone related VTE	
All inherited thrombophilias – including Factor V Leiden, Protein C and S deficiency, Antithrombin deficiency	
SIGNED	

If any indication ticked then please prescribe dalteparin on the drug chart and TTH

Booking Weight	Dose of Dalteparin
< 50 kg	**2500 units once daily**
50-90 kg	**5000 units once daily**
92 – 130 kg	**7500 units once daily**
130 + kg	**10 000 units once daily**

Delay starting Dalteparin:

- Until 12 hrs post epidural catheter withdrawal
- If DIC present
- If there is a need for spinal anaesthesia

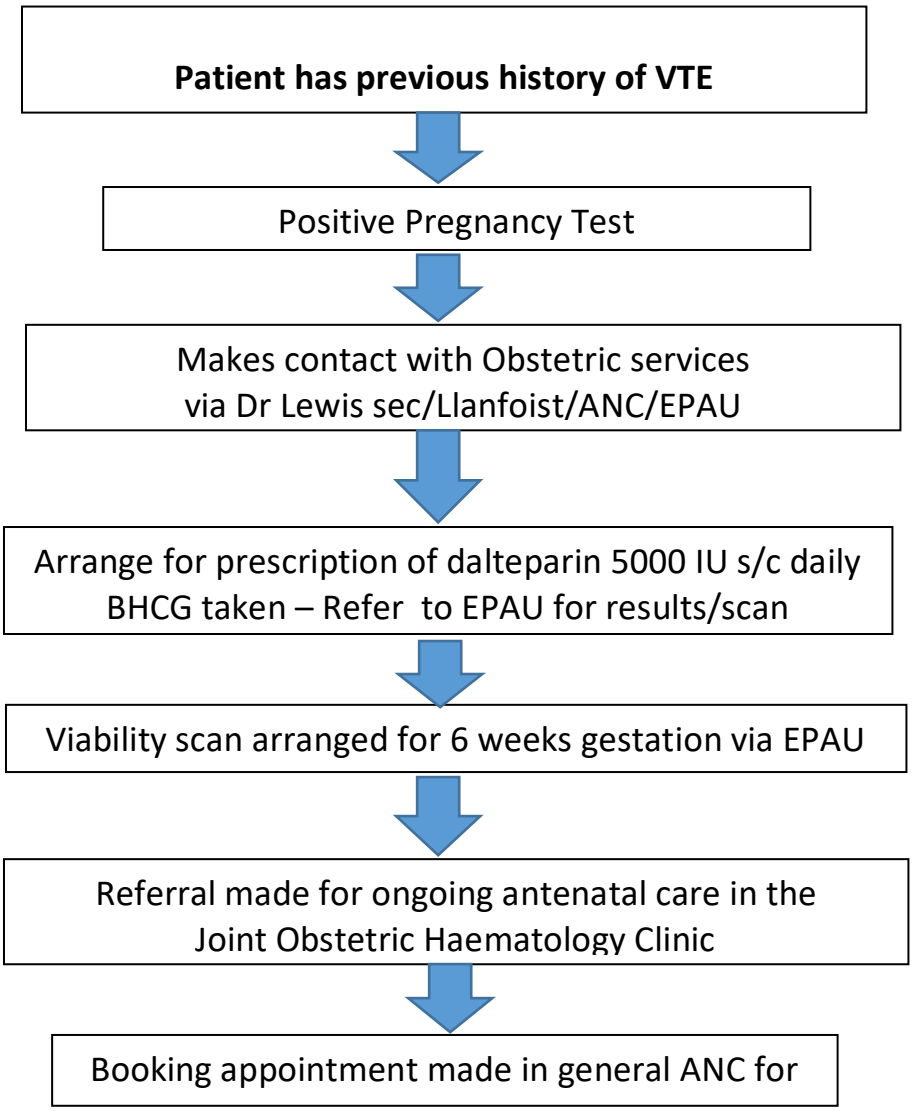
Encourage early mobilisation, hydration and awareness of symptoms of VTE in all women

Appendix 2

Flow Chart for Obstetric Patients with Previous Venous Thromboembolism (DVT/PE)

When diagnosed with DVT/PE, the risks of VTE recurrence in pregnancy are explained to the patient as well as the need for thromboprophylaxis in any future pregnancies, given the high risk of VTE recurrence in patients.

Patients are given a letter from DVT clinic which gives them the contact details to call when they become pregnant, to ensure they are seen in and commenced on LMWH prophylaxis as soon as possible, and that a viability scan is performed.



Patient Details

Date……
Seen By……..
Obstetrician ……

Dr Lewis Sec 01873732259
Mrs Parveen 01633 234612

Date		**Signed**
Date of Previous DVT/PE		
Weight		
LMP		
Dose of Dalteparin		
Explained to patient how to give injection		
Sharps box given to patient		
BHCG taken		
Viability scan arranged		
Referral made to Obs Haem clinic		
Referral for general Booking appt		

Appendix 3

Antenatal Clinic ABUHB

Management of Obstetric patients prescribed antenatal thromboprophylaxis for BMI > 45

- Patients are risk assessed at booking
- If BMI > 45 they should be offered dalteparin

Booking Weight	**91-130kg**	**131 kg +**
Dalteparin Dose	7500 IU daily	10,000 IU daily

- Please check Anti Xa level after 2 weeks : **14 weeks gestation**
- This should be taken 4 hours post injection in a **blue top** citrated vacutainer. Please ensure the bottle is properly filled
- Levels are run twice weekly @ RGH Coagulation lab – ext 44481

Anti Xa desired thromboprophylactic range: 0.05-0.15 IU

- If levels are within this range, please repeat each trimester **at 28 weeks and 36 weeks gestation**
- If levels outside of this range, please contact Dr Lewis for guidance regarding dose adjustment
- All patients on LMWH should be referred to the anaesthetist
- All patients on LMWH should be seen by their locality consultant obstetrician

Consultant Haematologist	**Sarah Lewis**	**sarah.lewis4@wales.nhs.uk**	**01873 732259**
Consultant Obstetrician	**Sajitha Parveen**	**sajitha.parveen@wales.nhs.uk**	**01633234612**

Appendix 4

Patient information and consent form – radiation exposure in pregnancy

Pregnancy is associated with a large increase (up to tenfold) in the possibility of clots –thrombosis – forming in the leg veins. These can travel to the lungs causing a pulmonary embolism (PE). This is one of the commonest causes of mothers dying in the UK; it may cause with breathlessness, chest pain or collapse. Where untreated, PE in pregnancy has a death rate of 15-30% - the diagnosis of PE is therefore important not to miss.

You may have already had ultrasound (involving no radiation) to look for deep vein thrombosis (DVT) in both your legs, and a chest X ray to check for other explanations for your symptoms (such as pneumonia). Unfortunately, in your case, these scans have not given us an answer (or were considered not useful) and we are still concerned that you may have a PE. Further scans are required to detect this.

CTPA or V/Q scan

There are two types of scan that we can use to look for blood clots in the lungs. A CT pulmonary angiogram (CTPA), or a Ventilation/Perfusion (V/Q) scan. Both of these scans unfortunately involve radiation, and there are slightly different risks associated with each; the exposure may affect you (primarily by increasing the risk of breast cancer) and your baby.

The CTPA scan is preferred in non pregnant women, because:

- It is more accurate at detecting clots than the V/Q scan.
- There is a chance that the V/Q scan will not be able to answer the question (an 'intermediate probability' of PE occurs in about 10% of scans during pregnancy, though quite a lot more than this outside of pregnancy) in which case we'll need a CTPA anyway.
- The V/Q scan, unlike the CTPA, is unable to detect other chest problems that may be causing your symptoms.
- V/Q scanning may be delayed because of difficulty getting hold of the isotopes.
- V/Q scanning cannot be used if you have an abnormal chest x-ray, asthma or any other lung disease.

Risks to the Baby

Following either scan there is an extremely slight increase in risk of childhood cancer in your unborn baby. It has been estimated that the risk of fatal cancer to the age of 15 years is less than 1/1,000,000 after in utero exposure to CTPA and 1/280,000 following a perfusion scan; this is because the average fetal radiation dose with CTPA is about 10% of that with V/Q scanning during all trimesters of pregnancy.

To put those numbers in perspective,

- The relative risk of maternal death from uncomplicated pregnancy in the UK, is about 1 in 170,000.
- Annual risk of death in the UK for all cancer is 1 in 400.
- Risk of dying by the age of 40 years in the UK is 1 in 700.
  (Increased by 1 in 200 in those who smoke 10 cigarettes each day).

The contrast or 'dye' injected into a vein is used to make the clots visible on the CTPA scan. There is no reported risk to an unborn child, though all children should have their thyroid function tested after birth (in the UK routinely done as part of the Newborn Bloodspot Screening test, 5-8d after birth). If you are breastfeeding, feed right before the scan, then use expressed milk for 24 hours after your CTPA, when it is advised not to breastfeed. Please tell us if you've had a previous reaction of any type to contrast dye or iodine.

Risks to the Mother

Studies suggest the greater risk is actually to you as the mother, with a lifetime risk of breast cancer following radiation exposure with the CTPA increased by 13.6%. This is a similar increase in risk associated with never being pregnant, periods starting before the age of 11 years, or late menopause. To put this in perspective, the lifetime risk of breast cancer is 1/8 (12.5%), following exposure to 20mGy of radiation (the dose received from one CTPA), this rate increases by:

- 1/1200 women at age 20 (0.00083%)
- 1/2000 women at age 30 (0.0005%)
- 1/3500 women at age 40 (0.00029%)

The V/Q scan does not have the same risk, with only a fractionally increased risk of breast cancer if any. For perspective, the radiation exposure:

- from a V/Q scan is 0.11–0.31 mGy,
- compared to about 3mGy from a mammogram,
- or 20mGy from a CTPA.

Conclusion

A scan is necessary to outrule a PE, which can easily be fatal if untreated. While a CTPA is generally a more reliable scan, the main disadvantage is that there is much more radiation to the breasts. To minimize the dose of radiation, lung perfusion scans are preferred for young women, especially if there is a family history of breast cancer or the woman has had a previous chest CT scan. While there is a higher risk of childhood cancer with the V/Q scan it is still extremely small.

Statement of health professional:

- I have explained the intended benefits and the risks associated with radiation exposure during pregnancy as detailed above to the patient named above.
- I confirm that the patient has the capacity to consent.

- We have decided on a……..scan

Signed…… Job title…….. Date……

Name (PRINT)……

Statement of patient:

I agree to the ……..scan and have understood the information given to me.

Signed…… Date……

Name (PRINT)…… Nam

Appendix 5 ABUHB Maternity Services Outpatient Dalteparin Prescription

ABUHB Maternity Services
Outpatient Dalteparin Prescription

Use: To be used for pregnant women requiring a prescription for pharmacological thromboprophylaxis with dalteparin subcutaneous injections (prescription-only medicine) at antenatal clinic visit.
Please assess all pregnant women for their risk of venous thromboembolism on the 'Thromboprophylaxis Risk Assessment for Pregnant Women' (pink) form before completing this prescription form.

Section 1: Patient Details (to be completed by Registered Midwife)

Addressograph	**Date:**
	Consultant:
	Booking weight (kg):
	Current gestation:

Patient allergies: None known / Yes
If yes, drug allergen…… **Description of reaction…….**

Section 2: Regimen
To be completed by Clinician/Consultant

Indication for pharmacological thromboprophylaxis with dalteparin (state below):

Dose of dalteparin (please tick):

Dalteparin subcutaneous injection	**2,500 units once daily (booking weight <50kg)**	
	5,000 units once daily (booking weight 50-90kg)	
	7,500 units once daily (booking weight 91-130kg)	
	10,000 units once daily (booking weight >130+kg)	

Duration of treatment (please tick):

Until the patient completes the course which has been supplied	
Until the patient returns to hospital for further assessment	
Until the Consultant tells them to stop	
Number of syringes to be supplied:	

Print Name of Prescriber:	**Signature of Prescriber:**	**Date:**

Section 3: Dispensing (to be completed by Registered Midwife)

Dispensing Procedure*:
Two Registered Midwives to check:

- ✓ **Correct patient details on prescription**
- ✓ **Prescription completed in full and signed and dated by prescriber**
- ✓ **Allergy status**
- ✓ **Correct medication dispensed (name, form, strength)**
- ✓ **Expiry date**
- ✓ **Correct quantity**
- ✓ **Label is fully completed in accordance with POM guidelines**

Sharps bin provided

Name of clinician/Registered Midwife assembling medication:	**Signature of clinician/Registered Midwife assembling medication:**
Name of clinician/Registered Midwife accuracy checking medication:	**Signature of clinician/Registered Midwife accuracy checking medication:**

Prescription to be filed in patient's notes following dispensing.
Please refer to ABUHB 'TTH/Discharge Supply by Nurses and Midwives' policy for further guidance