Venous Thrombo Embolism (VTE)

Risk assessment, prophylaxis and treatment in pregnancy and puerperium

Approved by: Antenatal Forum

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Amendment: 29 March 2023 Appendix 3 SOP for MLC women: statement added

Contents

Introduction

Venous thromboembolism (VTE) is the leading cause of direct maternal deaths in 2017-19, at a rate of 0.92 per 100,000 maternities. Most of these deaths were from pulmonary embolism (PE), but also include cerebral venous sinus thrombosis, and over two thirds of cases occurred post-delivery. Maternal morbidity rates are higher and also include deep vein thrombosis (DVT). This guideline outlines risk assessment and prophylaxis for women at risk of VTE, as well as acute management once a VTE event occurs, for use by health professionals within Swansea Bay University Hospitals Health Board.

Responsibilities

All health professionals should be aware of this guideline and the need to undertake a VTE risk assessment in all users of the maternity service.

Midwives:

Midwives should undertake an initial assessment using the risk assessment tool (appendix 1) when undertaking a booking visit. Where a woman is identified as being high risk, an urgent referral to obstetric care should be made.

Midwives should re-evaluate the risks on every admission to hospital and highlight to obstetricians where the risk changes. All assessments should be made using the same risk assessment tool page as at booking (appendix 1)

Obstetricians:

Obstetricians should check the VTE risk assessment tool for accuracy, assess for any contraindications and counsel women on any treatment advised.

Obstetricians should re-evaluate the risks after a new diagnosis

Obstetricians should prescribe any medication required. As an outpatient this is using the outpatient prescription tool (appendix 2).

Pharmacist:

Pharmacy will supply any low molecular weight heparin required during the pregnancy and puerperium. They will liaise with the patient for ongoing supplies during this time.

Pre-Pregnancy Counselling

Women who have had a previous VTE should have pre-pregnancy counselling and plan for thromboprophylaxis during pregnancy made.

Over two thirds of lethal VTE events were in women who were overweight or obese. Measures to manage weight should be explored at each opportunity.

Risk Assessment

All women should have a documented risk assessment using the VTE risk assessment tool (appendix 1) as early in pregnancy as possible. This should be reviewed following any new diagnosis. Where a need for thromboprophylaxis is identified this should be discussed with the woman, and if consenting to treatment this should be prescribed on the outpatient prescription form (appendix 2). This will allow pharmacy to dispense for the remainder of the pregnancy and puerperium. Completion of this form is indicated by ticking the box on the risk assessment tool (appendix 1). Women can be shown how to administer LMWH through the Antenatal Day Assessment Unit.

WEIGHT: The score for weight is stratified dependent on the booking BMI. This must be a measured BMI and not a self-reported BMI as these are not reliable.

IVF: This should score where fertility drugs are used. Intrauterine insemination does not pose an increased risk for VTE.

PREVIOUS VTE: It is important that the circumstances around the event are clarified and the result verified where possible. Ideally, these women should have had pre-pregnancy counselling and a plan for thromboprophylaxis. If not, they should be seen in the obstetric haematology clinic as soon as possible. Unless the woman has had a single VTE related to major surgery then she should be offered to start prophylaxis as soon as possible in her pregnancy.

FAMILY HISTORY: A history of an unprovoked or oestrogen related (pregnancy, hormonal contraception, HRT or fertility treatment) VTE in a first degree relative (parents, siblings, children) under the age of 50 years only. This raises the possibility of an inherited thrombophilia.

THROMBOPHILIAS: Each thrombophilia has its own elevated risk, but broadly speaking can be divided into high risk thrombophilia's (Antithrombin deficiency, antiphospholid syndrome, homozygous factor V Leiden, protein C or S deficiency, or compound thrombophilia's (i.e. more than 1)) and low risk thrombophilia's (heterozygote factor V Leiden, prothrombin gene mutation, antiphospholipid antibodies (without antiphospholipid syndrome)). Thrombophilia testing is not indicated in pregnancy from the perspective of VTE assessment.

COMORBIDITES: These include active autoimmune and inflammatory conditions such as Inflammatory Bowel (Crohns or Ulcerative Colitis), Arthritis, Nephropathy, cancer, Systemic Lupus Erythematosus, heart failure and sickle cell disease.

IMMOBILITY: This includes chronic problems such as paraplegia, as well as transient problems such as fractured limb, or pelvic girdle pain requiring walking aids. Long distance travel should also be considered – this is considered any journey longer than 4 hours (by any mode of transport).

INFECTION: Any current infection requiring treatment, such as a urinary infection or chest infection. Viral infections such as COVID also increase the risk of a VTE event.

SURGERY: Any non-obstetric related surgery performed during pregnancy.

Admission to Hospital

Admission to hospital during pregnancy is associated with an increased risk of VTE, especially if admission is for 3 days or more, and persists in the 28 days after discharge. At every admission, the risk assessment should be repeated and recorded in the sequential assessment section on the assessment tool (appendix 1). Women with a risk score of 2 or more should be considered for thromboprophylaxis.

Thromboprophylaxis

- Women with a risk assessment score of 4 should consider starting thromboprophylaxis as early in the pregnancy as possible.
- Women with a risk assessment score of 3 should consider starting thromboprophylaxis from around 28 weeks gestation
- Women with a score of 2 or more and not on thromboprophylaxis should consider taking thromboprophylaxis during any hospital admission
- Women with a risk assessment score of 2 should consider starting thromboprophylaxis postnatal for at least 10 days.
- Women taking antenatal thromboprophylaxis or scoring 3 or more and not on thromboprophylaxis, should consider taking thromboprophylaxis postnatal for at least 6 weeks.

Therapeutic Options

Low molecular weight heparin (LMWH) is the agent of choice for thromboprophylaxis in pregnancy. LMWH is safe to use with no risk of heparin induced thrombocytopenia (HIT) or osteoporosis when used for prophylaxis during pregnancy. Monitoring of anti-Xa levels (to assess effectiveness of therapy) is not required outside of obstetric haematology specialist advice. Dosage of LMWH drugs is based on maternal weight. This will usually be the booking weight, but consideration should be given to re-weighing where women are at the threshold between different doses and/or have changed their weight by 12Kg or more. Dosage of LMWH is shown in table 1. In Swansea Bay, the LMWH of choice is enoxaparin. For women with renal impairment the dosage may need to be reduced.

Weight	Enoxaparin	Tinzaparin	Dalteparin
<50kg	20mg od	3500 units od	2500 units od
50-90Kg	40mg od	4500 units od	5000 units od
91-130kg	60mg od	3500 units bd	7500 units od
131-170kg	40mg bd	4500 units bd	10000 units od
>170kg	0.6mg/kg/day	75 units/Kg/day	75 units/kg/day

Table 1. Dosage of LMWH based on weight

Risks and Contraindications

Risks of LMWH: There is current debate on whether LMWH increases the risk of haemorrhage. The most recent systematic review indicates an increase in PPH rates in women taking prophylactic doses of LMWH during pregnancy, but mean blood loss and blood transfusion rates are not increased. Because LMWH is only available as an injection bruising is common. Oral anticoagulants have not been shown to be safe in pregnancy.

Contraindications to LMWH: The only real contraindications to LMWH are allergy and active bleeding. However, caution should also be advised in severe hypertension, bleeding disorders and recent cerebral haemorrhage or surgery of the nervous system. In these cases, the risks and benefits need to be weighed up. In women who have previously had HIT haematology advice should be sought. In renal impairment the dose of heparin may need to be reduced. It also important to recognise that LMWH is porcine in origin (derived from pigs) and this may be relevant for certain women for dietary or religious beliefs.

Alternative thromboprophylaxis methods include mobilisation, hydration and thromboembolic stockings. However, these methods are not as effective as LMWH at reducing the risk of DVT, and only minimally reduce the risk of PE.

Thromboembolic stockings are contraindicated in peripheral arterial disease or arterial bypass grafting, fragile skin disorders, and recent skin graft. They must be of the correct size to achieve any effect and hence the legs must be measured before application.

If commencing LMWH women should be advised to not administer once labour begins or if they experience vaginal bleeding, unless advised by an obstetrician.

Induction of labour

Most women will discontinue their LMWH on the day of admission unless written instructions by a consultant state otherwise. All women who had antenatal LMWH should have thromboembolic stockings applied, and be advised on the importance of hydration and mobilisation. If the VTE score is 4 or more, then an individual plan should be made after the initial assessment of cervical favourability, to determine if further doses of LMWH should be administered during the induction of labour process. This should balance the risk of needing regional anaesthesia against the risk of VTE.

Anaesthesia

A spinal / epidural is only possible if the last dose of LMWH for prophylaxis was more than 12 hours before siting. LMWH should not be given until 4 hours after a spinal or epidural is removed.

Postnatal

All women should have a further assessment following delivery. This should include the postnatal risk factors section of the risk assessment form (appendix 1). For women with a score of 2 10 days of LMWH is advised, and those with a score of 3+ OR those taking antenatal LMWH should continue for 6 weeks.

Midwifery Led Care (MLC)

Women under MLC should follow the process above. Women who score 4 will be recommended obstetric led antenatal and intrapartum care. Women who score 3 should be transferred to obstetric led care for review and counselling at 28/40 regarding antenatal/postnatal thromboprophylaxis. Where antenatal thromboprophylaxis is accepted and commenced women should remain under obstetric led care for the remaining pregnancy and birth. Women who score 3 who decline antenatal prophylaxis and who are otherwise suitable for midwifery led care can continue with the MLC pathway for pregnancy and birth with the offer of postnatal thromboprophylaxis. Women who score 2 AND PLANNING TO BIRTH IN A MIDWIFERY LED SETTING should be referred to the local maternity unit (Singleton or Neath Port Talbot Hospital) where local arrangements are in place to provide LMWH for these women. They should take this to the birthing environment where instructions on administration can be given before discharge. See appendix 3.

Acute Venous Thrombotic Event

Most pregnant women with a VTE will have clinical symptoms. These include unilateral leg pain, redness and swelling, lower abdominal pain (pelvic vessel thrombus), dyspnoea, chest pain, haemoptysis, and collapse. Signs include tachypnoea, tachycardia, low grade pyrexia, and a discrepancy in the diameter of the lower limbs by 3cm or more. DVT is more likely to be on the left side than the right due to compression from the uterus on the iliac vessels.

Investigation and Management:
In any woman suspected of having a VTE treatment dose LMWH should be given until the diagnosis has been excluded. This can be with Tinzaparin 175units/Kg od or enoxaparin 1mg/Kg bd (based on booking weight unless a change of more than 12kg has occurred).

All women should have a full blood count (FBC), Coagulation screen, Urea and Electrolytes (U&Es) and Liver function tests (LFTs) taken. D-dimers are not useful in pregnant women as pregnancy elevates the results. Likewise, the WELLS score has not been validated as a screening tool for pregnant women, and its use is therefore not advised.

For suspicion of DVT a Doppler ultrasound of the affected leg should be undertaken. If this is negative for a DVT and the clinical suspicion of DVT is low, then LMWH can then be stopped. However, if clinical suspicion is high then treatment should be continued, and further imaging should be discussed with the radiologists. This may include a repeat Doppler scan after 7 days, contrast venography or MRI venography. For suspicion of PE in a clinically stable patient then a Chest X-ray, 12 lead ECG and arterial blood gas should also be undertaken. ECG abnormalities suggestive of a PE include T wave inversion, S1Q3T3 pattern, and right bundle branch block. CXR may show other pathologies such as pneumonia, which may affect the suitability of further imaging. If there are signs or symptoms of DVT then initial investigation is a Doppler, and if positive then treat as a PE. If there is no clinical indication of a DVT then the definitive investigation is either a Computerised Tomography Pulmonary Angiogram (CTPA) or Ventilation Perfusion (VQ) scan. Women need to be informed that with both imaging techniques the radiation exposure will slightly increase (1 in 170,000) the risk of childhood cancers in the infant (more so with VQ than CTPA) and breast cancer in the mother (more so with CTPA than VQ).

For suspicion of PE in a clinically unstable patient care must be undertaken by a multidisciplinary team including consultant obstetrician, consultant anaesthetist, physicians and radiologists, in an appropriate area such as labour ward HDU, and follow the principles of ABC resuscitation. Investigations ideally should be for clinically stable patients but with a portable echo (which may show right ventricular dysfunction) or CTPA. Treatment with IV unfractionated heparin is preferable to LMWH for its quicker response. A loading dose of 80units/kg should be given followed by an infusion of 18units/kg/hour. Monitoring of the APTT will be required where IV heparin is administered. If there is haemodynamic compromise, then thrombolytic therapy may be given followed by IV heparin infusion (omitting the loading dose). The health board IV heparin prescription chart should be used. http://howis.wales.nhs.uk/sites3/Documents/926/CID1182%20SBUHB%20Heparin%20Infusion%20Prescription%20Chart%20-%20November%202020.pdf

Treatment with LMWH should be continued for the duration of the pregnancy and at least 6 weeks postnatal. Total duration of therapy needs to be at least 3 months. A plan on management of anticoagulation for these women during induction of labour, spontaneous labour, or elective surgery, should be made in conjunction with haematology. Post-delivery anticoagulation can be with either LMWH or warfarin, although oral anticoagulation should not be commenced before day 5 postnatal. Liaison with the VTE service is advised for women wishing to start oral therapy. Women should ensure they have effective contraception if commencing warfarin due to its teratogenic effects. Warfarin is not contraindicated in women breastfeeding.

Appendix 1 – VTE assessment form

Maternity Risk Assessment for Venous Thromboembolism (VTE)

Risk Factors

Antenatal

	Yes	No	Score
BMI 30-39.9 = 1, BMI 40 - 50 = 2, BMI >50 = 3			1/ 2/ 3
Age >35			1
Parity 3+			1
Smoker			1
IVF Pregnancy			1
Multiple Pregnancy			1
Previous VTE (if associated with major surgery only score 3)			3 or 4
First degree relative with Unprovoked or oestrogen related VTE			1
High risk thrombophilia (Antithrombin deficiency, APLS, Homozygous factor V Leiden)			3
Low risk thrombophilia (heterozygote factor V Leiden, Prothrombin gene mutation)			1
Medical Co-morbidities (Cancer, inflammatory bowel, nephrotic syndrome, inflammatory arthritis, IDDM with nephropathy, sickle cell)			3
Severe varicose veins			1
Pre-eclampsia			1
Immobility eg PGP, paraplegia,			1
Hyperemesis or Ovarian Hyperstimulation Syndrome			1
Infection			1
Surgery eg appendicectomy			1

Postnatal

	Yes	No	Score
Caesarean Section (1 if Elective, 2 if Emergency)			1 or 2
Keillands / Manual Rotation and Instrumental delivery			1
Prolonged Labour (>24hours)			1
PPH >1litre OR blood transfusion			1
Birth <37/40			1
Stillbirth			1
Infection / Sepsis			1
Non Obstetric Surgery eg appendicectomy			1

Score of 2 – Post natal thromboprophylaxis for 10/7, and during any admission to hospital

Score of 3 – Consider thromboprophylaxis from 28/40 and 6 weeks post natal

Score of 4 or more – Consider thromboprophylaxis from first trimester and 6 weeks post natal

ContraIndications to LMWH – Active bleeding, Renal Impairment (GFR <30), known bleeding disorders (eg haemophilia), Plts <75

Contraindications to TED stockings – Absence of pedal pulses, peripheral vascular disease, severe dermatitis, peripheral neuropathy, recent skin graft.

Dosage **Booking Weight** **_____kg** Recalculate if >12kg weight change

Weight (kg)	**Tinzaparin**	**Enoxaparin**
<50	3500 units once daily	20mg once daily
50-90	4500 units once daily	40mg once daily
91-130	3500 units twice daily	60mg once daily
131-170	4500 units twice daily	40mg twice daily
>170	75 units/kg/day	0.6mg /kg/day

DATE (Booking, every admission and post natal)							
Score							
Treatment							
Duration (ongoing or specified time)							
Last Plts (and date)							
Last U+E (and date) if applicable							
Signature And Print Name							

Reprint this page if more assessments required. Outpatient Prescription completed ☐

Appendix 2 – LMWH prescription as OP

Patient Name …… ***NHS Number ……***

Pharmacy: *Following each dispensing please place in ISSUED CARE PLANS box*

Antenatal Thromboprophylaxis Pharmacy-led Supply **Preferred contact number** ……	NHS Number: Name: Address:

Section One: Prescription			
Prescription	**Expected Delivery Date**		
	Early Booking Weight		
	Treatment: Inhixa (Enoxaparin) Subcutaneous Injection (Syringe)		Please Tick
	<50 Kg	**20mg OD S/C**	
	50-90 Kg	**40mg OD S/C**	
	91-130 Kg	**60mg OD S/C**	
	131-170 Kg	**40mg BD S/C**	
	>170 Kg	**0.6Mg/Kg S/C OD** **Dose:**	
	High prophylactic dose for women 50-90Kg	**40mg BD S/C**	

Baseline Bloods					
Hb		**Platelets**		**K+ (Only if clinically indicated)**	
Cr (Only if clinically indicated)		**PT/INR (Only if clinically indicated)**		**ALT (Only if clinically indicated)**	

Exclusion to Pathway		
Platelets < 70	CrCl <30ml/min	

I confirm that this patient is suitable for management via the pharmacy-led LMWH pathway			
Prescribers Signature		**Date**	
Consultant		**Contact**	

Section Two: Supply *(Supply in a maximum of three months per instalment)*

1	**Inhixa (Enoxaparin) Syringe(s)**		Quantity	40 Inj
	……mg to be injected S/C …….. each day		Supply	
	Weight		Hb	
	Platelets			
	Creatinine (only if clinically indicated)		K+ (only if clinically indicated)	
	Clinical Check		Date	

Pharmacy: Once dispensed please place this care plan in the **ISSUED CARE PLANS** box

2	**Inhixa (Enoxaparin) Syringe(s)**		Quantity	40 Inj
	……mg to be injected S/C …….. each day		Supply	
	Weight		Hb	
	Platelets			
	Creatinine (only if clinically indicated)		K+ (only if clinically indicated)	
	Clinical Check		Date	

Pharmacy: Once dispensed please place this care plan in the **ISSUED CARE PLANS** box

3	**Inhixa (Enoxaparin) Syringe(s)**		Quantity	40 Inj
	……mg to be injected S/C …….. each day		Supply	
	Weight		Hb	
	Platelets			
	Creatinine (only if clinically indicated)		K+(only if clinically indicated)	
	Clinical Check		Date	

After delivery a postnatal risk assessment will be carried out and a further six week supply is usually required

Appendix 3 – SOP for MLC women

Maternity Risk Assessment for Antenatal Venous Thromboembolism (VTE).

If the birthing person has been on anti-coagulation pre-pregnancy, this SOP and VTE proforma should **not** be used and an urgent referral should be made to the Obstetric Haematology ANC

VTE risk assessment to be completed at **booking by Community Midwife**

↓

VTE score checked following **dating scan**.
Score of 2 or more?

NO
LMWH not required at this time.

YES
Give RCOG leaflet "Reducing the risk of venous thromboembolism in pregnancy and after birth".

↓

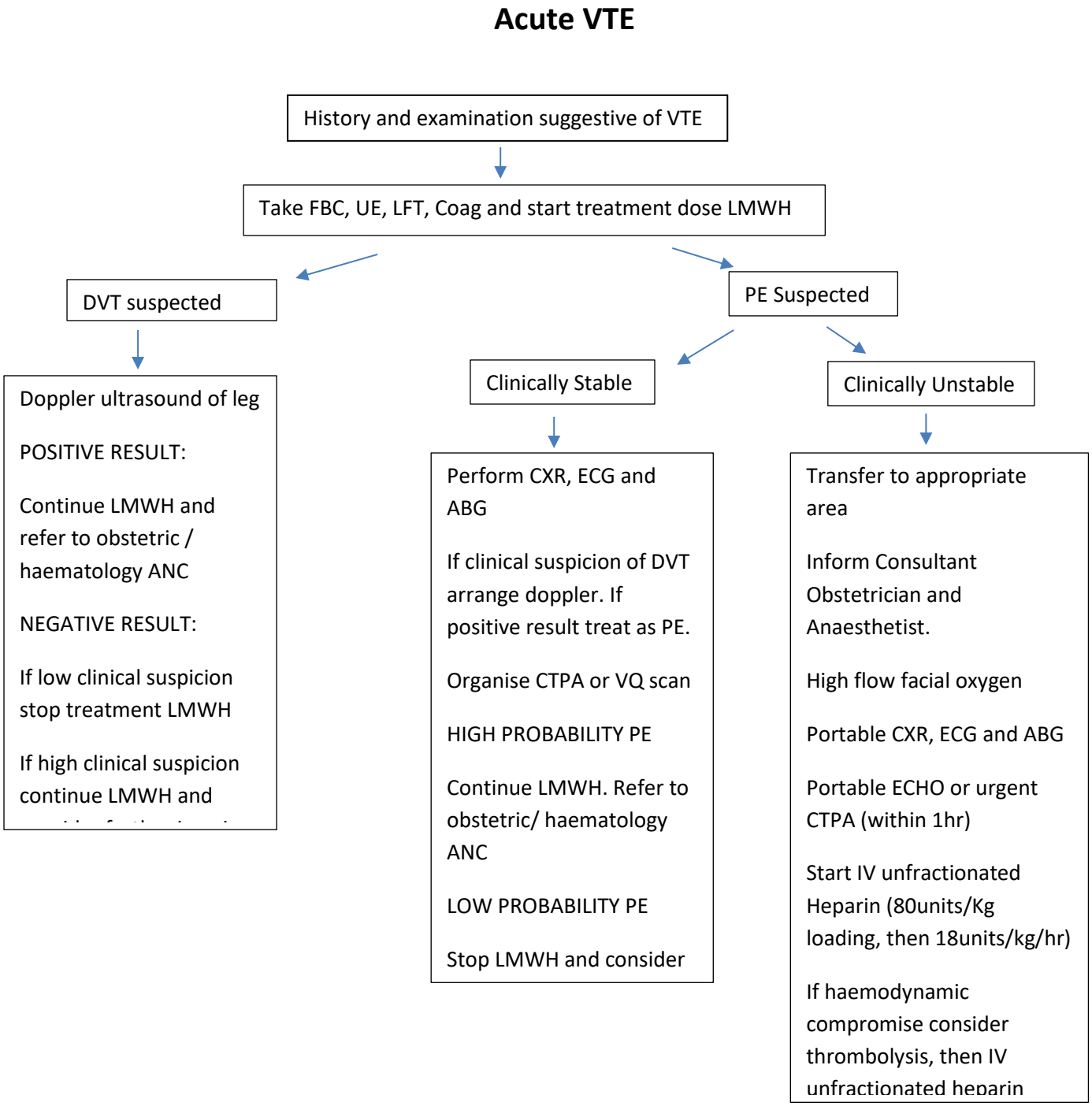
MLC **At dating appointment discussion around VTE prophylaxis and if consenting to therapy**	**CLC**
• If total score = 2, book into ADAU for prescription and collection of sharpes box, Tuesday am (Sing) Tuesday pm (NPTH) at 36/40 weeks. • **Singleton:** Dr Shaw will review Tuesday am if available, if not Gynae Reg to review. **NPTH:** Clinic consultant to review notes and prescribe if appropriate. • **If total score =3 full discussion held around antenatal thromboprohylaxis if opting into recommended prophylaxis transfer to Obstetric led care. Labour Ward is the recommended place of birth for women on antenatal thromboprophylaxis due to small increased chance in PPH >500ml and >1500 ml** ↓	• If total score = 2 Consultant/Senior Registrar to arrange ANC at 36/40 weeks for consideration 10 day postnatal prophylaxis. • If total score of 3, arrange ANC clinic at 28 weeks to consider thromboprophylaxis from this time. • If total score 4 midwife to book woman in the next ANC to consider thrombo-prophylaxis from first trimester. Labour ward is the recommended birth setting due to small increased chance of PPH in women on anticoagulants. ↓
• Information regarding the collection of prescription to be given to the woman **Advise women to take LMWH to birth area when attending in labour. Midwife responsible for the birth to demonstrate administration prior to discharge.**	• Give woman an appointment depending on VTE score to attend consultant clinic and liaise with ADAU for demonstration. Script to be collected from pharmacy.

NEW ADMISSION TO ADAU/AAU/WARD/CD

↓

Risk Assess VTE on existing purple VTE form and follow key on chart. If score ≥3 Obstetrician to consider LMWH
Note: If admitted to hospital during the antenatal period reassess VTE and consider LMWH this may sometimes only be a transient prescription. Review intended place of birth in light of VTE thromo prophylaxis

Appendix 4 – Flow chart for acute VTE



Maternity Services

Checklist for Clinical Guidelines being Submitted for Approval

Title of Guideline:	Venous Thrombo Embolism (VTE) Risk assessment, prophylaxis,and treatment in pregnancy and puerperium
Name(s) of Author:	Dr Louise-Emma Shaw
Chair of Group or Committee approving submission:	Antenatal Forum
Brief outline giving reasons for document being submitted for ratification	Updated guideline
Details of persons included in consultation process:	Antenatal forum members
Name of Pharmacist (mandatory if drugs involved):	
Issue / Version No:	3
Please list any policies/guidelines this document will supercede:	Venous Thrombo Embolism (VTE) Risk assessment, prophylaxis,and treatment in pregnancy and puerperium 2018
Date approved by Group:	March 2022
Next Review / Guideline Expiry:	March 2025
Please indicate key words you wish to be linked to document	VTE, DVT, prophylaxis, LMWH, tinzaprin, embolism, PE
File Name: Used to locate where file is stores on hard drive	