University Hospitals Sussex NHS Foundation Trust

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TRUST CLINICAL GUIDELINE

Obstetric VTE

Prevention and Management of Venous Thromboembolism (VTE) in Pregnancy and the Postnatal Period

Overview

The purpose of this guideline is to provide good practice evidence for staff regarding prevention and management of venous thromboembolism during pregnancy and postnatally.

This guideline applies to:

- Midwives
- Obstetricians
- Anaesthetists
- Maternity recovery staff
- Operating Department Practitioners
- Any physician looking after pregnant patients
- Emergency floor staff

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Obstetric VTE:

Prevention and Management of Venous Thromboembolism (VTE) in Pregnancy and the Postnatal Period

1.0 Introduction

This guideline aims to ensure measures are taken to prevent venous thromboembolism, and to ensure optimal investigation, treatment and outcome for pregnant women and birthing people with suspected thrombosis during pregnancy.

To provide information regarding:

- The prevention of venous thromboembolism (VTE) during pregnancy, birth and puerperium.
- The immediate investigation and management of women and birthing people in whom VTE is suspected during pregnancy or puerperium.

Normal physiological changes of pregnancy and the puerperium result in a relatively pro-thrombotic state, which starts in early pregnancy and persists for at least 12 weeks postpartum. Venous thrombo-embolism (VTE) remains the leading direct cause of maternal death in the UK. This accounts for deaths during pregnancy and up to 6 weeks after the end of pregnancy. Between 2016 - 2018, there were 34 maternal deaths from venous thromboembolism. The maternal mortality rate from VTE in the UK was 0.92 per 100,000 maternities in 2017 - 2019, 1.38 in 2018 - 2020, and 1.60 in 2019-2021 (MBRRACE-UK 2023)

2.0 Definitions and abbreviations used within this guideline

AES Anti-embolism Stockings	**CRP** C-reactive Protein
CTPA CT Pulmonary Angiogram	**DOACs** Direct Oral Anticoagulant
DVT Deep Vein Thrombosis	**ECG** Electrocardiogram
EPMA Electronic Prescribing and Medicine Administration	**GFR** Glomerular Filtration Rate
HG Hyperemesis Gravidarum	**JOHC** Joint obstetric Haematology Clinic
LFT Liver Function Test	**LMWH** Low Molecular Weight Heparin
LSCS Lower Segment Caesarean Section	**PE** Pulmonary Embolism
PPH Postpartum Haemorrhage	**RCOG** Royal College of Obstetricians & Gynaecologists
SLR Straight leg raise	**SROM** Spontaneous Rupture of Membranes
TED Thrombo–Embolus deterrent	**TTO** To take out
UFH Unfractionated Heparin	**U&E** Urea & Electrolytes
V/Q Ventilation/Perfusion scan	**VTE** Venous Thromboembolism

3.0 Terminology

Joint Obstetric Haematology Clinic (JOHC)	MDT clinic facilitated by Consultant Haematologists and Obstetricians held monthly at St Richards and Worthing Hospitals and Princess Royal Hospital (PRH).

4.0 Contents

- **Section 1**: Discusses antenatal risk assessment, antenatal and postnatal thromboprophylaxis recommendations for women and birthing people at risk of VTE.
- **Section 2:** Discusses the diagnosis and management of DVTs or PEs and links to the acute medicine DVT/ PE pathways in operation across the Trust.

5.0 Duties and responsibilities

All staff working in the Trust	To access, read, understand and follow this guideline. To use their professional judgement in application of this guideline.
Managers	To ensure the guideline is reviewed as required in line with Trust and National recommendations. To ensure the guideline is accessible to all relevant staff.

Section 1: Prevention of VTE in pregnancy

6.0 Pre-pregnancy risk assessment and counselling

Pregnant women and birthing people at high risk of or with previous confirmed VTE should be offered an appointment in the obstetric medicine clinic for pre-pregnancy counselling and antenatal, intrapartum and postpartum planning:

- Pregnant women and birthing people (with or without personal history of VTE) planning pregnancy who have a strong family history of an unprovoked or oestrogen-provoked VTE in a first-degree relative when aged <50 years should be tested for antithrombin deficiency. If the relative has a known thrombophilia, consider testing for same thrombophilic tendency. Please discuss with haematologists before offering testing.
- Prior to testing for thrombophilia, pregnant women and birthing people should be counselled regarding the implications to themselves and family members of a positive or negative result. Clinicians with specific expertise in this area should interpret the results.
- Thrombophilia testing is not required if the pregnant woman or birthing person has other risk factors for VTE in pregnancy indicating a need for thromboprophylaxis.

7.0 Risk assessment in pregnancy

- All pregnant women and birthing people should be weighed and have a risk assessment for VTE at booking or at their first antenatal visit.
- Antenatal venous thromboembolism (VTE) risk assessment should be completed on the BadgerNet Maternity.
- Pregnant women and birthing people at high risk of or with previous confirmed VTE should be referred at earliest opportunity to an obstetrician or clinician with expertise in thrombosis for discussion and initiation of thromboprophylaxis if indicated.
- For women and birthing people who are currently prescribed or due to be prescribed LMWH, re-weigh at 28 weeks and check that the appropriate prophylactic dose of LMWH is prescribed according to their new weight.
- VTE Risk assessment should also be repeated if **ANY** new risk factors are noted, for example if a pregnant woman or birthing person is admitted to hospital, if long-distance travel of more than 4 hours is planned or if there is significant weight gain at any stage in pregnancy and immediately postpartum and prescribe appropriate thromboprophylactic dose unless there is a specific contraindication such as active bleeding, bleeding disorder or imminent birth.
- For pregnant women and birthing people admitted under the medical team, the patient's VTE risk will be recorded on the pregnancy-specific VTE risk assessment chart appendix 1 and on EPMA. Where possible, this should occur within 14 hours of admission.
- VTE prophylaxis should be administered daily at 18.00 hours (unless special circumstances or contraindications exist).
- The risk of VTE must be reassessed on the consultant-led ward round within 24 hours of admission, at 72 hours after admission, and whenever there is a change in clinical condition.

- Consider VTE risk and thromboprophylaxis after **ectopic pregnancy, miscarriage or 2nd and 3rd trimester intrauterine death.** Stillbirth has been shown to be a risk factor for VTE
- NB the medical co-morbidities are only a risk for VTE if the disease is ACTIVE - if the disease is treated with drugs and in remission, it does not score

Following clinical review and scoring of VTE risk factors (appendix 1) consider the following prophylactic LMWH regimens in Table 1 below:

Define individual risk	**Thromboprophylaxis management**
Women and birthing people with **4 current risk** factors (other than previous VTE or major thrombophilia)	• Offer prophylactic low molecular weight heparin (LMWH) throughout the antenatal period from as early as possible. • May require prophylactic LMWH for 6 weeks postnatally, following a postnatal reassessment.
Women and birthing people with **3 current risk** factors (other than previous VTE or major thrombophilia)	• Offer thromboprophylaxis with LMWH from 28 weeks gestation. • May require prophylactic LMWH for 6 weeks postnatally, following a postnatal reassessment.
Women and birthing people with **2 current risk factors** (other than previous VTE or major thrombophilia)	• Offer thromboprophylaxis with LMWH for 10 days postpartum following postnatal reassessment of risk factors.
Women and birthing people with any previous VTE (except a single event related to major surgery)	• Offer thromboprophylaxis with LMWH throughout the antenatal period from as early as possible. • Offer thromboprophylaxis with LMWH for 6 weeks after birth.
Women and birthing people with VTE episode **provoked by surgery** from which they have recovered, and **NO** other risk factors.	• Offer thromboprophylaxis with LMWH from 28 weeks gestation. • Offer thromboprophylaxis with LMWH for 6 weeks after birth.

Heritable major thrombophilia: -antithrombin -protein C -protein S -homozygosity for factor V leiden -combination of minor thrombophilias i.e factor V leiden gene + prothrombin	• Immediate referral to Maternal Medicine Clinic / Joint Obstetric Haematology Clinic (JOHC). • See section 8.3 • RCOG PDF
Acquired thrombophilia (antiphospholipid syndrome)	• Immediate referral to Maternal Medicine Clinic / JOHC • See section 8.3 • RCOG PDF
All women and birthing people admitted to hospital during pregnancy	• Offer thromboprophylaxis with LMWH for **all** pregnant women and birthing people admitted to hospital unless there is a specific contraindication, such as active bleeding or labour • All women and birthing people admitted to hospital with COVID-19 require thromboprophylaxis with LMWH during their inpatient stay and for 10 days after discharge.
Women and birthing people with ovarian hyperstimulation syndrome	• Offer thromboprophylaxis with LMWH throughout the first trimester
Women and birthing people with Hyperemesis Gravidarum (HG)	• Women and birthing people admitted with HG should be offered thromboprophylaxis with LMWH and those being managed in the community should be assessed for VTE risk. • Thromboprophylaxis can be discontinued upon discharge providing no other indications exist for continuation of thromboprophylaxis. If one or more additional VTE risk factors then continue thromboprophylaxis until hyperemesis resolves.

8.0 Pregnant women and birthing people with a history of VTE

8.1 Single episode of VTE

- Pregnant women and birthing people with a history of VTE should ideally be referred for Obstetric review prior to pregnancy.

- In those who become pregnant before receiving such counselling, refer immediately to the Antenatal clinic for consideration of thromboprophylaxis with LMWH and an obstetric management plan**.**
- Where clinical documentation from previous medical history is not available, the previous diagnosis of VTE can be assumed in cases where the woman or birthing person gives a good history and received prolonged (greater than 6 weeks) therapeutic anticoagulation.

8.2 Recurrent episodes of VTE

- Refer patient to JOHC.
- Women and birthing people of childbearing age who are on warfarin should be counselled about the teratogenic effects of the drug and consider appropriate contraception (See UKMEC guideline). Warfarin crosses the placenta leading to an increased risk of congenital abnormalities including a characteristic warfarin embryopathy (hypoplasia of nasal bridge, congenital heart defects, ventriculomegaly, agenesis of the corpus callosum, stippled epiphyses) in approximately 5% of fetuses' exposed between 6 and 12 weeks of gestation.
- Women and birthing people on Warfarin or other long term anti-coagulants (eg DOAC's) should be counselled about the risks of these agents in pregnancy and with the support of their GP or Obstetric team, be advised to stop their anticoagulant therapy and change to LMWH as soon as the pregnancy is confirmed. *This should take place as soon as possible but ideally prior to* ***the sixth week*** *of pregnancy.*
- Reassure women and birthing people who require postnatal anticoagulation that both warfarin and LMWH are safe in breastfeeding. DOAC'S are not advised for use during breastfeeding.
- For women and birthing people with history of recurrent VTE, offer thromboprophylaxis with LMWH for 6 weeks after birth or until pre-pregnancy anticoagulation regime is resumed.

8.3 Women and birthing people with a history of thrombophilia: Heritable (i.e. asymptomatic antithrombin deficiency, protein S or protein C deficiency or those with more than one thrombophilic defect) and Acquired (i.e. antiphospholipid syndrome)

- Ideally refer for pre-pregnancy counselling to JOHC
- In those who become pregnant before receiving such counselling, refer immediately to the Antenatal Clinic for consideration of thromboprophylaxis with LMWH +- aspirin and an obstetric management plan.
- JOHC team will provide a clearly documented antenatal, intrapartum and postnatal plan in the antenatal notes and maternity computerised system following discussion at the regional maternal medicine network MDT for obstetric haematology for category C conditions. This may include antenatal anti-Xa monitoring and the potential for antithrombin replacement at initiation of labour or prior to caesarean birth.
- Different subtypes of antithrombin deficiency are associated with different levels of VTE risk and therefore advice should be sought from a local expert in this area.

9.0 Antenatal and postnatal thromboprophylaxis dosing

Current weight*	Enoxaparin Dose (Inhixa)
< 50 kg	**20 mg daily subcutaneously**
50 – 90 kg	**40 mg daily subcutaneously**
91 – 130 kg	**60 mg daily subcutaneously**
131 – 170 kg	**80 mg daily subcutaneously**
> 170 kg	**Seek specialist advice**
High prophylactic dose for women and birthing people weighing 50 – 90 kg consider if at very high risk*	**40 mg twice daily subcutaneously** *Consult with JOHC before prescribing as some of these patients may need full treatment dose on discussion.*

* ***Dose must be calculated on current weight.***
Antenatally: *Women and birthing people should be reweighed at 28 weeks and dose recalculated if prophylaxis started prior to this.*
Postnatally: *Weigh the woman or birthing person post birth and calculate dose using this weight. If immobile post birth (for instance post caesarean birth), use the most recent weight to calculate LMWH dose. Re-weigh and recalculate as soon as able to mobilise.*

* ***Very high risk:*** *Consult with JOHC before prescribing as some of these patients may need full treatment dose anticoagulation. (RCOG 2023). This group includes previous VTE on long term oral anticoagulant, antithrombin deficiency or antiphospholipid syndrome with previous VTE. For women and birthing people with either a weight either below 50kg or above 90kg requiring intermediate dose, please consult with a consultant haematologist.*

* **Cardiac valves:** *Need full treatment dose LMWH and discussion with Haematology Consultant regarding management.*

- Antenatal thromboprophylaxis **should begin as early in the pregnancy as practical**
- All pregnant women and birthing people started on LMWH should be offered the RCOG patient information leaflet.
- An individualised plan of when to stop prophylactic antenatal LMWH should be documented on BadgerNet Maternity.
- If no individualised plan has been documented, LMWH should be stopped the night before planned birth or early labour.

10.0 Pausing thromboprophylaxis for vaginal bleeding, labour, induction of labour or caesarean birth

- Pregnant women and birthing people receiving antenatal LMWH should be advised not to inject any further LMWH if they have any vaginal bleeding, SROM or if labour is suspected/begins. Advise them to contact Maternity Triage for advice.
- Pregnant women and birthing people should be reassessed on admission to hospital and further doses should be prescribed on EPMA by medical staff.

- If a pregnant woman or birthing person is admitted to hospital or midwife-led unit, with suspected ruptured ectopic pregnancy, vaginal bleeding or in active labour, pharmacological VTE prophylaxis should not be offered.
- Pregnant women and birthing people who are receiving antenatal LMWH should omit their morning dose if coming in for LSCS or Induction of labour.

10.1 Intrapartum considerations including regional analgesia

- All women and birthing people should be encouraged to mobilise during labour and postpartum; avoid dehydration and offer anti-embolic (TED) stockings.
- Regional analgesia techniques should be avoided until at least **12 hours** from last **prophylactic** dose of LMWH and at least **24 hours** from last **high prophylactic and treatment** dose of LMWH.
- In women and birthing people receiving treatment doses of LMWH, wound drains (abdominal and rectus sheath) should be considered at caesarean section and the skin incision should be closed with interrupted sutures to allow drainage of any haematoma.

10.2 Induction of labour

- Women and birthing people who have been prescribed prophylactic or treatment dose anticoagulation and who are waiting for an induction of labour should be reviewed by a consultant and prioritised in order to reduce the time they are not receiving their LMWH.
- If vaginal assessment for induction is unfavourable and the next dose of LMWH is due discuss with senior obstetrician and consider giving LMWH.
- Women and birthing people on high prophylactic or therapeutic doses for recent VTE or very high risk of recurrent VTE will have an individualised plan made by the JOHC team with anaesthetic input and should be prioritised to avoid prolonged period of no anticoagulation.

11.0 Postnatal thromboprophylaxis

- In women and birthing people who have given birth, aim to start LMWH **6 hours** afterwards unless there are specific contraindications.
- LMWH should not be given for 4 hours after the epidural catheter has been removed and the catheter should not be removed within 12 hours of the most recent injection.
- Any woman or birthing person who has undergone spinal anaesthesia will have a yellow wristband attached by the anaesthetist. The woman or birthing person, or any health care professional, should assess for straight leg rise after 4 hours. If able to straight leg rise (SLR), yellow wristband can be removed. If unable to SLR, notify the anaesthetist and leave yellow wristband in place. **LMWH should only be given once the regional anaesthetic block has resolved and the woman or birthing person is able to straight leg raise (SLR).**
- Ensure the woman or birthing person is reweighed post birth (postnatal weight) and VTE score is recalculated, before starting or recommencing VTE prophylaxis or treatment, to ensure correct dose is prescribed. If the woman or birthing person is immobile post birth (for instance post caesarean birth), use the most recent weight to calculate LMWH dose. Re-weigh and recalculate as soon as able to mobilise.

- If a woman or birthing person develops a haemorrhagic problem while on LMWH, the treatment should be stopped and case discussed with on-call consultant obstetrician who may wish to discuss with a haematologist. Thromboprophylaxis should be started or reinstituted as soon as the immediate risk of haemorrhage is reduced.
- Postnatal thromboprophylaxis must be prescribed on EPMA and this can provide evidence that it has been administered and a full-course of TTO anticoagulation therapy must be given to take home (including 6 week course).
- Women and birthing people at high risk of haemorrhage with risk factors including major antepartum haemorrhage, coagulopathy, progressive wound haematoma, suspected intra-abdominal bleeding and postpartum haemorrhage may be managed with anti-embolism stockings (AES), foot impulse devices or intermittent pneumatic compression devices. Re-start LMWH as soon as it is safe to do so, and discuss with consultant obstetrician/haematologist if significant risk of VTE.
- In women and birthing people receiving treatment doses of LMWH following birth, there is a significant risk of secondary PPH. These women and birthing people should be reviewed by senior obstetrician before transfer off the labour ward and again reviewed by senior obstetrician on day 1 on the postnatal ward. The women and birthing people should not be offered early postnatal discharge.

12.0 Prevention of VTE in pregnant women and birthing people with COVID-19

- COVID-19 has been identified as a pro-thrombotic illness.
- The RCOG recommend that all women and birthing people self-isolating with symptoms or confirmed COVID-19 and who are pregnant, stay well-hydrated.
- COVID-19 should be considered as **a transient factor in the VTE risk assessment and therefore this should trigger reassessment**.
- Thromboprophylaxis for women and birthing people who are self-isolating should cease when the illness has recovered and women and birthing people are mobile.
- All pregnant women and birthing people admitted to hospital with COVID-19 should receive thromboprophylaxis during admission and for 10 days after discharge.

13.0 Agents used for thromboprophylaxis

13.1 Low-molecular-weight Heparin (LMWH)

- LMWHs are the agents of choice for antenatal and postnatal thromboprophylaxis.
- Doses of LMWH are based on weight. For thromboprophylaxis and treatment the actual (most recent) weight is recommended.
- It is only necessary to monitor the platelet count for HIT complications if the woman or birthing person has had recent exposure to unfractionated heparin (UFH).
- Monitoring of anti-Xa levels is not required when LMWH is used for thromboprophylaxis.

NB Porcine origin of LMWH(s) - Enoxaparin sodium is a biological substance obtained by alkaline depolymerization of heparin benzyl ester derived from porcine intestinal mucosa. Please refer to What factors to consider when advising on medicines suitable for a Halal diet? – SPS - Specialist Pharmacy Service – The first stop for professional medicines advice and discuss with haematologists for further advice.

14.0 Contraindications to LMWH

- Women and birthing people with previous or current allergic reactions to LMWH should be offered an alternative preparation or alternative form of prophylaxis. Refer to JOHC.
- Seek advice from JOHC on the management of a woman with both VTE risk factors and bleeding risk factors or LMWH allergy.

Contraindications/cautions to LMWH use:

- Known bleeding disorder (e.g. haemophilia, von Willebrand's disease or acquired coagulopathy.
- Active antenatal or postpartum bleeding.
- Women and birthing people considered at increased risk of major haemorrhage (e.g. placenta praevia).
- Thrombocytopenia (platelet count < 75 × 109 /l).
- Acute stroke in previous 4 weeks (haemorrhagic or ischaemic).
- Severe renal disease (glomerular filtration rate [GFR] < 30 ml/minute/1.73m2).
- Severe liver disease (prothrombin time above normal range or known varices).
- Uncontrolled hypertension (blood pressure > 200 mmHg systolic or > 120 mmHg diastolic).

Clinical and laboratory thresholds are taken from the Department of Health's guidelines based on evidence from the nonpregnant population. Table from Green-top Guideline No. 37a.

14.1 Other agents

- **Danaparoid**
  Potential use of danaparoid should be discussed with consultant haematologist with expertise in haemostasis and pregnancy (JOHC).

- **Fondaparinux**
  Fondaparinux should be reserved for women and birthing people intolerant of heparin compounds or patients needing to avoid porcine products based on their faith, cultural beliefs or dietary preferences.

  Fondaparinux use in pregnancy should be in conjunction with consultant haematologist with expertise in haemostasis and pregnancy (JOHC).

- **Aspirin**
  Aspirin is not recommended for thromboprophylaxis in obstetric patients, but aspirin can use be used concurrently with LMWH if both are indicated for separate clinical reasons (or in women and birthing people with antiphospholipid syndrome).

- **Warfarin**
  Warfarin use in pregnancy is restricted to the few situations where heparin is considered unsuitable, e.g. Some women and birthing people with mechanical heart valves. Decision

to use warfarin in pregnancy is a MDT decision involving senior clinicians and members of the JOHC.

Women and birthing people receiving long-term anticoagulation with warfarin can be converted from LMWH to warfarin postpartum when the risk of haemorrhage is reduced, typically 5 days after birth and after senior clinical review. Warfarin is safe whilst breastfeeding.

- **Oral thrombin and xa inhibitors (DOACS)**
  DOACS cross the placenta and should be avoided in pregnant women and birthing people. Inadvertent pregnancy on a DOAC is not currently considered grounds for termination. Refer to fetal medicine clinic.

  Use of DOACS is not currently recommended in women and birthing people who are breastfeeding but can be considered postpartum if not breastfeeding as an alternative to warfarin or long-term treatment dose LMWH (discuss with consultant haematologist first).

- **Anti-embolism stockings**
  The use of properly applied anti-embolism stockings (AES) of appropriate size and providing graduated compression with a calf pressure of 14-15mmhg is recommended in pregnancy and the puerperium for women and birthing people who are hospitalised and have a contraindication to LMWH.

Section 2: Diagnosis and management of DVT and PE in pregnancy

15.0 Introduction

VTE is a condition in which a blood clot (a thrombus) forms in a vein. It most commonly occurs in the deep veins of the legs (and/or the pelvic veins in pregnancy); this is called deep vein thrombosis. The thrombus may dislodge from its site of origin to travel in the blood – a phenomenon called embolism.

Symptomatic venous thrombosis carries a considerable burden of morbidity, sometimes long term, because of chronic venous insufficiency. This in turn can cause post-thrombotic syndrome (chronic limb pain, swelling and skin changes and ultimately venous ulceration).

Non-fatal complications of DVT and PE including pulmonary hypertension have significant impact on long term health.

VTE remains the leading direct cause of maternal death in the UK. Imaging and initiation of treatment should not be delayed because the patient is pregnant.

Women and birthing people with suspected DVT or PE should be given the RCOG patient information: Diagnosis and treatment of venous thrombosis in pregnancy and after birth | RCOG.

16.0 Diagnosis of DVT and PE or suspected DVT or PE in the pregnant patient, after birth, miscarriage, termination or ectopic pregnancy

All women and birthing people with suspected VTE must be referred to, or discussed with, ED / Emergency Floor / Acute Medical Unit to ensure quick access to appropriate imaging.

Follow local acute medicine pathways for referral and investigation:

UH Sussex Brighton/PRH: Suspected Lower Limb DVT Pathway for A+E Presentations.docx, Primary Care - Referral Pathway for GP DVT.docx

UH Sussex SRH/WH: GB55 Query DVT pathway
GB66 Query PE Pathway (SRH Worthing)
GB65 VTE superficial vein thrombophlebitis
GB59 Confirmed VTE pathway

- See appendix 5 - Pathway for diagnosis and management of PE in pregnancy and puerperium (adapted from the RCOG 37b green top guideline) and appendix 6 for useful care bundle checklist for management of PE in pregnancy.

- Acute VTE should be suspected during pregnancy in women and birthing people with symptoms and signs consistent with possible VTE, particularly if there are other risk factors.
- The majority of women and birthing people with VTE in pregnancy have clinical symptoms:
  - The **symptoms and signs of DVT** include: leg pain and swelling (usually unilateral) and lower abdominal pain (reflecting extension of thrombus into the pelvic vessels and/or development of a collateral circulation.
  - **The symptoms of PE** include: dyspnoea (breathlessness), chest pain, haemoptysis (coughing-up blood) and collapse.
- It is important to note that a low-grade pyrexia and leucocytosis can occur with VTE, which may mimic signs of infection.
- Neurological examination including fundoscopy is mandatory in all women and birthing people with new onset headaches or headache with atypical symptoms for cerebral venous sinus thrombosis.

17.0 Further information on diagnostic tests

- In women and birthing people with suspected PE who also have symptoms and signs of DVT, compression duplex ultrasound should be performed. If compression ultrasonography confirms the presence of DVT, no further investigation is necessary and treatment for VTE should continue.
- Discuss with Radiologists on individual basis regarding which test may be offered most expediently (differs on each site) and/or is most appropriate.

17.1 VQ SCAN

- V/Q scanning may be recommended as first-line investigation in pregnancy because of its high negative predictive value in this situation and its substantially lower radiation dose to pregnant breast tissue. Advise women and birthing people this carries slightly increased risk of childhood cancer but associated with a lower risk of maternal breast cancer (in both situations the absolute risk is very small. V/Q investigation of first choice for young women and birthing people especially if family history of breast cancer or the patient has had previous chest CT scan (Appendix 2 patient information).

17.2 CTPA

- CTPA is more readily available and may be first-line because it can identify other pathology including pneumonia, pulmonary oedema and rarely aortic dissection. The radiation dose to the fetus is small but the maternal risk of breast cancer is higher though absolute risk is very small. Perform CTPA as first line if chest X-ray is abnormal and there is a clinical suspicion of PE.
- NB due to the increased blood velocity of pregnancy, the timing of the contrast injection in CTPA is earlier but errors due to this can result in inconclusive or suboptimal opacification of the pulmonary arteries - which is why in cases with high likelihood of PE, the VQ is still the first choice.

- If a woman or birthing person is unstable or requires rapid diagnosis or dual pathology, then CTPA is first line. Patient will require review and counselling with the experience to weigh up risk/ benefit of radiation to the mother or birthing parent and the fetus.
- Document counselling and verbal consent.
- Alternative or repeat testing should be carried out where V/Q scan or CTPA is normal but the clinical suspicion of PE remains in consultation with Consultant Radiologist.
- Ensuring that a Doppler ultrasound is done if CTPA or isotope imaging is negative for PE but there was a clinical suspicion of DVT.
- Anticoagulant treatment should be continued until PE is definitively excluded.
- Out of hours/weekends the Consultant Obstetrician should discuss these patients directly with a Consultant Radiologist if a prompt diagnosis needs to be reached especially if high risk of imminent birth.
- If ultrasound is negative but high level of clinical suspicion of DVT, then for discussion with the medical team to stop anticoagulation and repeat the ultrasound in 3 to 7 days.

18.0 Treatment of VTE in pregnancy and postpartum

- VTE occurring in pregnancy is managed on a dose of enoxaparin 1mg/kg BD ie 1mg/kg twice daily from diagnosis at any week of pregnancy (NB this LMWH has porcine origin. Please see section 14.1 for alternative)
* Doses are based on the woman or birthing person's actual weight following MBRRACE-UK 2023 recommendation. Lower doses of enoxaparin should be used if the creatinine clearance is <30ml/min, expert help should be sought.
* If the woman or birthing person is immobile post birth (for instance post caesarean birth), use the 28-week weight to calculate LMWH dose. Re-weigh and recalculate dose as soon as able to mobilise.
- See Appendix 4: Administration Chart for Treatment Doses

18.1 Analgesia

- Paracetamol 1g QDS PO unless BW less than 50kg then 15mg/kg as oral solution. Morphine oral solution 5-10mg 4 hourly for severe pain to promote mobility start with lowest dose.

18.2 Unfractionated heparin in life-threatening/massive PE

- UFH not recommended in UH Sussex for use on the labour ward. However in a life-threatening massive PE peri-partum, the use of UFH is a decision to be made in conjunction with Consultant Physician, Haematologist, Obstetrician and Anaesthetist/ Intensivist (section 6.4 of RCOG GTG37b How should massive life-threatening PE in pregnancy and the puerperium be managed?).

18.3 Blood test monitoring in pregnant women and birthing people on heparin

- Routine measurement of peak anti-Xa activity for patients on LMWH for treatment of acute VTE in pregnancy or postpartum is not recommended except in women and birthing people at extremes of body weight or with other complicating factors (for example, with renal impairment or recurrent VTE (peak anti-Xa activity, 3 hours post-injection, of 0.5–1.2 u/ml). For metallic heart valves - these patients should be discussed with or reviewed in JOHC and an individual management plan made as they may require higher anti-Xa targets.

18.4 Additional /alternative therapies

- **Graduated elastic compression stockings**: Recommend follow up with GP 2 weeks after initiating treatment for DVT and refer for consideration of graduated elastic compression stockings if the leg remains swollen.
- **Inferior vena cava filters:** Their use is not recommended – there may be some exceptional circumstances peripartum. This decision must be made at **consultant level only** (In discussion with obstetrician, physicians, haematologist and radiologists).
- Consideration can be given to the use of newer anticoagulants (fondaparinux, argatroban or r-hirudin) in pregnant women and birthing people who are unable to tolerate heparin or LMWH, danaparoid and who require continuing anticoagulant therapy.

19.0 Following diagnosis of VTE

- Follow-up for all women and birthing people with a confirmed VTE in pregnancy must be in the JOHC. A treatment plan should be documented on EVOLVE/ PANDA and BadgerNet Maternity for labour and birth, and a referral to the anaesthetic team.
- Women and birthing people who had an episode of VTE in pregnancy should be treated with a therapeutic dose of LMWH for rest of the pregnancy and for at least 6 weeks postnatally. Patient should complete **at least 3 - 6 months of treatment in total**. Length of anticoagulation to be determined by Consultant Haematologist in JOHC.
- Vaginal birth is the preferred mode of birth and is not contraindicated if >1 week from diagnosis.
- If the VTE occurred <1 week prior to birth, the mode of birth should be a multidisciplinary decision by Consultant Obstetrician, Haematologist and Radiologist.
- Postpartum when restarting treatment dose LMWH for an acute VTE event, the patient should **be reweighed after birth** and **once** daily doses (1.5mg/kg) recalculated before hospital discharge. Discuss the option to switch to DOAC if **not** breastfeeding or warfarin if breastfeeding.
- Women and birthing people should be offered a choice of LMWH or warfarin for postnatal therapy after discussion regarding the need for regular blood test monitoring of warfarin, particularly during the first 10 days of treatment. If warfarin is planned this should commence from day 5.

20.0 Postnatal Clinic review

- An appointment should be offered for within 6 months post birth with either the maternal medicine consultant or at the haematology clinic to discuss management of a future pregnancy.
- Women and birthing people must be advised to avoid oestrogen containing contraception**.**
- Pre-pregnancy advice – Advise to seek advice prior to planning next pregnancy so that medication can be reviewed and a plan of care made for the pregnancy.

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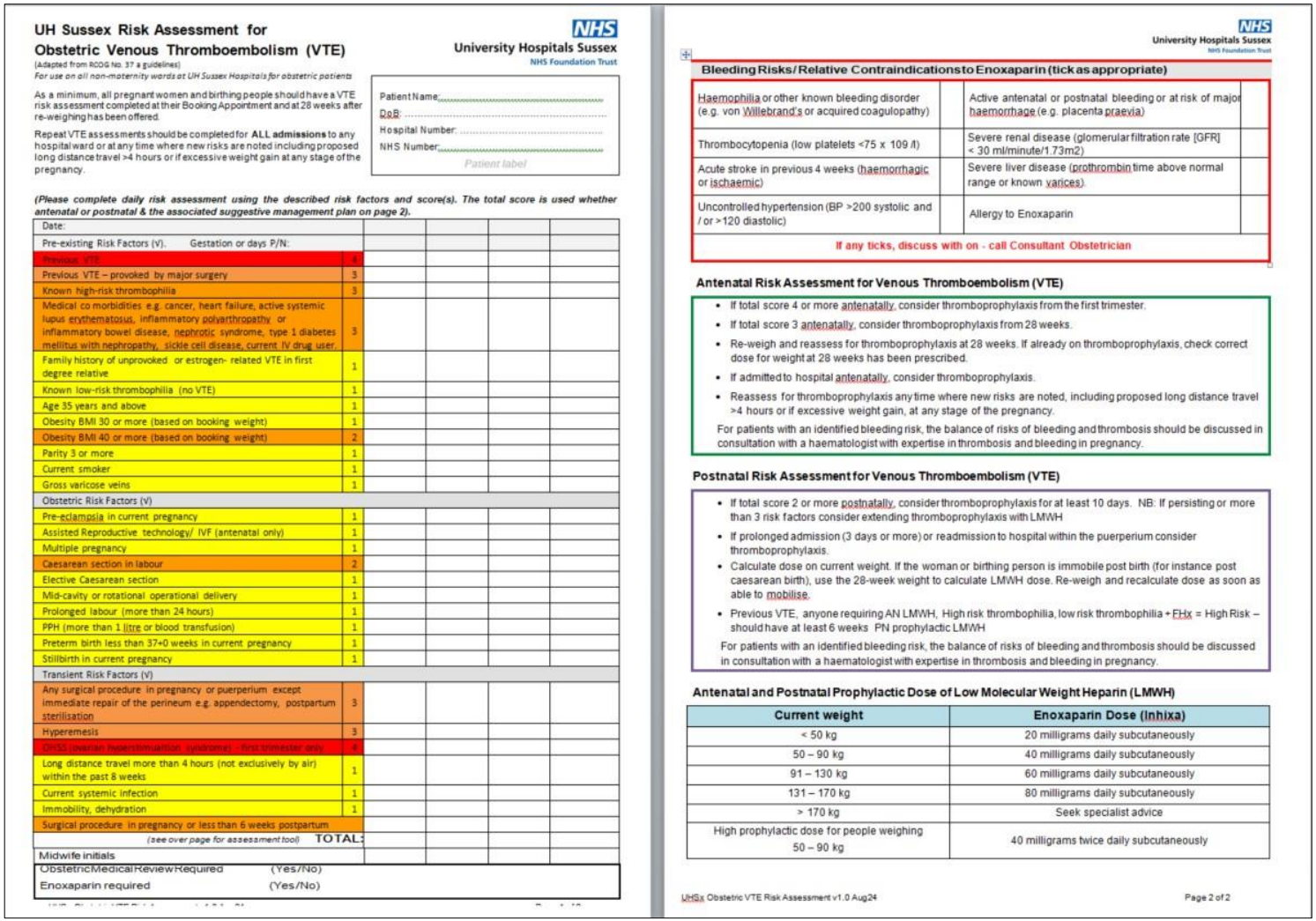
Appendix 1: VTE risk assessment for use on non-maternity wards

([RCOG Green-top guideline 37a, 2015])

PLEASE DO NOT PRINT FROM GUIDELINE. Printable version available on SharePoint.



UH Sussex Risk Assessment for Obstetric Venous Thromboembolism (VTE)

(Adapted from RCOG No. 37 a guidelines)

For use on all non-maternity wards at UH Sussex Hospitals for obstetric patients

As a minimum, all pregnant women and birthing people should have a VTE risk assessment completed at their Booking Appointment and at 28 weeks after re-weighing has been offered.

Repeat VTE assessments should be completed for **ALL admissions** to any hospital ward or at any time where new risks are noted including proposed long distance travel >4 hours or if excessive weight gain at any stage of the pregnancy.

Patient Name:
DoB:
Hospital Number:
NHS Number:
Patient label

(Please complete daily risk assessment using the described risk factors and score(s). The total score is used whether antenatal or postnatal & the associated suggestive management plan on page 2).

Date:						
Pre-existing Risk Factors (V). Gestation or days P/N:						
Previous VTE	4					
Previous VTE – provoked by major surgery	3					
Known high-risk thrombophilia	3					
Medical co morbidities e.g. cancer, heart failure, active systemic lupus erythematosus, inflammatory polyarthropathy or inflammatory bowel disease, nephrotic syndrome, type 1 diabetes mellitus with nephropathy, sickle cell disease, current IV drug user.	3					
Family history of unprovoked or estrogen- related VTE in first degree relative	1					
Known low-risk thrombophilia (no VTE)	1					
Age 35 years and above	1					
Obesity BMI 30 or more (based on booking weight)	1					
Obesity BMI 40 or more (based on booking weight)	2					
Parity 3 or more	1					
Current smoker	1					
Gross varicose veins	1					
Obstetric Risk Factors (V)						
Pre-eclampsia in current pregnancy	1					
Assisted Reproductive technology/ IVF (antenatal only)	1					
Multiple pregnancy	1					
Caesarean section in labour	2					
Elective Caesarean section	1					
Mid-cavity or rotational operational delivery	1					
Prolonged labour (more than 24 hours)	1					
PPH (more than 1 litre or blood transfusion)	1					
Preterm birth less than 37+0 weeks in current pregnancy	1					
Stillbirth in current pregnancy	1					
Transient Risk Factors (V)						
Any surgical procedure in pregnancy or puerperium except immediate repair of the perineum e.g. appendectomy, postpartum sterilisation	3					
Hyperemesis	3					
OHSS (ovarian hyperstimulation syndrome) - first trimester only	4					
Long distance travel more than 4 hours (not exclusively by air) within the past 8 weeks	1					
Current systemic infection	1					
Immobility, dehydration	1					
Surgical procedure in pregnancy or less than 6 weeks postpartum						
(see over page for assessment tool) TOTAL:						
Midwife initials						
ObstetricMedicalReviewRequired (Yes/No)						
Enoxaparin required (Yes/No)						

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Bleeding Risks/Relative Contraindications to Enoxaparin (tick as appropriate)

Haemophilia or other known bleeding disorder (e.g. von Willebrand's or acquired coagulopathy)		Active antenatal or postnatal bleeding or at risk of major haemorrhage (e.g. placenta praevia)	
Thrombocytopenia (low platelets <75 x 109 /l)		Severe renal disease (glomerular filtration rate [GFR] < 30 ml/minute/1.73m2)	
Acute stroke in previous 4 weeks (haemorrhagic or ischaemic)		Severe liver disease (prothrombin time above normal range or known varices)	
Uncontrolled hypertension (BP >200 systolic and / or >120 diastolic)		Allergy to Enoxaparin	

If any ticks, discuss with on - call Consultant Obstetrician

Antenatal Risk Assessment for Venous Thromboembolism (VTE)

- If total score 4 or more antenatally, consider thromboprophylaxis from the first trimester.
- If total score 3 antenatally, consider thromboprophylaxis from 28 weeks.
- Re-weigh and reassess for thromboprophylaxis at 28 weeks. If already on thromboprophylaxis, check correct dose for weight at 28 weeks has been prescribed.
- If admitted to hospital antenatally, consider thromboprophylaxis.
- Reassess for thromboprophylaxis any time where new risks are noted, including proposed long distance travel >4 hours or if excessive weight gain, at any stage of the pregnancy.

For patients with an identified bleeding risk, the balance of risks of bleeding and thrombosis should be discussed in consultation with a haematologist with expertise in thrombosis and bleeding in pregnancy.

Postnatal Risk Assessment for Venous Thromboembolism (VTE)

- If total score 2 or more postnatally, consider thromboprophylaxis for at least 10 days. NB: If persisting or more than 3 risk factors consider extending thromboprophylaxis with LMWH
- If prolonged admission (3 days or more) or readmission to hospital within the puerperium consider thromboprophylaxis.
- Calculate dose on current weight. If the woman or birthing person is immobile post birth (for instance post caesarean birth), use the 28-week weight to calculate LMWH dose. Re-weigh and recalculate dose as soon as able to mobilise.
- Previous VTE, anyone requiring AN LMWH, High risk thrombophilia, low risk thrombophilia + FHx = High Risk – should have at least 6 weeks PN prophylactic LMWH

For patients with an identified bleeding risk, the balance of risks of bleeding and thrombosis should be discussed in consultation with a haematologist with expertise in thrombosis and bleeding in pregnancy.

Antenatal and Postnatal Prophylactic Dose of Low Molecular Weight Heparin (LMWH)

Current weight	Enoxaparin Dose (Inhixa)
< 50 kg	20 milligrams daily subcutaneously
50 – 90 kg	40 milligrams daily subcutaneously
91 – 130 kg	60 milligrams daily subcutaneously
131 – 170 kg	80 milligrams daily subcutaneously
> 170 kg	Seek specialist advice
High prophylactic dose for people weighing 50 – 90 kg	40 milligrams twice daily subcutaneously

UHSx Obstetric VTE Risk Assessment v1.0 Aug24 Page 2 of 2

Appendix 2: Patient information - Radionuclide scan

Instructions for breastfeeding mothers or birthing people

We have been asked to perform a radionuclide scan. This will involve injecting a very small amount of radioactivity so that we can examine your lungs.

Although the radiation is not dangerous, we do try to keep the dose to babies as low as possible, which is why we ask you to take the following steps:

Breastfeeding

A small amount of radiation will be present in breast milk, please express and throw away the milk produced for the next 12 hours. Milk produced after this will not contain radiation. The appointment will be arranged so that you have a chance to express enough milk to feed your baby.

Close Contact

After treatment you will give off very small amounts of radiation so we would discourage prolonged handling of your baby (including feeding) for 12 hours afterwards. This will reduce the radiation dose to your baby. Contact should be kept to a minimum, if at all possible, for these 12 hours.

I, ……..

(insert name)

am willing to undergo the Radioisotope Lung Scan. I understand the implications of breastfeeding after the scan. I will stop breastfeeding for 12 hours after the scan and will express and discard all milk produced during this period.

I also understand that I should avoid prolonged contact with my child (including feeding) for the next 12 hours.

Signed: ……

Date: ……..……

Appendix 3: Patient information

RCOG patient information

Patient Video Techdow Pharma England Ltd (techdow-pharma.co.uk)

Appendix 4: Administration chart for treatment doses

STANDARD Strength Syringes→100mg/mL		
Syringes Available	*Dose*	*Syringe and Volume to Administer (mL)*
60mg/0.60mL	40mg	0.40mL
	50mg	0.50mL
	60mg	0.60mL
80mg/0.80mL	70mg	0.70mL
	80mg	0.80mL
100mg/1mL	90mg	0.90mL
	100mg	1mL

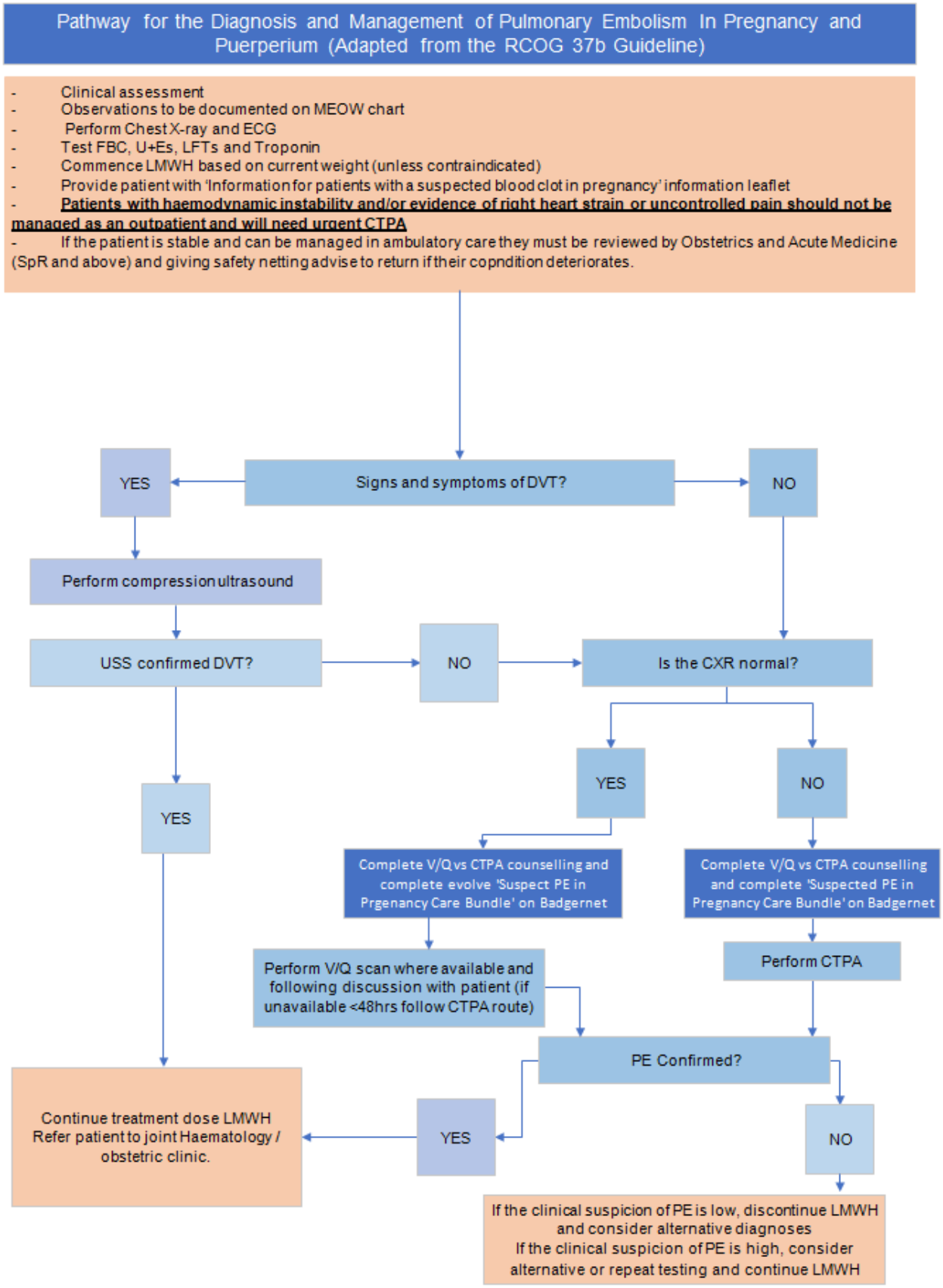
For treatment dose enoxaparin the manufacturer does not recommend to use the 20mg and 40mg prophylactic syringes.

HIGH Strength Syringes → 150mg/mL*		
Syringes Available	*Dose*	*Syringe and Volume to Administer (mL)*
120mg/0.80mL	120mg	0.80mL
150mg/1mL	135mg	0.90mL
	150mg	1mL

*Please note increments on high strength syringes are every 15mg

Multiple syringes required		
Dose	*Syringe and Volume to Administer*	
180mg	1mL (100mg/mL)	0.8mL (80mg/0.8mL)
>180mg	Round the dose. The dose is not capped.	

Appendix 5: Pathway for diagnosis and management of PE in pregnancy and puerperium (adapted from the RCOG 37b green top guideline)



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Appendix 6: Suspected PE in Pregnancy Care Bundle in A&E

Patient Name: .....

DOB: .....

Hosp No: ……..……..

Date: ……..

Clinician: .....

Initial Assessment	❑ Blood pressure, heart rate, respiratory rate, temperature and oxygen saturations (including ambulatory). ❑ Symptoms and clinical signs of DVT (including calf measurements) documented. ❑ Bloods tests (FBC, U&E, CRP, Trop I, Clotting), Arterial Blood Gas, 12-lead ECG. ❑ Chest X-ray with abdominal shield.
Information giving and shared decision making	❑ Patient provided with "Information for patients with a suspected blood clot in pregnancy" leaflet. ❑ Increased risk to patient breast tissue with CTPA explained to patient. ❑ Increased risk of childhood cancer with VQ scan explained to patient. ❑ Post imaging precautions with VQ scan explained to patient.
Is the patient to be treated through ambulatory care? (To manage the patient as an outpatient all the following criteria <u>MUST</u> apply)	❑ Haemodynamically stable (using MEOWS chart). ❑ Reviewed by O&G and discussed with acute medicine. ❑ Troponin normal. ❑ ECG normal (looking for signs of right heart strain. ❑ The patient is able to self-inject treatment dose LMWH (10 days supply and sharps bin).
Referral to ambulatory care	❑ Discussed with acute medicine. ❑ If returning the next day, ensure correct patient details are on whiteboard.
Imaging modality requested	❑ Ultrasound doppler ❑ CTPA ❑ V/Q Scan
Patient has consented to imaging modality	❑ Yes
Imaging outcome	❑ Positive for DVT ❑ Positive for PE ❑ Negative for PE
In positive findings (DVT and/or PE)	❑ Referral made to joint haematology + obstetric clinic

Appendix 7: Monitoring the effectiveness of this guideline

Issue being monitored	Monitoring method	Responsibility	Frequency	Reviewed by and actions arising followed up by
Cases of PE	Incident review	Patient Safety Midwife	On-going	Maternity Governance Lead

Appendix 8: Guideline Version Control Log

This should be included for all updated policies, summarising the changes between the current and previous version. (Earlier changes should be deleted from the list when the guideline is updated.)

Do not list minor and stylistic changes or changes which do not alter the processes described.

If the update includes a significant reorganisation of the material, indicate this and list the main areas where the process itself has changed.

Change Log – Obstetric VTE

Version	Date	Author	Status	Comment
1.0	July 2024	Sophia Stone, Obstetric Consultant Jo Sinclair, Obstetric Consultant David Annandale, W&C Pharmacist	LIVE	New Trust wide Maternity guideline replacing • CG1153 Prevention and Management of Venous Thromboembolism (VTE) in pregnancy guideline (SRH/WH) • MP012 Venous thrombosis (PRH/RSCH)

Appendix 9: Due Regard Assessment Tool

To be completed and attached to any guideline when submitted to the appropriate committee for consideration and approval.

		Yes/No	Comments
1.	**Does the document/guidance affect one group less or more favourably than another on the basis of:**		
	Age	*No*	
	· Disability	*No*	
	· Gender (Sex)	*No*	
	· Gender Identity	*No*	
	· Marriage and civil partnership	*No*	
	· Pregnancy and maternity	*No*	
	· Race (ethnicity, nationality, colour)	*No*	
	· Religion or Belief	*No*	
	· Sexual orientation, including lesbian, gay and bisexual people	*No*	
2.	**Is there any evidence that some groups are affected differently and what is/are the evidence source(s)?**	*No*	
3.	**If you have identified potential discrimination, are there any exceptions valid, legal and/or justifiable?**	*NA*	
4.	**Is the impact of the document likely to be negative?**	*No*	
5.	**If so, can the impact be avoided?**	*NA*	
6.	**What alternative is there to achieving the intent of the document without the impact?**	*NA*	
7.	**Can we reduce the impact by taking different action and, if not, what, if any, are the reasons why the guideline should continue in its current form?**	*NA*	
8.	**Has the document been assessed to ensure service users, staff and other stakeholders are treated in line with Human Rights FREDA principles (fairness, respect, equality, dignity and autonomy)?**	*Yes*	

If you have identified a potential discriminatory impact of this guideline, please refer it to [Insert Name], together with any suggestions as to the action required to avoid/reduce this impact. For advice in respect of answering the above questions, please contact uhsussex.equality@nhs.net 01273 664685).

Appendix 10: Template Dissemination, Implementation and Access Plan

To be completed and attached to any guideline when submitted to Corporate Governance for consideration and TMB approval.

	Dissemination Plan	Comments
1.	Identify:	
	Which members of staff or staff groups will be affected by this guideline?	Midwives and obstetricians
	How will you confirm that they have received the guideline and understood its implications?	Dissemination through the usual Communication channels and highlighted at Safety Huddles. A&E Leads will be asked to disseminate to their staff.
	How have you linked the dissemination of the guideline with induction training, continuous professional development, and clinical supervision as appropriate?	All new members of staff are shown where to access Clinical documents that are relevant to their area of practice.
2.	How and where will staff access the document (at operational level)?	Accessed by staff via Sharepoint

		Yes/No	Comments
3.	Have you made any plans to remove old versions of the guideline or related documents from circulation?	Yes	Previous versions will be archived as part of the uploading onto sharepoint process.
4.	Have you ensured staff are aware the document is logged on the organisation's register?	Yes	Dissemination plan includes notifying staff via email, safety noticeboards, departmental newsletter and social media.

Appendix 10: Additional guidance and information

NICE CG132 Caesarean Section 2019

NICE (2024) NG182 Caesarean birth

NICE NG89 Venous thromboembolism in over 16s: reducing the risk of hospital-acquired deep vein thrombosis or pulmonary embolism 2019

MBRRACE-UK 2023

RCOG (2015) Reducing the Risk of Thrombosis and Embolism during Pregnancy and the Puerperium (Green-top Guideline No. 37a)

RCOG (2015) Thrombosis and Embolism during Pregnancy and the Puerperium: Acute Management (Green-top Guideline No. 37b)

Patient information

Diagnosis and treatment of venous thrombosis in pregnancy and after birth | RCOG

Reducing the risk of venous thrombosis in pregnancy and after birth | RCOG