Venous Thromboembolism (VTE) in Pregnancy and Puerperium: Prophylaxis, Diagnosis and Management

Requested/Required by: Women’s & Sexual Health Directorate

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### Document History

<table>
<thead>
<tr>
<th>Requirement for document:</th>
<th>Cross References:</th>
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<tr>
<td>Maidstone &amp; Tunbridge Wells NHS Trust Clinical Guideline: To ensure that evidence based practice is undertaken for the prophylaxis, diagnosis and management of women with VTE</td>
<td><strong>Cross References:</strong></td>
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### Cross References / Associated Documents:

Venous Thromboembolism (VTE) in Pregnancy and Puerperium: Prophylaxis, Diagnosis and Management

Written by: Obstetric Middle Grade
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Document Issue No. 6.0


Associated Documents:
Maidstone & Tunbridge Wells NHS Trust. Trust Intranet, Q-Pulse system, Organisational-wide Database:
- Venous Thromboembolism (VTE) during, and in the weeks following, pregnancy Information for pregnant women LEAFLET http://twhqpulse01:84/QPulseDocumentService/Documents.svc/documents/Active/attachment?number=RWF-OPLF-PWC48
- Venous Thromboembolism (VTE), diagnosis and management in adults policy and procedure http://twhqpulse01:84/QPulseDocumentService/Documents.svc/documents/Active/attachment?number=RWF-OPPPES-C-SM15

Version Control:

<table>
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<tr>
<th>Issue</th>
<th>Description of changes</th>
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<tr>
<td>1.0</td>
<td>Guideline for Thromboprophylaxis after Caesarean Section and Vaginal Delivery</td>
<td>2005</td>
</tr>
<tr>
<td>2.0</td>
<td>Guideline reviewed in the light of current evidence</td>
<td>November 2009</td>
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<tr>
<td>3.0</td>
<td>Minor amendments made following publication of NICE guidance Venous Thromboembolism 2010</td>
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<tr>
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<td>Further amendments to reflect service reconfiguration+ review of audit tool and risk assessment proforma</td>
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<tr>
<td>5.0</td>
<td>Amendments to improve VTE Risk Assessment Proformas i.e. A/N version included in new handheld health record + inclusion of Wells scoring. Unforeseen delay with 2012 publication due to Q-Pulse; therefore document resubmitted to appropriate forums for approval and ratification in 2013 (see page 1). Further publication delays due to Q-Pulse issues, but no further changes</td>
<td>November 2013</td>
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<td>6.0</td>
<td>Updated following publication of RCOG Green Top Guideline April 2015</td>
<td>July 2015 - March 2016</td>
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Guideline Statement

Venous Thromboembolism (VTE) in Pregnancy and Puerperium: Prophylaxis, Diagnosis Management

Venous Thromboembolism (VTE) is a main direct cause of maternal death in the UK. The recent Confidential Enquiries into Maternal Deaths (2011) has shown that for the first time since the UK-wide Enquiry began in 1985, Thromboembolism is no longer the leading cause of maternal death. This fall in deaths is likely the result of better recognition of at-risk women and more widespread thromboprophylaxis.

Substandard care was present in 56% of cases of Maternal Death. This took the form of inadequate risk assessment, inadequate thromboprophylaxis (by the standards at the time), failure to investigate chest symptoms in at-risk women, and failure to ensure multidisciplinary care involving a consultant obstetrician or a psychiatrist for women who also had a pre-existing medical or mental health illness that affected their treatment.

VTE is up to ten times more common in pregnant women than in non-pregnant women of the same age and can occur at any stage of pregnancy, but the puerperium is the time of highest risk. Obesity remains the most important risk factor for Thromboembolism.

The risk of a pregnancy associated VTE is 0.1%, and in women with a previous VTE the risk of recurrence is 2-3%. Although most VTE occurs antenatally, the risk per day is greatest in the weeks immediately after delivery.

This guideline summarizes and provides an evidence based approach to the diagnosis, evaluation, and treatment of venous thromboembolism in pregnancy. It applies to all medical professionals caring for a pregnant woman or recently pregnant woman suspected to have Venous Thromboembolism.

This guideline is designed for use by those carrying out risk assessments at booking, during any hospital admissions in pregnancy and immediately postpartum to ensure prophylactic anticoagulation is commenced when indicated.
Venous Thromboembolism (VTE) in Pregnancy and Puerperium: Prophylaxis, Diagnosis and Management

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The Diagnosis and Management of Thromboembolism in Pregnancy and Postpartum

| Diagnosis of acute VTE |
| Symptoms and Signs of DVT and PE in the light of known risk factors |
| Suspected DVT-Investigations |
| Suspected PE-Investigations |
| Initial anticoagulant treatment of VTE in pregnancy |
| Therapeutic dose of LMWH in pregnancy |
### Management of massive life-threatening PTE in pregnancy

### Additional therapies

### Maintenance treatment of VTE

### Anticoagulant therapy during labour and delivery

### Anticoagulation and Caesarean Section

### What anticoagulant therapy should be employed in women at high risk of haemorrhage?

### Postnatal anticoagulation

### Prevention of post-thrombotic leg syndrome

### Patient Information and Consent

### Postnatal clinic review

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## Process Requirements

6.0 Monitoring and Audit

Appendix One Process Requirements

Appendix Two Consultation Process

Appendix Three Equality Impact Assessment

Appendix Four ANTENATAL Risk Assessment Proforma

Appendix Five POSTNATAL Risk Assessment Proforma
Venous Thromboembolism (VTE) in Pregnancy and Puerperium: Prophylaxis, Diagnosis and Management

Flowchart 1: Antenatal Assessment and Management

**Antenatal assessment and management (to be assessed at booking and repeated if admitted)**

- Any previous VTE except a single event related to major surgery
- Hospital admission
- Single previous VTE related to major surgery
- High-risk thrombophilia + no VTE
- Medical comorbidities e.g. cancer, heart failure, active SLE, IBD or inflammatory polyarthritis, nephrotic syndrome, type 1 DM with nephropathy, sickle cell disease, current IVDU
- Any surgical procedure e.g. appendicectomy
- OHSS (first trimester only)

**HIGH RISK**
- Requires antenatal prophylaxis with LMWH
- Refer to trust-nominated thrombosis in pregnancy expert/team

**INTERMEDIATE RISK**
- Consider antenatal prophylaxis with LMWH

**LOW RISK**
- Mobilisation and avoidance of dehydration

**Four or more risk factors:** prophylaxis from first trimester

**Three risk factors:** prophylaxis from 28 weeks

**Fewer than three risk factors**

**APL** = antiphospholipid antibodies (lupus anticoagulant, anticardiolipin antibodies, β2-glycoprotein 1 antibodies); **ART** = assisted reproductive technology; **BMI** = body mass index; **DM** = diabetes mellitus; **FHX** = family history; **IBD** = inflammatory bowel disease; **LMWH** = low-molecular-weight heparin; **IVDUs** = intravenous drug users; **IVF** = in vitro fertilisation; **IVF/ART** = IVF/ART

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Flowchart 2: Postnatal Assessment and Management

Postnatal assessment and management (to be assessed on delivery suite)

- Any previous VTE
- Anyone requiring antenatal LMWH
- High-risk thrombophilia
- Low-risk thrombophilia + FHx

HIGH RISK
At least 6 weeks’ postnatal prophylactic LMWH

INTERMEDIATE RISK
At least 10 days’ postnatal prophylactic LMWH
NB If persisting or ≥ 3 risk factors consider extending thromboprophylaxis with LMWH

Age > 35 years
Obesity (BMI > 30 kg/m²)
Parity ≥ 3
Smoker
Elective caesarean section
Family history of VTE
Low-risk thrombophilia
Gross varicose veins
Current systemic infection
Immobility, e.g. paraplegia, PGP, long-distance travel
Current pre-eclampsia
Multiple pregnancy
Preterm delivery in this pregnancy (< 37th week)
Stillbirth in this pregnancy
Mid-cavity rotational or operative delivery
Prolonged labour (> 24 hours)
PPH > 1 litre or blood transfusion

Antenatal and postnatal prophylactic dose of LMWH
- Weight < 50 kg = 20 mg enoxaparin/2500 units dalteparin/3500 units tinzaparin daily
- Weight 50–90 kg = 40 mg enoxaparin/5000 units dalteparin/6500 units tinzaparin daily
- Weight 91–130 kg = 60 mg enoxaparin/7500 units dalteparin/7000 units tinzaparin daily
- Weight 131–170 kg = 80 mg enoxaparin/10000 units dalteparin/9000 units tinzaparin daily
- Weight > 170 kg = 0.6 mg/kg/day enoxaparin/ 75 u/kg/day dalteparin/ 75 u/kg/day tinzaparin

LOWER RISK
Early mobilisation and avoidance of dehydration

Two or more risk factors

Fewer than two risk factors
Antenatal prophylactic and therapeutic doses of low-molecular-weight Heparin

Dalteparin is the recommended option in our Trust (prophylactic and therapeutic)

<table>
<thead>
<tr>
<th>Normal body weight (50–90 kg)</th>
<th>Body weight &lt; 50 kg</th>
<th>Body weight 90-130 kg</th>
<th>Body weight 131-170 kg</th>
<th>Body weight &gt; 170 kg</th>
<th>Therapeutic dose</th>
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</thead>
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<tr>
<td>40 mg daily</td>
<td>20 mg daily</td>
<td>60 mg daily</td>
<td>40 mg 12-hourly</td>
<td>0.6 mg /kg /day</td>
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<tr>
<td>5000 units daily</td>
<td>2500 units daily</td>
<td>7500 units daily</td>
<td>5000 units 12-hourly</td>
<td>75 units /kg /day</td>
<td>90units/kg 12-hourly</td>
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<tr>
<td>4500 units daily</td>
<td>3500 units daily</td>
<td>7000 units daily</td>
<td>4500 units 12-hourly</td>
<td>75 units /kg /day</td>
<td>90units/kg 12-hourly</td>
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</table>

Therapeutic dose of LMWH in pregnancy
Dalteparin 100 units/kg twice daily.

<table>
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<tr>
<th>Initial Dose</th>
<th>Early pregnancy weight (kg)</th>
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<tbody>
<tr>
<td></td>
<td>&lt;50</td>
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<tr>
<td>Enoxaparin</td>
<td>40mg bd</td>
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<tr>
<td>Dalteparin</td>
<td>5000 iu bd</td>
</tr>
<tr>
<td>Tinzaparin</td>
<td>175 units/kg once daily (all weights)</td>
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1.0 Introduction and Scope of Document

Venous Thromboembolism (VTE) is a main direct cause of maternal death in the UK. The recent Confidential Enquiries into Maternal Deaths (2011) has shown that for the first time since the UK-wide Enquiry began in 1985, Thromboembolism is no longer the leading cause of maternal death. This fall in deaths is likely the result of better recognition of at-risk women and more widespread thromboprophylaxis.

Substandard care was present in 56% of cases of Maternal Death. This took the form of inadequate risk assessment, inadequate thromboprophylaxis (by the standards at the time), failure to investigate chest symptoms in at-risk women, and failure to ensure multidisciplinary care involving a consultant obstetrician or a psychiatrist for women who also had a pre-existing medical or mental health illness that affected their treatment.

VTE is up to ten times more common in pregnant women than in non-pregnant women of the same age and can occur at any stage of pregnancy, but the puerperium is the time of highest risk. Obesity remains the most important risk factor for Thromboembolism.

The risk of a pregnancy associated VTE is 0.1%, and in women with a previous VTE the risk of recurrence is 2-3%. Although most VTE occurs antenatally, the risk per day is greatest in the weeks immediately after delivery.

This guideline summarizes and provides an evidence based approach to the diagnosis, evaluation, and treatment of venous thromboembolism in pregnancy. It applies to all medical professionals caring for a pregnant woman or recently pregnant woman suspected to have Venous Thromboembolism.

This guideline is designed for use by those carrying out risk assessments at booking, during any hospital admissions in pregnancy and immediately postpartum to ensure prophylactic anticoagulation is commenced when indicated.

2.0 Definitions

**VTE** encompasses deep-vein thrombosis (DVT), pulmonary embolism (PE) and cerebral venous sinus thrombosis. There is synergism between genetic causes of venous thrombosis (such as factor V Leiden mutation, prothrombin 20210A, protein C or protein S deficiency, antithrombin III deficiency) and acquired risk factors (such as antiphospholipid syndrome, pregnancy, contraceptive use, surgery, trauma, immobilisation and malignancy).

**Thrombophilia's** are heritable or acquired abnormalities that predispose individuals to thrombosis. Thrombophilia may also confer an increased risk of pregnancy complications such as miscarriage, pre-eclampsia and intrauterine growth restriction.
3.0 Duties

It is the registered professional’s responsibility to deliver care that is evidence based, always acting in the woman’s best interest.

All midwives and medical professionals looking after pregnant or recently pregnant women should carry out a VTE risk assessment.

All women must have a VTE risk assessment at delivery whatever the mode of delivery.

4.0 Training / Competency Requirements

Registered medical staff and midwives caring for obstetric patients have a professional responsibility to maintain their competence and read the updated guidelines. It is the registered professional’s responsibility to deliver care that is evidence based, always acting in the woman’s best interest.

No specific training is required for the implementation or use of this guideline.

5.0 Procedure for: Thromboprophylaxis during Pregnancy, Labour, after Vaginal Delivery and Caesarean Section

Appropriate and Timely Risk assessments to identify those at risk of VTE:

REFER to Flowchart 1 for Pre-pregnancy/Antenatal Risk Assessment for VTE and complete Risk Assessment Proforma (APPENDIX FOUR)

REFER to Flowchart 2 for Postnatal Risk Assessment for VTE and complete Risk Assessment Proforma (APPENDIX FIVE)

Consider Pre-pregnancy in women at high risk:

• Booking Visit
• Antenatal admission and any Change in clinical condition
• At Delivery

Actions to be taken in response to risk assessments once the risk of VTE is identified

Complete the Antenatal/Postnatal VTE risk assessment form: tick the risk factors on the left and the risk category on the right

Complete/Tick the actions to be taken in response to the risk assessment for VTE
LMWH to be prescribed on the drug chart if appropriate

GECS/AES arranged for the woman and documented in the notes

Woman to be advised regarding low dose aspirin, mobilisation and avoidance of dehydration

**Requirement to document an individual management plan in the health records of women who require thromboprophylaxis or treatment for a diagnosis of VTE**

(Individual) Management Plan for Treatment or Thromboprophylaxis with LMWH to be documented in maternity records

Appropriate dose of LMWH to be prescribed based on present weight

Duration of treatment to be advised/considered

Patient Information Leaflet to be given to the woman (leaflet available on the Q-Pulse Policies & Guidelines system)

Haematologist involvement if appropriate

Consultant Obstetrician involvement if appropriate

Follow up to be arranged as appropriate

5.1 **Preconceptual and antenatal risk assessment** and actions to be taken in response to risk factors: please use Flowchart 1 for high risk women having preconception/antenatal assessment for VTE.

**Risk factors**

Pregnancy is a risk factor for VTE and is associated with a ten-fold increase compared with the risk for non-pregnant women. Some women are at even higher risk during pregnancy because they have one or more additional risk factors. The level of risk associated with many of these factors is unclear.

- **Women at high risk of VTE, including those with previous confirmed VTE, should be offered / considered for pre-pregnancy counseling with an Obstetrician with a prospective management plan. This is important because thrombotic risk exists from the beginning of the first trimester and often the antenatal booking visit is at the end of the first trimester. ANTENATAL RISK ASSESSMENT PROFORMA (APPENDIX FOUR) may be used for their assessment.**
- **This risk assessment should be repeated/initiated at the booking visit in pregnancy, if the woman is admitted to hospital and if she develops other intercurrent problems.**
- **Expert haematological advice should be sought in cases when the antenatal team is uncertain about thromboprophylaxis.**
The risk assessment should be repeated at delivery using POSTNATAL RISK ASSESSMENT PROFORMA (APPENDIX FIVE)

The risk assessments and the actions to be taken in response to the risk assessments must be filed in the maternity records.

The risk of VTE should be discussed with women at risk and reasons for individual recommendations explained.

### Pre-existing Risk Factors

<table>
<thead>
<tr>
<th>Previous VTE</th>
<th>Thrombophilia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antithrombin deficiency</td>
<td>Protein C deficiency</td>
</tr>
<tr>
<td>Protein S deficiency</td>
<td>Factor V Leiden</td>
</tr>
<tr>
<td>Prothrombin gene variant</td>
<td>Lupus anticoagulant</td>
</tr>
<tr>
<td>Acquired (antiphospholipid syndrome)</td>
<td>Anticardiolipin antibodies</td>
</tr>
<tr>
<td>Age over 35 years</td>
<td>Obesity (BMI &gt; 30 kg/m2)</td>
</tr>
<tr>
<td>Parity &gt; 3</td>
<td>Paraplegia</td>
</tr>
<tr>
<td>Family history of unprovoked or oestrogen-provoked VTE in the first degree relative</td>
<td>Sickle cell disease</td>
</tr>
<tr>
<td>Gross varicose veins</td>
<td>Inflammatory disorders e.g. inflammatory bowel disease</td>
</tr>
<tr>
<td>Paraplegia</td>
<td>Some medical disorders, e.g. nephrotic syndrome, certain cardiac diseases</td>
</tr>
<tr>
<td>Sickle cell disease</td>
<td>Myeloproliferative disorders, e.g. essential thrombocythaemia, polycythaemia vera</td>
</tr>
<tr>
<td>Intravenous Drug Abuse</td>
<td></td>
</tr>
</tbody>
</table>

### New onset or transient

| Surgical procedure in pregnancy or puerperium, e.g. evacuation of retained products of conception, postpartum sterilisation (except immediate repair of perineum) |
| Dehydration |
| Ovarian hyperstimulation syndrome |
| Assisted conception |
| Severe infection, e.g. pyelonephritis |
| Immobility (> 4 days bed rest) |
| Pre-eclampsia |
| Excessive blood loss |
| Multiple Pregnancy |
| Long-haul travel: > 4 hours |
| Prolonged labour |
| Midcavity instrumental delivery |
| Still birth |
| Preterm birth |
| Immobility after delivery: > 3 days bed rest |
| Caesarean Section |

**Investigation of women with previous VTE**

Women with previous VTE have an increased risk of recurrence in pregnancy. For women with a single previous thrombosis and no known thrombophilia, the risk of recurrence in pregnancy is increased to 2.0–3.0% from about 0.1%. However, the risk is higher if the woman had thrombophilia or if the previous VTE was in an unusual site or was unprovoked.

Women with a previous VTE should have a careful history documented and undergo screening for both inherited and acquired thrombophilia, ideally before pregnancy. They should have a prospective management plan for thromboprophylaxis in pregnancy.

**Women with a previous VTE and no known thrombophilia**

The risk of VTE recurrence in pregnancy varies between 2-11% and is constant over the whole period of pregnancy. Therefore women with previous VTE and no thrombophilia should be offered prophylaxis with low molecular weight heparin (LMWH) throughout the antenatal period. The only exception to this are those with a single previous VTE related to major surgery and no other risk factors. LMWH can
be withheld until 28 weeks provided they receive close surveillance for the development of other risk factors. All women with a history of VTE should be offered prophylaxis for 6 weeks postpartum.

The screening for thrombophilia in pregnancy should not be routine. This is except in situations where antiphospholipid syndrome or antithrombin deficiency are suspected because it will determine the required dose of LMWH. Therefore women with a previous VTE, family history of VTE and either antithrombin deficiency or undetected specific thrombophilia should be tested for antithrombin. Also those with an unprovoked VTE should be tested for the presence of antiphospholipid antibodies.

**Women with a previous VTE who have inherited thrombophilia**

Women with a history of VTE and an inherited thrombophilias should (similar to those without) be offered antenatal and 6 weeks of postnatal prophylaxis.

The risk of reoccurrence is significantly higher for those with a family history and deficiencies of naturally occurring anticoagulants (antithrombin deficiency) than this with factor V leiden or prothrombin variant. They are often on long term oral anticoagulant therapy and will need intermediate or therapeutic dose LMWH prophylaxis during antenatal and postnatal period. This should be undertaken with input from a haematologist because different subtypes of Antithrombin Deficiency are associated with different levels of VTE risk.

**Women with inherited thrombophilia without previous VTE**

The risk of VTE associated with thrombophilia varies considerably.

Antithrombin deficiency is associated with a high risk (30%) of VTE in pregnancy. Women with antithrombin deficiency should always receive thromboprophylaxis in pregnancy and the puerperium. Asymptomatic women with protein C or protein S deficiencies have an eight-fold increased risk of VTE associated with pregnancy but most events occur postpartum.

Antenatal thromboprophylaxis should be given in those with combined defects, those homozygous for defects or those with antithrombin deficiency.

*Women with asymptomatic inherited or acquired thrombophilia may qualify for antenatal or postnatal thromboprophylaxis, depending on the specific thrombophilia and the presence of other risk factors.*

**Women with acquired thrombophilia (antiphospholipid syndrome)**

Antiphospholipid syndrome (APS) is defined as the presence of lupus anticoagulant or anticardiolipin antibodies of medium–high titre on two occasions eight weeks apart, found in association with a history of thrombosis (arterial or venous) or adverse pregnancy outcome (three or more unexplained miscarriages before ten weeks of gestation, a fetal death after ten weeks of gestation or a premature {less than 35 weeks} birth due to severe pre-eclampsia or intrauterine growth restriction).

The risk of recurrent thromboses in women with APS is up to 70% and may be even higher in pregnancy.
Therefore, pregnant women with APS and previous thromboses should receive antenatal and postnatal thromboprophylaxis with higher dose LMWH (50%, 75% or full treatment dose). Their management should be in collaboration with a haematologist.

Previous recurrent VTE

These women may require higher dose LMWH prophylaxis and expertise for this should be sought from a clinician with experience in haemostasis and pregnancy. Those on warfarin or other oral anticoagulants should be counselled about the risks to a foetus pre-pregnancy and changed to LMWH as soon as pregnancy is confirmed (ideally within 2 weeks of last menstrual period). Those not on warfarin or other oral anticoagulants should be started on LMWH as soon as they have a positive test.

Women without previous VTE or thrombophilia

There are few data to support recommendations for many of the individual risk factors listed above.

Antenatal Thromboprophylaxis (including actions to be taken in response to the risk assessments once the risk of VTE is identified)

- All women should undergo a documented assessment of risk factors for venous thromboembolism (VTE) in early pregnancy at booking or before pregnancy using Appendix 6. The risk factors must be ticked on the left and the risk category on the right
- Electronic PAS entry to be completed every time an inpatient is risk assessed for VTE (antenatal or postnatal)
- If a woman is identified as intermediate or high risk at the booking visit by the midwife she should be referred to the Consultant clinic to discuss antenatal anticoagulation
- This assessment should be repeated if the woman is admitted to hospital for any reason and if she develops other intercurrent problems. Women at high risk of VTE in pregnancy, such as those with previous VTE, should be considered for / offered prepregnancy counseling and a prospective management plan for thromboprophylaxis in pregnancy. Those who become pregnant before receiving such counseling should be referred to a consultant obstetrician or trust-nominated expert in thrombosis in pregnancy early in pregnancy
- If a woman is identified as intermediate or high risk at the assessment when admitted by the midwife or junior doctor, anticoagulation should be discussed with the middle grade or Consultant and a management plan documented in the notes and anticoagulation prescribed if appropriate
- Any woman with three or more current or persisting risk factors should be considered for prophylactic LMWH antenatally. (Flowchart 1)
- Women receiving antenatal LMWH should be advised that, if they have any vaginal bleeding or once labour begins, they should not inject any further
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LMWH. They should be reassessed on admission to hospital and further doses should be prescribed by medical staff

- Expert haematological advice should be sought in cases when the antenatal team is uncertain about thromboprophylaxis

- The risk assessments and the actions to be taken in response to the risk assessments must be filed in the maternity records

- Clinical judgment is required with regard to the weighting of the above risk factors. There are circumstances where one or two risk factors alone may be sufficient to justify antenatal thromboprophylaxis with LMWH, for example an extremely obese woman admitted to the antenatal ward

Postnatal Thromboprophylaxis

- All women should have a VTE risk assessment at delivery using Flowchart 2.

- Electronic PAS entry to be completed every time an inpatient is risk assessed for VTE (antenatal or postnatal)

- In general, women with two or more current or persisting risk factors should be considered for prophylactic LMWH antenatally and for at least ten days postpartum

- All women with class-three obesity: body mass index (BMI) > 40kg/m2, should be considered for thromboprophylaxis with LMWH for ten days after delivery

- Women should be repeatedly assessed for risk factors for VTE if they develop intercurrent problems or require surgery or readmission in the puerperium

- In women who have additional persistent (lasting more than 7 days postpartum) risk factors, such as prolonged admission or wound infection, thromboprophylaxis should be extended for up to 6 weeks or until the additional risk factors are no longer present

- Women who have a history of VTE will need LMWH or Warfarin for at least 6 weeks postpartum irrespective of mode of delivery

- Women with a family history of VTE and an identified thrombophili should be considered for 6 weeks postnatal thromboprophylaxis

- **Graduated elastic compressions stockings/Anti-emboli Stockings** should be put on prior to surgery and women should be advised that these should be worn until fully mobile. Their use should be extended to six weeks in woman who are very high risk for VTE

- During surgery a **sequential compression device** should be applied to the lower legs and this should remain in situ for the following 24hrs or till the woman is mobile

Documenting an individual management plan in the health records of women who require thromboprophylaxis or treatment for a DIAGNOSIS of VTE:

- An (Individual) Management Plan should be documented in maternity records
• If a diagnosis of VTE is suspected: therapeutic or thromboprophylactic anticoagulation should be prescribed, as appropriate. Appropriate dose of LMWH to be prescribed based on present weight

• Imaging should be arranged as appropriate

• Duration of treatment should be advised / considered as appropriate

• Haematologist should be involved if appropriate

• Consultant Obstetrician should be involved if appropriate

• Follow up should be arranged as appropriate

5.2 Timing and duration of thromboprophylaxis during pregnancy or postnatally:

Antepartum

If a decision is made to initiate thromboprophylaxis antenatally, this should begin as early in pregnancy as practical. Once antenatal treatment is initiated it should continue until delivery unless a specific risk factor is removed or disappears. Women with ovarian hyperstimulation syndrome (OHSS) require thromboprophylaxis for at least the period of inpatient stay.

Women with no previous VTE and without particular first trimester risk factors or admission to hospital, but with four other risk factors should be considered for antenatal prophylaxis throughout pregnancy. Those with three other risk factors should start antenatal prophylaxis at 28 weeks gestation.

Women with hyperemesis should be considered for thromboprophylaxis with LMWH and can discontinue when it has resolved. Those with ovarian hyper stimulation syndrome should be considered for LMWH for the first trimester. Women with IVF pregnancy and three other risk factors should be considered for LMWH starting in the first trimester.

Postpartum

Postpartum thromboprophylaxis should be given as soon as possible after delivery, provided that there is no postpartum haemorrhage. Those with postpartum haemorrhage should be fitted with Thromboembolism deterrent stockings/boots. If the woman has been given regional analgesia, LMWH should be withheld until four hours after insertion or removal of the epidural catheter.

Postpartum thromboprophylaxis is normally continued for six weeks in high-risk women. However, for women at lower risk prophylaxis for ten days is usually recommended, despite the lack of evidence in this area.

The combined oral contraceptive pill should not be prescribed during the first three months postpartum for women with other risk factors for VTE.

5.3 Agents for Thromboprophylaxis

• Low molecular weight Heparin (LMWH)
Low molecular weight Heparins are the agents of choice for antenatal and postnatal thromboprophylaxis. They are as effective as and safer than unfractionated Heparin in pregnancy.

There is only need to monitor platelet count if the women had prior exposure to unfractionated heparin.

Dalteparin is the recommended option in our Trust (prophylactic and therapeutic).

Antenatal prophylactic and therapeutic doses of low-molecular-weight Heparin

<table>
<thead>
<tr>
<th>Prophylaxis</th>
<th>Enoxaparin (100 units/mg)</th>
<th>Dalteparin</th>
<th>Tinzaparin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal body weight (50–90 kg)</td>
<td>40 mg daily</td>
<td>5000 units daily</td>
<td>4500 units daily</td>
</tr>
<tr>
<td>Body weight &lt; 50 kg</td>
<td>20 mg daily</td>
<td>2500 units daily</td>
<td>3500 units daily</td>
</tr>
<tr>
<td>Body weight 90–130 kg</td>
<td>60 mg daily</td>
<td>7500 units daily</td>
<td>7000 units daily</td>
</tr>
<tr>
<td>Body weight 131–170 kg</td>
<td>40 mg 12-hourly</td>
<td>5000 units 12-hourly</td>
<td>4500 units 12-hourly</td>
</tr>
<tr>
<td>Body weight &gt; 170 kg</td>
<td>0.6 mg /kg /day</td>
<td>75 units /kg /day</td>
<td>75 units /kg /day</td>
</tr>
<tr>
<td>Therapeutic dose</td>
<td>1 mg/kg 12-hourly</td>
<td>90 units/kg 12-hourly</td>
<td>90 units/kg 12-hourly</td>
</tr>
</tbody>
</table>

- The **booking weight** must be used to calculate the appropriate dose of thromboprophylaxis when LMWH is being prescribed following a risk assessment at booking.
- **All women should be weighed if they are admitted antenatally** and require LMWH prophylaxis, to calculate the appropriate dose of LMWH.
- **All women must be weighed postnatally** to calculate the appropriate dose of LMWH if thromboprophylaxis is required.
- For all women being prescribed LMWH: the need and doses of non-steroidal anti-inflammatory agents should be considered as the combination may increase the risk of bleeding.
- The dose of LMWH should be reduced in women with renal impairment. If creatinine clearance is less than 30ml. minute.

LMWHs are at least as effective as unfractionated Heparin for the prevention of deep vein thrombosis in non-pregnant women undergoing surgery.

The risk of Heparin-induced thrombocytopenia is reduced with LMWH. Prolonged unfractionated Heparin use during pregnancy may result in osteoporosis and fractures but this risk is low with LMWH. Allergic skin reactions to Heparin can occur and may require a change of Heparin preparation or conversion to a Heparinoid (Danaparoid Sodium).

Experience indicates that, provided that the woman has normal renal function, monitoring of anti-Xa levels is not required when LMWH is used for thromboprophylaxis. In antithrombin deficiency, anti-Xa monitoring is critical, higher doses of LMWH may be necessary and these patients should be monitored by a haemostatic expert. Antithrombin concentrates may be required. Although the risk...
of Heparin-induced thrombocytopenia is extremely low with LMWH and has never been reported in pregnancy.

Where antenatal thromboprophylaxis with LMWH is given to women who are normally on long-term oral anticoagulants, usually because of previous recurrent VTE and/or a thrombophilia, higher prophylactic doses or therapeutic doses of LMWH may be appropriate. Whether high prophylactic doses or therapeutic doses are required is controversial and there is some evidence from non-pregnant and pregnant data that the former may suffice.

For postpartum thromboprophylaxis, LMWH is probably the agent of choice for women who had LMWH antenatally or for those requiring only ten days of postpartum treatment. Experience of enoxaparin in the puerperium reports no adverse effects on the baby resulting from breastfeeding.

Contraindications to LMWH

LMWH should be avoided, discontinued or postponed in women who are risk of bleeding after careful consideration of the balance of risks of bleeding and clotting.

Risk factors for bleeding:

- Women with active antenatal or postpartum bleeding
- Women considered at increased risk of major haemorrhage (such as placenta previa)
- Women with a bleeding diathesis, such as von Willebrand’s disease, haemophilia or acquired coagulopathy
- Women with thrombocytopenia (platelet count less than 75 x 109)
- Acute stroke in the last 4 weeks (ischaemic or haemorrhagic)
- Severe renal disease (glomerular filtration rate less than 30 ml/minute/1.73 m2)
- Severe liver disease (prothrombin time above normal range or known varices)
- Uncontrolled hypertension (blood pressure greater than 200 mmHg systolic or greater than 120 mmHg diastolic).

Low-dose aspirin

Aspirin is not recommended for thromboprophylaxis in obstetric patients.

Warfarin

Warfarin should be avoided if possible during pregnancy, especially between 6 and 12 weeks of gestation, because it is associated with an up to 5% risk of teratogenesis and increases the risk of miscarriage, fetal haemorrhage, maternal haemorrhage and neurological problems in the baby and stillbirth. Its use is in pregnancy is restricted to the few situations where heparin is considered unsuitable (e.g. some women with mechanical heart valves).
Warfarin is safe after delivery and for breastfeeding, although it requires close monitoring, frequent visits to an anticoagulant clinic and carries an increased risk of postpartum haemorrhage and perineal haematoma compared with LMWH. It is not appropriate for women requiring only three to five days of postpartum prophylaxis.

**If the woman chooses to commence warfarin postpartum, this can usually be initiated on the fifth to seventh postnatal day. LMWH should be continued until the international normalised ratio is greater than 2.0. The dosage regimens are the same as for women converting to warfarin postpartum following an acute VTE in pregnancy.**

Dextran

Dextran should not be used primarily because of the risk of anaphylaxis, which has killed fetuses by causing massive histamine release and uterine hypertonus.

**Oral thrombin and Xa inhibitors**

These should be avoided in pregnant and breastfeeding women.

**Graduated elastic compression stockings/Anti Embolic Stockings (Appendix Eight)**

Graduated elastic compression stockings may be used antenatally. There are no trials to support such practice but the British Society for Haematology guidelines give a grade C recommendation (evidence level IV) that:

- All women with previous VTE or a thrombophilia should be encouraged to wear class-II graduated elastic compression below knee stockings throughout their pregnancy and for 6–12 weeks after delivery
- Class-I thromboelastic stockings are appropriate for hospital inpatients at increased risk of VTE and may be combined with LMWH
- Their use is also recommended for pregnant women travelling by air
- Those who are hospitalised and have a contraindication to LMWH
- Those who are hospitalised post-caesarean section (combined with LMWH) and considered to be at particularly high risk of VTE (such as previous VTE, more than three risk factors)
- Outpatients with prior VTE (usually combined with LMWH)
- Women travelling long distance for more than 4 hours

Properly applied thigh-length stockings are advocated for pregnant women but knee-length stockings should be considered if (as is often the case) full-length stockings are ill fitting or compliance is poor.

**Contraindications to the use of Anti-embolic stockings (Appendix Eight)**

- Suspected or proven peripheral arterial disease
- Peripheral arterial bypass grafting
- Peripheral neuropathy or other causes of sensory impairment
- Any local conditions in which stockings may cause damage, for example fragile ‘tissue paper’ skin, dermatitis, gangrene or recent skin graft
- Known allergy to material of manufacture
- Cardiac failure
- Severe leg oedema or pulmonary oedema from congestive heart failure
- Unusual leg size or shape
- Major limb deformity preventing correct fit.

5.4 Care during labour and delivery for women on thromboprophylaxis

*Once the woman is in labour or thinks she is in labour, she should be advised not to inject any further heparin. She should be reassessed on admission to hospital and further doses should be prescribed by medical staff.*

The pregnancy-associated prothrombotic changes in the coagulation system are maximal immediately following delivery. Therefore, it is desirable to continue LMWH during labour or delivery in women receiving antenatal thromboprophylaxis with LMWH. For women receiving high prophylactic or therapeutic doses of LMWH, the dose of Heparin should be withheld if the woman goes into labour or reduced to its thromboprophylactic dose on the day before induction of labour or elective caesarean section.

*To minimise the risk of epidural haematoma, regional techniques should not be used until at least 12 hours after the previous prophylactic dose of LMWH. When a woman presents while on a therapeutic regimen of LMWH, regional techniques should not be employed for at least 24 hours after the last dose of LMWH. LMWH should not be given for at least four hours after the epidural catheter has been inserted or removed and the cannula should not be removed within 10–12 hours of the most recent injection.*

For delivery by elective caesarean section, the woman should receive a thromboprophylactic dose of LMWH on the day before delivery. On the day of delivery, the morning dose should be omitted and the operation performed that morning. The thromboprophylactic dose of LMWH should be given by six hours postoperatively (or four hours after insertion or removal of the epidural catheter, if appropriate). There is an increased risk of around 2% of wound haematoma following caesarean section with both unfractionated heparin and LMWH.

Women 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 more conveniently managed with unfractionated heparin. Unfractionated heparin has a shorter half-life than LMWH and there is more experience in the use of protamine sulphate to reverse its activity. If a woman develops a haemorrhagic condition while taking LMWH, the treatment should be stopped and expert haematological advice sought. It should be remembered that excess blood loss and blood transfusion are risk factors for VTE, so thromboprophylaxis should be commenced or re instituted as soon as the immediate risk of haemorrhage is reduced.

In some women on high dose prophylactic or treatment doses of LMWH, there may be an indication for induction of labour to help plan thromboprophylaxis around delivery and facilitated a 24 hour window between the last dose of LMWH and regional analgesia.
5.5 The Diagnosis and Management of Thromboembolism in Pregnancy and Postpartum

Note: Wells score to be used before requesting radiological investigations / imaging for the diagnosis of DVT / PE

- An (Individual) Management Plan should be documented in maternity records
- If a diagnosis of VTE is suspected: therapeutic or thromboprophylactic anticoagulation should be prescribed, as appropriate.
- Appropriate dose of LMWH to be prescribed based on present weight
- Imaging should be arranged as appropriate
- Duration of treatment should be advised / considered as appropriate
- Haematologist should be involved if appropriate
- Consultant Obstetrician should be involved if appropriate
- Follow up should be arranged as appropriate

**Diagnosis of acute VTE including the significance of signs and symptoms in the light of known risk factors**

Any woman with signs and symptoms suggestive of VTE, especially in the presence of known risk factors, should have objective testing performed expeditiously and treatment with low-molecular-weight heparin (LMWH) should be commenced until the diagnosis is excluded by objective testing, unless treatment is contraindicated. By itself the clinical diagnosis of DVT and PE is unreliable.

In non-pregnant individuals, DVT is confirmed in about 20-30% of cases but this falls to about 8% for DVT and < 5% for PE in pregnancy. Hence objective testing should be performed expeditiously. There are no large clinical studies evaluating the accuracy of objective tests for DVT and PE in pregnancy. Hence, recommendations for the diagnosis of DVT and PE in pregnancy are empirical and based on extrapolations from studies in non-pregnant patients.

**Symptoms and Signs of DVT and PE**

<table>
<thead>
<tr>
<th>DVT</th>
<th>PE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leg pain or discomfort</td>
<td>Dyspnoea</td>
</tr>
<tr>
<td>Swelling</td>
<td>Collapse</td>
</tr>
<tr>
<td>Tenderness</td>
<td>Chest pain</td>
</tr>
<tr>
<td>Increased temperature and edema</td>
<td>Haemoptysis</td>
</tr>
<tr>
<td>Lower abdominal pain</td>
<td>Faintness</td>
</tr>
<tr>
<td>Elevated white cell count</td>
<td>Raised jugular venous pressure</td>
</tr>
<tr>
<td></td>
<td>Tachycardia</td>
</tr>
<tr>
<td></td>
<td>Reduced PaO2 and /or PaCO2</td>
</tr>
<tr>
<td></td>
<td>Focal signs in the chest</td>
</tr>
<tr>
<td></td>
<td>Abnormalities on Xray</td>
</tr>
<tr>
<td></td>
<td>Symptoms and signs associated with DVT</td>
</tr>
</tbody>
</table>
DVT (Deep Vein Thrombosis) - Diagnosis

Compression duplex ultrasound should be undertaken where there is a clinical suspicion of DVT. If ultrasound is negative and there is a low level of clinical suspicion, anticoagulant treatment can be discontinued. If ultrasound is negative and a high level of clinical suspicion exists, the woman should remain anticoagulated and ultrasound repeated in 1 week or an alternative diagnostic test employed. If repeat testing is negative, anticoagulant treatment should be discontinued.

When iliac vein thrombosis is suspected (back pain and swelling of the entire limb), magnetic resonance venography or conventional contrast venography should be considered.

---

**Diagnostic Algorithm in suspected DVT in pregnancy**

```
Suspected Acute DVT
↓
↓
Consider thrombophilia screen
↓
↓
Start LMWH while awaiting objective testing
↓
↓
Compression USS of symptomatic leg
↓
↓
Normal and low clinical suspicion       Normal but high clinical suspicion       DVT
↓
↓
Stop Treatment                                  Continue Treatment and rpt
↓
↓
Compression USS in a week                                Fill IR1 form
↓
↓
If normal stop Rx
↓
↓
```

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PE (Pulmonary Embolism): - Diagnosis

Where there is clinical suspicion of acute PTE a chest X-ray should be performed. Chest X-ray may identify other pulmonary disease such as pneumonia, pneumothorax or lobar collapse. Whilst the X-ray is normal in over 50% of pregnant women with objectively proven PTE, abnormal features caused by PE include atelectasis, effusion, focal opacities, regional oligaemia or pulmonary oedema. The radiation dose to the fetus from a chest X-ray performed at any stage of pregnancy is negligible. Anticoagulant treatment should be continued until a PE is definitively excluded.

V/Q scanning carries a slightly increased risk of childhood cancer compared with CTPA (1/280,000 versus less than 1/1,000,000) but carries a lower risk of maternal

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breast cancer (lifetime risk increased by up to 13.6% with CTPA, background risk of 1/200 for study population). Ideally, informed consent should be obtained before these tests are undertaken.

**The choice of technique for definitive diagnosis (V/Q scan or CTPA): following a discussion and audit in the radiology department the recommended protocol is as follows. If the chest x-ray is normal, pregnant patients should have a half dose perfusion scan. If the chest x-ray is significantly abnormal for CTPA is advised. For breast feeding patients and other female patients, the instant availability and higher diagnostic accuracy of CTPA, makes this the preferred method of investigation.**

With V/Q scanning, if the scan is normal a diagnosis of PE is excluded. If the test result is negative and Doppler studies are negative but the clinical suspicion is high, then treatment should be continued and a CTPA organized or repeat testing organized in a week. If the result is medium probability, then treatment should be continued and a CTPA considered. A high probability result confirms a PE.

**Diagnostic Algorithm in suspected PE in pregnancy**

```
CXR, ECG, Blood Gases, Thrombophilia Screen
Exclude other causes
Start Treatment while awaiting objective testing
Imaging Technique (V/Q Scan/CTPA)
(If CXR is normal - for half dose Perfusion Scan)
If CXR significantly abnormal - for CTPA
Breast feeding patients and other female patients(for CTPA)
↓
↓
↓
V/Q Scan
↓
Low Risk
↓
Low clinical risk
PE not confirmed
Stop Rx
Medium Risk
Consider CTPA
High risk
PE confirmed
Continue Rx
Do DATIX Report
```

The British Thoracic Society recommends CTPA as first-line investigation for non-massive PTE in non-pregnant women. This technique has potential advantages over radionuclide (V/Q) imaging including better sensitivity and specificity (at least in non-pregnant women) and a lower radiation dose to the fetus. In addition, it can identify other pathology, such as aortic dissection. The main disadvantage of CTPA is the high radiation dose to the maternal breasts, which is associated with an increased lifetime risk of developing breast cancer. This is particularly relevant when it is known that only around 5% of such investigations will have a positive result. In addition, CTPA may not identify small peripheral PTE. In contrast to CTPA, V/Q
scanning may be delayed because of availability of isotope. Many authorities continue to recommend V/Q scanning 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.

The average fetal radiation dose with CTPA is less than 10% of that with V/Q scanning during all trimesters of pregnancy. While CTPA is associated with a lower risk of radiation for the fetus, this must be offset by the relatively high radiation dose (20 mGy) to the mother’s thorax and, in particular, breast tissue. The radiation dose to the mother’s thorax with CTPA will be around 2 rads and 1 rad will increase the lifetime risk of breast cancer by 14%. This is important as only 1/20 pregnant women with suspected PE will have the diagnosis confirmed. It has been estimated that the increased risk is 13.6% (background risk 1/200), a figure that has been cited widely. It therefore seems sensible to recommend that lung perfusion scans should be considered the investigation of first choice for young women, especially if there is a family history of breast cancer or the woman has had a previous chest CT scan.

Pulmonary angiography carries the highest radiation exposure.

There have been concerns over the safety of iodinated contrast medium with CTPA, as this can potentially alter fetal or neonatal thyroid function. Current European guidelines indicate that following administration of iodinated agents to the mother during pregnancy, thyroid function should be checked in the neonate.

**D-dimer testing should not be performed to diagnose acute VTE in pregnancy**

In pregnancy, D-dimer can be elevated at term, in the postnatal period, in preterm labour, abruption and gestational hypertension. Thus a ‘positive’ D-dimer test in pregnancy is not necessarily consistent with VTE and objective testing is required. However, a low level of D-dimer in pregnancy is likely, as in the non-pregnant woman, to suggest that there is no VTE, especially in combination with a negative venous ultrasound.

Before anticoagulant therapy is commenced, blood should be taken for a full blood count, coagulation screen, urea and electrolytes and liver function tests. The use of anticoagulant therapy can be influenced by renal and hepatic function and blood should be taken to confirm that these are normal before starting treatment.

Performing a thrombophilia screen prior to therapy is not routinely recommended. The results of a thrombophilia screen will not influence immediate management of acute VTE but it can provide information that can influence the duration and intensity of anticoagulation. When undertaken, thrombophilia screens should be interpreted by clinicians (usually haematologists) with specific expertise in the area.

➢ Protein S levels fall in normal pregnancy, making it extremely difficult to make a diagnosis of protein S deficiency during pregnancy
➢ Activated protein C (APC) resistance is found with the APC sensitivity ratio test in around 40% of pregnancies, owing to the physiological changes in the coagulation system.
➢ Antithrombin may be reduced when extensive thrombus is present
➢ In nephrotic syndrome and pre-eclampsia (conditions associated with an increased risk of thrombosis) antithrombin levels are reduced
➢ In liver disease protein C and S will be reduced
Genotyping for factor V Leiden and prothrombin G20210A will not be influenced by pregnancy or current thrombosis.

5.6 Initial anticoagulant treatment of VTE in pregnancy

*In clinically suspected DVT or PTE, treatment with LMWH should be given until the diagnosis is excluded by objective testing, unless treatment is strongly contraindicated.*

Meta-analyses of randomised controlled trials indicate that LMWHs are more effective, are associated with a lower risk of haemorrhagic complications and are associated with lower mortality than unfractionated heparin in the initial treatment of DVT in non-pregnant women.

With regard to safety, there is substantial accumulating evidence with the use of LMWHs, both in pregnant and non-pregnant women, for the prevention and treatment of VTE. There is also evidence that LMWHs do not cross the placenta.

LMWHs are not associated with an increased risk of severe bleeding peripartum. It is known that the risk of heparin-induced thrombocytopenia is substantially lower with LMWH use compared with unfractionated heparin.

The data on LMWH also substantiate a much-reduced risk of LMWH compared with unfractionated heparin for heparin-induced osteoporosis. The overall risk of this complication on systematic review was 0.04%.

**Therapeutic dose of LMWH in pregnancy**

LMWH should be given daily in two subcutaneous divided doses (In view of recognised alterations in the pharmacokinetics of Dalteparin and Enoxaparin during pregnancy) with dosage titrated against the woman’s most recent weight. Enoxaparin and Dalteparin should be first choice agents as there is extensive published experience with them.

Enoxaparin 1 mg/kg twice daily; Dalteparin 100 units/kg twice daily.

Once-daily administration of Tinzaparin 175 units/kg

<table>
<thead>
<tr>
<th>Initial Dose</th>
<th>Early pregnancy weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;50</td>
</tr>
<tr>
<td>Enoxaparin</td>
<td>40mg bd</td>
</tr>
<tr>
<td>Dalteparin</td>
<td>5000 iu bd</td>
</tr>
<tr>
<td>Tinzaparin</td>
<td>175 units/kg once daily (all weights)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Initial Dose</th>
<th>Early pregnancy weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50-69</td>
</tr>
<tr>
<td>Enoxaparin</td>
<td>60mg bd</td>
</tr>
<tr>
<td>Dalteparin</td>
<td>7500 iu am 5000 iu pm</td>
</tr>
<tr>
<td>Tinzaparin</td>
<td>175 units/kg once daily (all weights)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Initial Dose</th>
<th>Early pregnancy weight (kg)</th>
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<tr>
<td></td>
<td>70-89</td>
</tr>
<tr>
<td>Enoxaparin</td>
<td>80mg bd</td>
</tr>
<tr>
<td>Dalteparin</td>
<td>7500 iu bd</td>
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<tr>
<td>Tinzaparin</td>
<td>10000 iu bd</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Initial Dose</th>
<th>Early pregnancy weight (kg)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>&gt;90</td>
</tr>
<tr>
<td>Enoxaparin</td>
<td>100mg bd</td>
</tr>
<tr>
<td>Dalteparin</td>
<td>10000 iu bd</td>
</tr>
</tbody>
</table>

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 at
extremes of body weight (less than 50 kg and 90 kg or more) or with other complicating factors (for example with renal impairment or recurrent VTE) putting them at high risk.

Routine platelet count monitoring should not be carried out (unless unfractionated heparin has been given), as there have been no cases of heparin-induced thrombocytopenic thrombosis in pregnancies managed with LMWH. If unfractionated heparin is employed, or if the obstetric patient is receiving LMWH after first receiving unfractionated heparin, or if she has received unfractionated heparin in the past, the platelet count should ideally be monitored every 2–3 days from day 4 to day 14 or until heparin is stopped, whichever occurs first.

5.7 Management of massive life-threatening PE in pregnancy

➢ Collapsed, shocked patients need to be assessed by a team of experienced clinicians, including the on-call consultant obstetrician, hematologist and physician, who should decide on an individual basis whether a woman receives intravenous unfractionated heparin, thrombolytic therapy or thoracotomy and surgical embolectomy

➢ Intravenous unfractionated heparin is the preferred treatment in massive PTE with cardiovascular compromise

➢ The on-call medical team should be contacted immediately. An urgent portable echocardiogram or CTPA within 1 hour of presentation should be arranged. If massive PE is confirmed or, in extreme circumstances prior to confirmation, immediate thrombolysis should be considered

➢ Guidelines for the administration of intravenous unfractionated heparin should be followed. This should be discussed with the Haematology Consultant and medical team

➢ Management should involve a multidisciplinary resuscitation team including senior physicians, haematologists, obstetricians, radiologists, anesthetists, and cardiothoracic surgeons

➢ The woman should be moved to ITU if appropriate

Intravenous unfractionated heparin is the traditional method of heparin administration in acute VTE and remains the preferred treatment in massive PE because of its rapid effect and extensive experience of its use in this situation.

There is an increasing realisation that APTT monitoring of unfractionated heparin is technically problematic, particularly in late pregnancy. This can lead to unnecessarily high doses of heparin being used, with subsequent haemorrhagic problems. Where such problems are considered to exist, senior Haematologists should be involved in the patient’s management. It may be useful to determine the anti-Xa level as a measure of heparin dose. With unfractionated heparin, a lower level of anti-Xa is considered therapeutic (target range 0.35–0.70 units/ml or 0.5–1.0 unit/ml for women with life-threatening PE).

In massive life-threatening PE with haemodynamic compromise there is a case for considering thrombolytic therapy, as anticoagulant therapy will not reduce the obstruction of the pulmonary circulation. After thrombolytic therapy has been given,
an infusion of unfractionated heparin can be given but the loading dose (outlined above) should be omitted. Data are limited in pregnancy and there have been concerns about maternal bleeding and adverse fetal effects.

Using thrombolytic agents for PE have established that thrombolytic therapy is more effective than heparin therapy in reducing clot burden and rapidly improving haemodynamics. Thrombolytic therapy should be reserved for women with severe pulmonary thromboembolism with haemodynamic compromise. Problems associated with treatment included five non-fatal maternal bleeding complications (2.9%) and three fetal deaths (1.7%). No maternal deaths associated with thrombolytic therapy have been reported. Maternal bleeding complication rate is in the range of 1–6%, which is consistent with that in non-pregnant women receiving thrombolytic therapy. Most bleeding events occur around catheter and puncture sites and, in pregnant women, there have been no reports of intracranial bleeding.

5.8 Additional therapies

In the initial management of DVT, the leg should be elevated and a **graduated elastic compression stocking** applied to reduce oedema. Mobilisation with graduated elastic compression stockings should be encouraged.

Consideration should be given to the use of a **temporary inferior vena caval filter** in the perinatal period for women with iliac vein VTE, to reduce the risk of PE or in women with proven DVT and who have continuing PE despite adequate anticoagulation.

Pain and swelling in the affected leg are debilitating symptoms of DVT. Pain and swelling improve faster in mobile patients wearing compression hosiery than in those resting in bed without any compression. This approach can also prevent the development of post-thrombotic syndrome. For patients with persisting leg oedema after DVT, class II compression hosiery is more effective than class I stockings.

Where DVT threatens leg viability through venous gangrene, the leg should be elevated, anticoagulation given and consideration given to **surgical embolectomy or thrombolytic therapy**.

There is evidence that the use of an inferior vena caval filter prior to labour or delivery reduces the risk of PE. However, when VTE occurs in the antepartum period, delivery should be delayed, if possible, to allow maximum time for anticoagulation rather than putting in a filter.

5.9 Maintenance treatment of VTE

Treatment with therapeutic doses of subcutaneous LMWH should be employed during the remainder of the pregnancy.

Women receiving therapeutic-doses of unfractionated heparin should have their platelet count monitored at least every other day until day 14 or until the unfractionated heparin is stopped, whichever occurs first. Pregnant women who develop heparin-induced thrombocytopenia or have heparin allergy and require continuing anticoagulant therapy should be managed with the heparinoid, danaparoid sodium or fondaparinux, under specialist advice.

Women with antenatal VTE can be managed with subcutaneous LMWH for the remainder of the pregnancy using LMWH administered 12-hourly. If LMWH therapy
requires monitoring, the aim is to achieve a peak anti-Xa 3 hours post-injection, of 0.5–1.2 units/ml.

For the acute treatment of VTE, therapy is initiated based on the booking weight. As pregnancy progresses, either the same dose initiated can be continued throughout the treatment phase, the dose may be altered in proportion to the weight change, or anti-Xa factor can be measured and the dose adjusted accordingly.

A high recurrence rate of VTE was reported (47%) in a prospective randomized controlled trial in non-pregnant patients, when thromboprophylactic doses of unfractionated heparin (5000 iu every 12 hours) were employed after initial management with intravenous unfractionated heparin.

There are now compelling safety data for LMWHs and thus we continue to recommend continuation of therapeutic doses based on the patient’s weight throughout pregnancy.

Prolonged unfractionated heparin use during pregnancy may result in osteoporosis and fractures. Allergic skin reactions to heparin can occur and may require the heparin preparation to be changed.

Because of their adverse effects on the fetus, oral anticoagulants should not be used for antenatal VTE treatment.

Oral anticoagulants cross the placenta readily and are associated with a characteristic embryopathy in the first trimester, central nervous system abnormalities which occur during any trimester, fetal haemorrhage and neonatal haemorrhage following the trauma of delivery.

5.10 Anticoagulant therapy during labour and delivery

The woman taking LMWH for maintenance therapy should be advised that once she is established in labour or thinks that she is in labour, she should not inject any further heparin.

Where delivery is planned, LMWH maintenance therapy should be discontinued 24 hours before planned delivery. For elective delivery, LMWH should be stopped 24 hours before induction of labour or caesarean section. Bleeding complications appear to be very uncommon with LMWH. If spontaneous labour occurs in women receiving therapeutic doses of subcutaneous unfractionated heparin, careful monitoring of the APTT is required. If it is markedly prolonged near delivery, protamine sulfate may be required to reduce the risk of bleeding.

The dose of enoxaparin should be reduced to 40mg once daily on the day before induction of labour or the day before planned caesarean section, or if the thrombosis was recent, to 1.5mg/kg body weight as a single dose on the day before planned induction or caesarean section. (Give thromboprophylactic dose as opposed to the therapeutic dose of the particular LMWH that the patient is on))

Regional anaesthetic or analgesic techniques should not be undertaken until at least 24 hours after the last dose of therapeutic LMWH, or 12 hours after the previous prophylactic dose. Subcutaneous unfractionated heparin should be discontinued 12 hours before and intravenous unfractionated heparin stopped 6 hours before induction of labour or regional anaesthesia. Epidural anaesthesia can be sited only after discussion with a senior anaesthetist, in keeping with local anaesthetic protocols. When a woman presents while on a therapeutic regimen of
LMWH (a twice-daily regimen), regional techniques should not be employed for at least 24 hours after the last dose of LMWH. LMWH should not be given for at least 4 hours after the epidural catheter has been removed and the cannula should not be removed within 12 hours of the most recent injection.

A thromboprophylactic dose of LMWH (Enoxaparin 40 mg, Dalteparin 5000 iu) should be given by 3 hours post-operatively and the treatment dose recommenced that evening. There is an increased risk of wound haematoma following caesarean section with both unfractionated heparin and LMWH of around 2%.

**Are specific surgical measures required for anticoagulated women undergoing delivery by caesarean section?**

In women receiving therapeutic doses of LMWH, wound drains (abdominal and rectus sheath) should be considered at caesarean section and the skin incision should be closed with staples or interrupted sutures to allow drainage of any haematoma.

**What anticoagulant therapy should be employed in women at high risk of haemorrhage?**

Any woman who is considered to be at high-risk of haemorrhage and in whom continued heparin treatment is considered essential should be managed with intravenous, unfractionated heparin until the risk factors for haemorrhage have resolved. Risk factors include major antepartum haemorrhage, coagulopathy, progressive wound haematoma, suspected intra-abdominal bleeding and postpartum haemorrhage. Unfractionated heparin has a shorter half-life than LMWH and its activity is more completely reversed with protamine sulphate. If a woman develops a haemorrhagic problem while on LMWH, the treatment should be stopped and expert haematological advice sought.

5.11 Postnatal anticoagulation

*Therapeutic anticoagulant therapy should be continued for the duration of the pregnancy and for at least 6 weeks postnatally and until at least 3 months of treatment has been given in total.*

Women should be offered a choice of LMWH or oral anticoagulant for postnatal therapy after discussion about the need for regular blood tests for monitoring of warfarin, particularly during the first 10 days of treatment.

Women should be advised that neither heparin (unfractionated or LMWH) nor warfarin is contraindicated in breastfeeding.

Postpartum warfarin should be avoided until at least the third day and for longer in women at increased risk of postpartum haemorrhage.

National guidelines in the UK recommend that, in non-pregnant patients, anticoagulant therapy should be continued for 6 weeks for calf vein thrombosis and 3 months for proximal DVT or pulmonary embolism when VTE has occurred in relation to a temporary risk factor and 6 months for a first episode of idiopathic VTE. The presence of continuing risk factors and the safety of LWMH has led authorities to propose that anticoagulant therapy should be continued for the duration of the pregnancy and until at least 6 weeks postpartum, and to allow a total duration of treatment of at least 3 months.
There are few published data on whether LMWHs are secreted in breast milk, although extensive experience of enoxaparin in the puerperium reports no problems during breastfeeding and other heparins are known not to cross the breast. Neither unfractionated heparin nor LMWH is orally active and no effect would therefore be anticipated in the fetus. If the woman chooses to continue with LMWH postnatally, then either the doses that were employed antenatally can be continued or the manufacturers’ recommended doses for the non-pregnant patient can be employed (Enoxaparin 1.5mg/kg once daily, Dalteparin 10,000–18,000 units once daily depending on body weight, Tinzaparin 175 units/kg once daily). If the woman chooses to commence Warfarin postpartum, this should be avoided until at least the third postnatal day. Daily testing of the international normalised ratio (INR) is recommended during the transfer from LMWH to warfarin to avoid over anticoagulation. Warfarin administration should be delayed in women with risk of postpartum haemorrhage. The regimen for commencing warfarin should be based on local protocols developed with Haematologists. The INR should be checked on day 2 of Warfarin treatment and subsequent Warfarin doses titrated to maintain the INR between 2–3. Heparin treatment should be continued until the INR is greater than 2 on two successive days.

5.12 Prevention of post-thrombotic leg syndrome

Graduated elastic compression stockings (class II) should be worn on the affected leg for 2 years after the acute event to reduce the risk of post-thrombotic syndrome. A randomised controlled trial in non-pregnant patients has shown that such therapy can reduce the incidence of post thrombotic syndrome from 23% to 11% over this period.

The post-thrombotic syndrome is a common complication following DVT. It is found in over 60% of cases followed up over a median of 4.5 years. It is characterised by chronic persistent leg swelling, pain, a feeling of heaviness, dependent cyanosis, telangiectasis, chronic pigmentation, eczema, associated varicose veins and in some cases lipodermatosclerosis and chronic ulceration. Symptoms are made worse by standing or walking and improve with rest and recumbence. The syndrome is more common where there is a recurrent DVT, with obesity and where there has been inadequate anticoagulation. Graduated elastic compression stockings will improve the microcirculation by assisting the calf muscle pump, reducing swelling and reflux, and reducing venous hypertension.

5.13 Patient information and consent

All patients admitted to hospital and identified as high risk for VTE, will receive a patient information document relating to the prevention of thromboembolism and anticoagulation.

5.14 Postnatal clinic review

For women diagnosed with VTE in pregnancy, follow up and care should be as follows:

At discharge:

- The woman should be reviewed by the team SHO / Middle grade
- A clear plan of care should be documented in the notes
Follow up by the community midwife should be arranged if required (if any monitoring is thought to be necessary)

The GP surgery should be informed of the diagnosis and the woman’s discharge by telephone

Follow up should be arranged in the patient’s named Consultant Obstetrician clinic in 4-6 weeks time

In addition, the woman should also have follow-up arranged at the:

Haematology Consultant Clinic at New Tunbridge Wells Hospital or Maidstone Hospital in 8-10 weeks’ time

The midwife discharging the patient should make sure these appointments are in place before the woman leaves hospital

At the postnatal review:

➢ an assessment should be made of post-thrombotic venous damage
➢ thrombophilia tests should be reviewed
➢ arrangements made to repeat them if necessary
➢ advice should be given on the need for thromboprophylaxis in any future pregnancy and at other times of increased risk
➢ hormonal contraception should be discussed

Discharge Planning

On discharge, all patients and/or their families will be informed of the signs and symptoms of DVT and PE and the importance of seeking medical help if this is suspected.

If discharged with VTE prophylaxis, patients and/or their families or carers will be offered information on the correct use and duration of VTE prophylaxis at home and who to contact if problems occur.

Topics suitable for audit

• Proportion of women with previous venous thromboembolism who undergo screening for thrombophilia
• Proportion of women with previous venous thromboembolism who receive six weeks postnatal LMWH
• Documentation of risks of VTE investigations and management
• Correct therapeutic management of suspected and proven VTE
• Appropriate interval for administration of postpartum anticoagulant therapy
• Documentation of postpartum management plan
• Attendance for postnatal review and appropriate thrombophilia testing

6.0 Monitoring and Audit

Monitoring and Audit of this guideline will be identified with issues raised via Clinical Risk / Clinical Governance.
APPENDIX ONE
[Compulsory]

Process Requirements

1.0 Implementation and Awareness

1.1 Once approved this policy/procedural document will be published on the Trust intranet by the Maternity Compliance & Safety Co-ordinator.

1.2 On publication of any Maternity document, the Maternity Compliance & Safety Co-ordinator or Maternity Secretary will ensure that an email is sent to all Maternity staff and other stakeholders, as appropriate.

1.3 On receipt of notification, all managers should ensure that their staff members are aware of the new publications.

2.0 Review

2.1 It is essential that Trust Policy/procedural documents remain accurate and up to date; this policy/procedural document will be reviewed three years after approval, or sooner if there are changes in practice, new equipment, law, national and local standards that would require an urgent review of the policy/procedure. It is the responsibility of the Document Lead for this policy/procedure to ensure this review is undertaken in a timely manner.

2.2 The Document Lead should review the policy/procedure and, even when alterations have not been made, undertake the consultation process as detailed in Section 5.5 Consultation of MTW Policy and Procedure ‘Production, Approval and Implementation of Policies and Procedures’.

3.0 Archiving

3.1 The Trust Intranet retains all superseded files in an archive directory in order to maintain document history.

3.2 Old paper guideline copies pre-dating Datix are stored at:
Chatham Archive & Storage document Co.
Anchor Wharf
Chatham
ME4 4TZ
Telephone: 01634 826665
CONSULTATION ON: Venous Thromboembolism (VTE) in Pregnancy and Puerperium. Prophylaxis, Diagnosis and Management

Consultation process – Use this form to ensure your consultation has been adequate for the purpose.

Please return comments to: Dr Matthew Brown (email: matthew.brown14@nhs.net )

By date: 3 February 2016 (all documents must undergo a minimum of two weeks consultation)

<table>
<thead>
<tr>
<th>Job title</th>
<th>Date sent dd/mm/yy</th>
<th>Date reply received</th>
<th>Modification suggested?</th>
<th>Modification made?</th>
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<td>Consultant Paediatricians</td>
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<td>Chief Pharmacist</td>
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<td>THROMBOSIS COMMITTEE Meeting 10/03/16</td>
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<tr>
<td>Radiographers</td>
<td>19/01/16</td>
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<td></td>
<td></td>
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<tr>
<td>Head of Midwifery / CD</td>
<td>19/01/16</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Matrons for Maternity Inpatient &amp; Outpatient Services</td>
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<td>13/05/16 (Gynaec)</td>
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<td>Y</td>
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<td>Governance &amp; Risk Manager</td>
<td>19/01/16</td>
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<td>Maternity Risk Manager</td>
<td>19/01/16</td>
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<tr>
<td>Supervisors of Midwives</td>
<td>19/01/16</td>
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<td>Y</td>
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<td>Birth Centre Managers</td>
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<td>Maternity Team leads</td>
<td>19/01/16</td>
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<tr>
<td>Maternity staff via email</td>
<td>19/01/16</td>
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<td>Y</td>
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</table>
Equality Impact Assessment

In line with race, disability and gender equalities legislation, public bodies like MTW are required to assess and consult on how their policies and practices affect different groups, and to monitor any possible negative impact on equality.

The completion of the following Equality Impact Assessment grid is therefore mandatory and should be undertaken as part of the policy development and approval process. Please consult the Equality and Human Rights Policy on the Trust intranet, for details on how to complete the grid.

**Please note that completion is mandatory for all policy development exercises. A copy of each Equality Impact Assessment must also be placed on the Trust's intranet.**

<table>
<thead>
<tr>
<th>Title of Policy or Practice</th>
<th>Venous Thromboembolism (VTE) in Pregnancy and Puerperium. Prophylaxis, Diagnosis and Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What are the aims of the policy or practice?</strong></td>
<td>To ensure that evidence based practice is undertaken for the prophylaxis, diagnosis and management of women with VTE</td>
</tr>
<tr>
<td><strong>Identify the data and research used to assist the analysis and assessment</strong></td>
<td>Please refer to page 2</td>
</tr>
<tr>
<td><strong>Analyse and assess the likely impact on equality or potential discrimination with each of the following groups.</strong></td>
<td>Is there an adverse impact or potential discrimination (yes/no). If yes give details.</td>
</tr>
<tr>
<td>Males or Females</td>
<td>NO</td>
</tr>
<tr>
<td>People of different ages</td>
<td>NO</td>
</tr>
<tr>
<td>People of different ethnic groups</td>
<td>NO</td>
</tr>
<tr>
<td>People of different religious beliefs</td>
<td>NO</td>
</tr>
<tr>
<td>People who do not speak English as a first language</td>
<td>Translators can be arranged on request.</td>
</tr>
<tr>
<td>People who have a physical disability</td>
<td>NO</td>
</tr>
<tr>
<td>People who have a mental disability</td>
<td>NO</td>
</tr>
<tr>
<td>Women who are pregnant or on maternity leave</td>
<td>N/A</td>
</tr>
<tr>
<td>Single parent families</td>
<td>NO</td>
</tr>
<tr>
<td>People with different sexual orientations</td>
<td>NO</td>
</tr>
<tr>
<td>People with different work patterns (part time, full time, job share, short term contractors, employed, unemployed)</td>
<td>NO</td>
</tr>
<tr>
<td>People in deprived areas and people from different socio-economic groups</td>
<td>NO</td>
</tr>
<tr>
<td>Asylum seekers and refugees</td>
<td>NO</td>
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<tr>
<td>Prisoners and people confined to closed institutions, community offenders</td>
<td>NO</td>
</tr>
<tr>
<td>Carers</td>
<td>NO</td>
</tr>
<tr>
<td>If you identified potential discrimination is it minimal and justifiable and therefore does not require a stage 2 assessment?</td>
<td>n/a</td>
</tr>
<tr>
<td>When will you monitor and review your EqIA?</td>
<td>Alongside this policy/procedure when it is reviewed.</td>
</tr>
<tr>
<td>Where do you plan to publish the results of your Equality Impact Assessment?</td>
<td>As Appendix 3 of this policy/procedure on the Trust approved document management database on the intranet, under ‘Trust policies, procedures and leaflets’.</td>
</tr>
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</table>
### ANTENATAL Thromboprophylaxis PROFORMA

#### APPENDIX FOUR

**Risk Assessment & Actions in Response to Risk Assessment for Venous Thromboembolism (VTE)**

- Tick the **Risk Factors** on the left and tick the **Risk Assessment** on the right as appropriate.
- Complete the **Actions to be taken in Response to the Risk Assessment for VTE**.
- This tool should be completed at Booking, with any Antnatal Admission or with any Change in the Clinical Circumstances if appropriate.
- Please check **Contraindications** to Anticoagulation & TEDS in the Maternity VTE Guideline on Q-Pulse.

#### Risk Assessment & Actions

- **Intermediate Risk**
  - Apply **GECS (TEDS)**
  - Consider antenatal prophylaxis with LMWH

- **High Risk**
  - Requires antenatal prophylaxis LMWH + GECS (TEDS)
  - If in doubt, seek advice from thrombosis in pregnancy specialist Team and / or refer to full guideline

- **Lower Risk**
  - Mobilisation and avoidance of dehydration

#### Fewer than three risk factors

- **Actions to be taken in Response to the Risk Assessment for VTE**
  - **High Risk:** LMWH: ☐ GECS (TEDS): ☐ Low Dose Aspirin: ☐ Referral to Specialist: ☐
  - **Intermediate Risk:** LMWH: ☐ GECS (TEDS): ☐ Low Dose Aspirin: ☐ Referral to Specialist: ☐
  - **Lower Risk:** Mobilisation and Avoidance of Dehydration ☐ (also applies to high risk / intermediate risk groups)

#### Dose of LMWH

<table>
<thead>
<tr>
<th>Weight</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 50 kg</td>
<td>2500 u Dalteparin Daily</td>
</tr>
<tr>
<td>50-90 kg</td>
<td>5000 u Dalteparin Daily</td>
</tr>
<tr>
<td>91-130 kg</td>
<td>7500 u Dalteparin Daily</td>
</tr>
<tr>
<td>&gt; 130 kg</td>
<td>5000 u Dalteparin BD</td>
</tr>
<tr>
<td>&gt; 170 kg</td>
<td>75 u/kg/day</td>
</tr>
</tbody>
</table>

#### Assessor

- Date: … / … / …
- Signature: …………………………………………
- Designation: …………………………………………

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**Venous Thromboembolism (VTE) in Pregnancy and Puerperium: Prophylaxis, Diagnosis and Management**

Written by: Obstetric Middle Grade

Review date: March 2019

Document Issue No. 6.0
POSTNATAL Thromboprophylaxis PROFORMA

Risk Assessment & Actions in Response to Risk Assessment for Venous Thromboembolism (VTE)

- Tick the Risk Factors on the left and tick the Risk Assessment on the right as appropriate.
- Complete the Actions to be taken in Response to the Risk Assessment for VTE.
- This tool should be completed following Delivery or with any Change in the Clinical circumstances Postdelivery if appropriate.
- Please check Contraindications to Anticoagulation & TEDS in the Maternity VTE Guideline on Q-Pulse.

Date: … / … / …… Time of Assessment: ………….. hrs Mode of Delivery: ……………………………

Delivery: □ Change in Clinical Circumstances Post Delivery: □ (Complete New Form)

Any Previous VTE □
Anyone requiring antenatal LMWH □
High Risk Thrombophilia □
Low Risk Thrombophilia + Family Hx □

Caesarean Section in Labour or complicated C/S □
Any surgical procedure in the puerperium except immediate repair of perineum □
BMI > 40kg/m² □
Readmission or hospital admission >3days in puerperium □
Medical co-morbidities e.g. cancer, heart failure, active SLE, IBD or inflammatory conditions, nephrotic syndrome, type 1 DM with nephropathy, sickle cell disease, current intravenous drug user □

Age > 35 years □
Obesity (BMI > 30 kg/m²) □
Parity ≥3 □
Smoker □
Elective caesarean section □
Family history of VTE □
Low-risk thrombophilia □
Gross varicose veins □
Current systemic infection □
Immobility (≥3 days), paraplegia, long distance travel (> 4 hours), SPD □
Pre-eclampsia (current) □
Mid-cavity rotational operative delivery □
Prolonged Labour >24 hours □
PPH > 1 litre or Blood Transfusion □
Multiple pregnancy □
Stillbirth in this pregnancy □
Preterm delivery this pregnancy <37wks □

Actions to be taken in Response to the Risk Assessment for VTE

High Risk: □ Referral to Specialist: □
Intermediate Risk: □ Referral to Specialist: □
Lower Risk: □ (also applies to high risk / intermediate risk groups)

Dose of LMWH

Weight < 50 kg: 2500 u Dalteparin Daily
Weight 50-90 kg: 5000 u Dalteparin Daily
Weight 91-130 kg: 7500 u Dalteparin Daily
Weight 131-170 kg: 5000 u Dalteparin BD
Weight > 170 kg: 75 u/kg/day

Assessor: ……………………………………………….. Date: … / … / …… Time: ………………..hrs
Signature: …………………………………… Designation: ……………………………..