VENOUS THROMBOEMBOLISM (VTE) IN PREGNANCY, LABOUR AND POST NATAL PERIOD - CLINICAL GUIDELINE FOR THE DIAGNOSIS, REFERRAL, TREATMENT AND ONGOING MANAGEMENT

1. Aim/Purpose of this Guideline
   1.1. This is to give guidance to any health professional caring for a pregnant or newly delivered woman with suspected or confirmed thromboembolic disease.
   1.2. It also contains an information leaflet for patients regarding scanning for pulmonary embolism in pregnancy (appendix 3)
   1.3 For the purposes of this guideline 'post-natal' and 'post partum' refer to the period up to 6 weeks post delivery for all women.
   1.4 In cases where scanning is required for women with suspected PE the scanning algorithm should be applied to all women who continue to breast-feed beyond 6 weeks post delivery

2. The Guidance
   2.1. Introduction
   Venous thromboembolism (VTE) is a major cause of mortality in pregnant women, with an estimated mortality rate in the UK of 1.08 per 100,000; Risk is highest during the post-partum period. Possible sites are:
   • Pulmonary embolism (PE)
   • Deep vein thrombosis (DVT)

   2.2. Signs of PE: In a study of 38 pregnant women with confirmed PE, the four most common features at presentation are:1,2:
   • Dyspnoea (62%)
   • Pleuritic chest pain (55%)
   • Cough (24%)
   • Sweating (18%)

   2.3. Signs of DVT
   • painful calf swelling (unilateral / bilateral) in pregnancy or postnatal period.

   2.4. Initial assessment
   All pregnant women with suspected VTE should have a thorough clinical assessment to exclude other conditions which may cause a similar presentation.
   If the woman has any features to suggest respiratory failure or haemodynamic instability, and is in the community setting, prompt referral should be made to the emergency department (ED).
   If the woman is on an obstetric ward, the obstetrician in charge will assess and if appropriate liaise with the medical team.
   In the community setting, if a PE is suspected but there are no features to suggest respiratory failure or haemodynamic instability and the woman is clinically stable, the
woman should be referred to the GP urgently. The Acute GP Service (ext. 3566) is available from 08:30hrs to 18:30hrs, Monday to Friday and 08:30hrs to 18:00hrs on Saturday and Sunday. Outside of these hours the referral pathway is to out of hours GP. Those women assessed in ED / MAU / obstetric ward may be followed up by the Acute GP Service following an internal referral.

2.5. Referral for suspected DVT alone
Ring the Thrombosis Nursing Team on x3597 between Monday-Friday, 09:00hrs-17.00hrs and Saturday 9.00hrs-12.00hrs to organise compression ultrasound (CUS) and further management. Referral to the Thrombosis team can also be made via the Maxims system.
Out of hours, initiate treatment (table 1) and refer to the Thrombosis Nursing Team the next working day.

The Thrombosis Nursing Team will refer the patient to the joint obstetric and haematology clinic as appropriate and will organise any long term follow up.

2.6. Investigations
These should be initiated in the appropriate health setting. If a referral is made to the acute GP setting the following investigations will be done by them.
If a plan is made to manage within the inpatient setting the following investigations need initiating at that point.
FBC, U&Es, LFTs, and coagulation profile should be done for all women. Clinicians need to be aware that, at present, there is no evidence to support the use of pre-test probability assessment in the management of acute VTE in pregnancy.
D-dimers should not be performed in the investigation of acute VTE in pregnancy or during the post-partum period.
Women presenting with signs of an acute PE should have an electrocardiogram (ECG) and a chest X-ray performed.
Arterial blood gas analysis should be performed if resting SpO₂ is less than 94% on air
Diagnostic radiology should be performed where there is a high clinical suspicion of VTE.

2.7. Diagnostic Radiology
The imaging algorithm below is recommended for clinically stable patients.
If a patient needs urgent imaging out of hours, contact the radiology consultant/SpR on call for advice.
DVT – if ultrasound is negative and there is a low level of suspicion anticoagulant treatment can be discontinued. If ultrasound is negative and a high level of suspicion remains anticoagulant treatment should be discontinued but the ultrasound should be repeated within 3-7 days
PE The risks benefits and alternatives should be discussed with the woman prior to the investigations being undertaken. For those who are unstable, e.g. massive PE, refer to section 2.9.

Imaging
The following imaging algorithm adapted from the American Thoracic Society/Society of Thoracic Radiology Clinical Practice Guideline (5) is recommended for clinically stable patients. For those who are unstable, e.g. massive PE, refer to relevant section later in the guideline. A sensitive SPECT perfusion (Q) scan is acquired in Royal Cornwall Hospital instead of a ventilation/perfusion (V/Q) scan as advocated in the original guideline. This service is available Monday to Friday. As special lung kits need to be prepared for the scans
they will either be performed on the day the scan is requested, or on the next working day. If a patient needs urgent imaging in the evening (after 5pm) at the weekend or on a bank holiday, the case will have to be discussed with the radiology consultant/SpR on call. Presentations on a Sunday evening could be imaged on the Monday morning. Patients should be appropriately counselling regarding the investigations. See patient information leaflet, appendix 1

### 2.8. Initial Treatment

Women with a high suspicion of VTE should be commenced on anticoagulation on presentation, provided there are no absolute contraindications. The agents preferred are either Dalteparin or Enoxaparin titrated against the woman’s booking or early pregnancy weight, in a twice daily schedule. Prefilled syringes should be used. (see table 1). Where delivery is planned, either by elective caesarean section or induction of labour, LMWH therapy should be discontinued 24 hours prior to planned delivery. Regional anaesthetic or epidural catheter insertion should not be undertaken until at least 24 hours after the last dose of therapeutic LMWH and the epidural catheter should not be removed within 12 hours of the most recent LMWH injection. For women who develop VTE at term consideration should be given to the use of unfractionated heparin. Consideration should be given for the use of newer anticoagulants (fondaparinux, argatroban) in pregnant women who are unable to tolerate LMWH or unfractionated heparin.
Table 1: Dose and frequency of anticoagulation treatment

<table>
<thead>
<tr>
<th>Weight</th>
<th>&lt;50kg</th>
<th>51-69kg</th>
<th>70-89kg</th>
<th>90-109kgs</th>
<th>&gt;110kgs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dalteparin</td>
<td>5000u b.d</td>
<td>7500u am</td>
<td>10000u am</td>
<td>12500u am</td>
<td>15000u am</td>
</tr>
<tr>
<td>Enoxaparin</td>
<td>40mg b.d</td>
<td>60mg b.d</td>
<td>80mg b.d</td>
<td>100mg b.d</td>
<td>120mg b.d</td>
</tr>
</tbody>
</table>

2.9. Management of a woman with suspected PE with respiratory compromise (If the woman is on maternity unit refer to guideline for the Severely Ill Woman)

2.9.1. Respiratory support
If the patient has a resting SpO₂ < 94% on air, supplemental oxygen should be given to achieve a SpO₂ > 94-98%. An anaesthetic opinion should be sought to maintain an appropriate SpO₂. Critical Care or HDU involvement should be sought in the presence of severe respiratory failure and be a MDT decision.

2.9.2. Massive PE
Unfractionated heparin should be given intravenously, see section 2.3 of *Thrombosis Prevention and Anticoagulation Policy*. An urgent portable echocardiogram or CTPA should be arranged. Consider thrombolysis, see section 2.8 of *Thrombosis Prevention and Anticoagulation Policy*. This needs to be a MDT decision. The woman should be managed on Critical Care or HDU based on the clinical indication.

2.9.3. Severe renal failure
Anticoagulation should be administered as per Appendix E of *Thrombosis Prevention and Anticoagulation Policy*.

2.10 Ongoing treatment of confirmed VTE:
All confirmed cases should be referred to the Joint Haematology Obstetric clinic. Treatment should be continued for the duration of pregnancy and for at least 6 weeks post-natally or until at least 3 months of treatment given in total. Obstetric women receiving unfractionated heparin should have their platelet count performed every 2-3 days from days 4-14 or until heparin is stopped. LMWH should not be given for 4 hours after the use of spinal anaesthesia or after the epidural catheter has been removed. Women receiving ante-natal LMWH should be advised to stop treatment if they have any vaginal bleeding or once labour begins. In these instances the patients should be re-assessed on admission to hospital and any further doses prescribed by medical staff. Women should be offered a choice of either LMWH or oral anticoagulant for postnatal therapy. Postpartum warfarin should be avoided until at least the fifth day and for longer in women at increased risk of post-partum bleeding.

2.10.1 The first dose of post-partum Dalteparin can be given:
- When result of FBC received and platelets are greater than 75
- When there is no active bleeding
- After 4 hours of epidural catheter removal and spinal.
- Then daily following the first dose
In the initial management of DVT the leg should be elevated and a graduated compression hosiery applied to reduce oedema. Mobilisation with GCH should be encouraged.

2.11. Documentation of management plans for confirmed VTE
For women seen by the acute GP service plan of care will be documented in the main health records and a referral letter will be sent to the joint Obstetric/haematology clinic and copied to the GP.
For women seen in DVT clinic a printout of the outcome and any plan will be given to the woman to insert into her hand held notes and a copy will be put into the main health records.
For women seen at the joint obstetric/haematology clinic a letter will be sent to the woman’s community midwife, consultant obstetrician, consultant anaesthetist and the woman’s GP informing them of the plan of care. The plan of care should also be documented on the ‘maternity management plan’ page of the maternity hand held notes.
For women seen by the consultant obstetrician team either as an outpatient or as antenatal inpatient, the plan of care should also be documented on the ‘maternity management plan’ page of the maternity hand held notes.
Any management plan which relates to labour, delivery and the post natal period should be copied to the ‘risk file’ on delivery suite.
### 3. Monitoring compliance and effectiveness

| Element to be monitored | The audit will take into account record keeping by obstetricians and midwives  
|                         | The results will be inputted onto an excel spread sheet  
|                         | The audit will be registered with the Trust’s audit department |

| Lead | Maternity Risk Management Midwife |

| Tool | Was a booking risk assessment completed.  
|      | If an ante natal admission (non labour related) was a risk assessment completed  
|      | Was a post-delivery risk assessment completed  
|      | If assessed as intermediate or high was the appropriate referral made to the joint haem/obs team or consultant clinic  
|      | If the woman required thromboprophylaxis was an appropriate management plan documented in her notes  
|      | If the woman required treatment for a VTE was an appropriate management plan documented in her notes  
|      | If the woman received a diagnosis of VTE during pregnancy and post natal period was she offered a follow up at the joint haem/obs clinic |

| Frequency | 1% or 10 sets, whichever the greater, of all health records of women who have delivered and received thromboprophylaxis or treatment for a diagnosis of VTE will be audited over a 12 month period |

| Reporting arrangements | A formal report of the results will be received annually at the maternity risk management and clinical audit forum, as per the audit plan  
|                       | During the process of the audit if compliance is below 75% or other deficiencies identified, this will be highlighted at the next maternity risk management and clinical audit forum and an action plan agreed. |

| Acting on recommendations and Lead(s) | Any deficiencies identified on the annual report will be discussed at the maternity risk management and clinical audit |

| Change in practice and lessons to be shared | Required changes to practice will be identified and actioned within a time frame agreed on the action plan  
|                                               | A lead member of the forum will be identified to take each change forward where appropriate.  
|                                               | The results of the audits will be distributed to all staff through the risk management newsletter/audit as per the action plan |

### 4. Equality and Diversity

4.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement which can be found in the ‘Equality, Diversity & Human Rights Policy’ or the Equality and Diversity website.

#### 4.2. Equality Impact Assessment

The Initial Equality Impact Assessment Screening Form is at Appendix 2.
## Appendix 1. Governance Information

<table>
<thead>
<tr>
<th>Document Title</th>
<th>Venous thromboembolism (VTE) in pregnancy, labour and post natal period - clinical guideline for the diagnosis, referral, treatment and ongoing management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Issued/Approved:</td>
<td>20(^{th}) May 2016</td>
</tr>
<tr>
<td>Date Valid From:</td>
<td>20(^{th}) May 2016</td>
</tr>
<tr>
<td>Date Valid To:</td>
<td>20(^{th}) May 2019</td>
</tr>
</tbody>
</table>
| Directorate / Department responsible (author/owner): | Obs and Gynae directorate  
Dr Aylur Rajasri Consultant Obstetrician  
Haematology directorate  
Mr Andrew Mcsorley, Thrombosis Specialist Nurse |
| Contact details: | Dr Aylur Rajasri  
Obs and Gynae directorate |
| **Brief summary of contents** | This is to give guidance to any Obstetrician or midwife who is caring for a pregnant or newly delivered woman with suspected thromboembolic disease  
To give guidance to any clinician within RCHT who is caring for a pregnant or newly delivered woman with suspected thromboembolic disease. E.g. Emergency department (ED), medical admissions unit (MAU) and any other clinical settin |
| Suggested Keywords: | Pulmonary Embolism, PE, Deep Vein Thrombosis, DVT, VTE, DVT, Thromboembolism, pregnancy |
| Target Audience | RCHT | PCH | CFT | KCCG |
| ✓ | |
| Executive Director responsible for Policy: | Medical Director |
| Date revised: | May 2016 |
| This document replaces (exact title of previous version): | Venous thromboembolism (VTE) in pregnancy, labour and post natal period - clinical guideline for the diagnosis, referral, treatment and ongoing management |
| Approval route (names of committees)/consultation: | Maternity Guidelines  
Obs and Gynae Directorate and Divisional Board |
| Divisional Manager confirming approval processes | Head of Midwifery |
### Related Documents:

- BTS guideline for emergency oxygen use in adult patients. Thorax 2008;63: Suppl 6 vi1-vi68
- Knight M, Kenyon S, Brocklehurst P, Neilson J, Shakespeare J, Kurinczuk JJ (Eds.) on behalf of MBRRACE-UK. Saving Lives, Improving Mothers’ Care -

- Thromboembolic disease in pregnancy and the puerperium: acute management. Green top guideline No.37 Royal College of Obstetricians and Gynaecologists

Training Need Identified? None

Version Control Table

<table>
<thead>
<tr>
<th>Date</th>
<th>Version No</th>
<th>Summary of Changes</th>
<th>Changes Made by (Name and Job Title)</th>
</tr>
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<tr>
<td>December 2009</td>
<td>V1.0</td>
<td>Initial Document</td>
<td>Mr Rob Jones Consultant Obstetrician</td>
</tr>
<tr>
<td>August 2013</td>
<td>V1.1</td>
<td>Updated document to include change in management process</td>
<td>Dr Aylur Rajasri Consultant Obstetrician</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Include management of a pregnant woman with suspected VTE anywhere</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>within acute setting</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Updated Compliance Monitoring</td>
<td></td>
</tr>
<tr>
<td>May 2016</td>
<td>V1.2</td>
<td>Updated document to include recommendations from RCOG green top</td>
<td>Andrew Mcsorley Thrombosis practitioner / VTE CNS</td>
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<tr>
<td></td>
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<td>guidance No. 37b April 2015</td>
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All or part of this document can be released under the Freedom of Information Act 2000

This document is to be retained for 10 years from the date of expiry.

This document is only valid on the day of printing

Controlled Document

This document has been created following the Royal Cornwall Hospitals NHS Trust Policy on Document Production. It should not be altered in any way without the express permission of the author or their Line Manager.
Appendix 2. Initial Equality Impact Assessment Form

<table>
<thead>
<tr>
<th>Name of Name of the strategy / policy / proposal / service function to be assessed (hereafter referred to as policy) (Provide brief description):</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Directorate and service area:</td>
<td></td>
<td>Is this a new or existing Policy?</td>
</tr>
<tr>
<td>Name of individual completing assessment: Andrew mcSorley</td>
<td>Telephone: 01872 250000</td>
<td></td>
</tr>
<tr>
<td>1. Policy Aim* Who is the strategy / policy / proposal / service function aimed at?</td>
<td>This is to give guidance to any Obstetrician or midwife who is caring for a pregnant or newly delivered woman with suspected thromboembolic disease To give guidance to any clinician within RCHT who is caring for a pregnant or newly delivered woman with suspected thromboembolic disease. E.g. Emergency department (ED), medical admissions unit (MAU) and any other clinical setting</td>
<td></td>
</tr>
<tr>
<td>2. Policy Objectives*</td>
<td>To ensure a pathway for pregnant or newly delivered women with suspected VTE</td>
<td></td>
</tr>
<tr>
<td>3. Policy – intended Outcomes*</td>
<td>Prompt management of a pregnant or newly delivered woman with a suspected or confirmed VTE</td>
<td></td>
</tr>
<tr>
<td>4. *How will you measure the outcome?</td>
<td>Compliance monitoring tool</td>
<td></td>
</tr>
<tr>
<td>5. Who is intended to benefit from the policy?</td>
<td>Pregnant and newly delivered women</td>
<td></td>
</tr>
<tr>
<td>6a) Is consultation required with the workforce, equality groups, local interest groups etc. around this policy?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>b) If yes, have these *groups been consulted?</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>C). Please list any groups who have been consulted about this procedure.</td>
<td>N/A</td>
<td></td>
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</table>

7. The Impact
Please complete the following table.

<table>
<thead>
<tr>
<th>Are there concerns that the policy could have differential impact on:</th>
<th></th>
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</thead>
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<tr>
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<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Category</td>
<td>X</td>
<td>All pregnant women</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>---</td>
<td>--------------------</td>
</tr>
<tr>
<td>Sex (male, female, transgender / gender reassignment)</td>
<td>X</td>
<td>All pregnant women</td>
</tr>
<tr>
<td>Race / Ethnic communities /groups</td>
<td>X</td>
<td>All pregnant women</td>
</tr>
<tr>
<td>Disability - Learning disability, physical disability, sensory impairment and mental health problems</td>
<td>X</td>
<td>All pregnant women</td>
</tr>
<tr>
<td>Religion / other beliefs</td>
<td>X</td>
<td>All pregnant women</td>
</tr>
<tr>
<td>Marriage and civil partnership</td>
<td>X</td>
<td>All pregnant women</td>
</tr>
<tr>
<td>Pregnancy and maternity</td>
<td>X</td>
<td>All pregnant women</td>
</tr>
<tr>
<td>Sexual Orientation, Bisexual, Gay, heterosexual, Lesbian</td>
<td>X</td>
<td>All pregnant women</td>
</tr>
</tbody>
</table>

You will need to continue to a full Equality Impact Assessment if the following have been highlighted:
- You have ticked “Yes” in any column above and
- No consultation or evidence of there being consultation - this excludes any policies which have been identified as not requiring consultation. or
- Major service redesign or development

8. Please indicate if a full equality analysis is recommended.  
<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

9. If you are not recommending a Full Impact assessment please explain why.

N/A

Signature of policy developer / lead manager / director : Date of completion and submission 1.6.2016

Names and signatures of members carrying out the Screening Assessment

1. Andrew Mcsorley

Keep one copy and send a copy to the Human Rights, Equality and Inclusion Lead, c/o Royal Cornwall Hospitals NHS Trust, Human Resources Department, Knowledge Spa, Truro, Cornwall, TR1 3HD

A summary of the results will be published on the Trust’s web site.

Signed: Sarah-Jane Pedler

Date: 1.6.2016
APPENDIX 3

Patient information leaflet
Scanning for Pulmonary Embolism in Pregnancy

What is Pulmonary Embolism?
Pulmonary embolism (PE) is a blockage of the blood vessels in the lungs usually caused by blood clots. Often these blood clots will have originated in the deep veins of your leg which is known as Deep vein Thrombosis (DVT). These blood clots can break away from the leg and travel through the circulation and eventually become stuck in the lungs.

What are the symptoms of PE?
The symptoms of PE can vary depending on the size of the clot. PE will often cause a feeling of breathlessness with chest pain which can be worse on breathing in. Occasionally PE will cause a sensation of rapid pulse or palpitations and in rare cases coughing up of blood. Large blood clots in the lungs may cause severe shortness of breath, and can result in faint or collapse. There may be pain and swelling present in one or both of your legs (DVT). It is important to remember breathlessness can be common in pregnancy and does not necessarily mean you have had a Pulmonary Embolism.

Why might I have a PE?
Being pregnant increases your risk of developing DVT and PE as your blood thickens more than usual and is more prone to clot formation. You may be less active towards the end of your pregnancy and blood flow in your legs may slow down which adds to the risk. Pregnant women are more at risk of developing DVT and PE than non-pregnant women of the same age.

How will I know if I have a PE?
To confirm whether you have had a PE you will need to have a special scan to look at the blood circulation in your lungs. The main types of scan for your lungs are a perfusion or ‘Q’ scan or a Computed Tomography Pulmonary Angiography (CTPA) scan.

What do these scans involve?
**Perfusion scan**
For a perfusion scan a small amount of radioactive tracer is injected into your blood. A scan is then performed which gives an image of the blood flow in your lungs. This scan will be examined along with an x-ray of the chest in order to diagnose whether you may have blood clots present.

**CTPA**
CTPA is a scan which will look at the blood flow in the arteries of the lung. You will be asked to lie flat on a table and an X-ray dye will be injected into your blood. This dye allows clear pictures of your circulation to be taken. The table will move into a doughnut shaped scanner and images will be taken of the lungs. You will be asked to hold your breath during the scan and it is important that you are able to lie very still whilst the images are being taken.

Are there any risks associated with lung perfusion or CTPA scan?
During a lung perfusion scan or a CTPA you and your baby will be exposed to a low level of radiation. We are all exposed to radiation all the time. This background radiation comes from the sun, our food and rocks in the ground. There is no difference between background radiation and radiation used for scans. The risks to you and your baby of the additional radiation dose from the scan are small. They are much less than the risks of not treating a clot on the lung, or treating you when you do not have a blood clot.

Can I wait until I deliver my baby?
No. PE can have serious consequences in pregnancy therefore it is vital that a diagnosis is made as soon as possible. It is important to confirm as soon as possible whether or not you have a PE so that you can be treated appropriately.

Which scan will I have?
The decision on which scan is the most appropriate will be made by your doctor. Generally factors such as your stage of pregnancy, any findings on your recent chest X-ray, any known allergies to the X-ray dye, previous history of DVT or PE, and your current kidney and heart/lung function will play role in this decision.

**Is there any other way to diagnose PE?**

Unfortunately no. If you have any symptoms of DVT you may have an ultrasound scan of the legs first but this can often be negative. Scanning the chest is the best available method to make a firm diagnosis that you have PE.

**What will happen if I do not have the scan?**

Unfortunately there is no other way of confirming whether you have had a Pulmonary Embolism unless a scan is performed. Pulmonary Embolism is a serious medical condition which if undiagnosed can be fatal or can pose a significant risk to your health and the health of your baby.

**What happens if the scan is positive?**

This will confirm you have had a PE. You will be commenced on the appropriate treatment which is likely to be injections of heparin which is a blood thinner. You will be given full explanations of this treatment if it is required.

**What happens if the scan is negative?**

You will be reviewed by your doctor and will be advised if any other investigations are required.

**Important**

If you have had your baby and are breastfeeding please discard your breast milk for 24 hours after the scan. Your midwife can help you with this.

If you have any further questions please discuss these with the medical team who are looking after you. If you are not currently under the direct care of a medical team and think that the symptoms described in this leaflet apply to you please talk to your GP urgently or alternatively contact the RCHT thrombosis nurses on 01872-253597 (available Mon-Fri 9-5, Saturday 9-12).