## Diagnosis and Management of Venous Thromboembolism: Deep Vein Thrombosis (DVT) Procedure

<table>
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<th>Guideline Number:</th>
<th>457A</th>
<th>Supersedes:</th>
<th>Classification</th>
<th>Clinical</th>
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<th>Date of EqIA:</th>
<th>Approved by:</th>
<th>Date Approved:</th>
<th>Date made active:</th>
<th>Review Date:</th>
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<tr>
<td>5</td>
<td>Thrombosis Committee</td>
<td>26/7/2018</td>
<td>31/7/2018</td>
<td>26/7/2021</td>
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### Brief Summary of Document:
It is a standardised diagnostic pathway for patients presenting with suspected deep vein thrombosis. It outlines key principles in relation to the diagnosis and management of DVT in an outpatient setting. It is to be used across the Health Board so that all patients are assessed, diagnosed and treated in accordance with current NICE recommendations.

### Scope
This procedure is to be used for the diagnosis and treatment of deep vein thrombosis in adults in the acute and outpatient setting. It does not include the management of pulmonary embolus. The management of deep vein thrombosis in children and obstetric patients are excluded from this procedure.

To be read in conjunction with:
482 - Anticoagulation Discharge Referral Information Procedure

Owning committee: Thrombosis Committee
Glossary of terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>DVT</td>
<td>Deep Vein Thrombosis</td>
</tr>
<tr>
<td>PE</td>
<td>Pulmonary Embolism</td>
</tr>
<tr>
<td>COAD</td>
<td>Chronic Obstructive Airways Disease</td>
</tr>
<tr>
<td>VTE</td>
<td>Venous Thromboembolism</td>
</tr>
<tr>
<td>LMWH</td>
<td>Low Molecular Weight Heparin</td>
</tr>
<tr>
<td>FBC</td>
<td>Full Blood Count</td>
</tr>
<tr>
<td>LFT</td>
<td>Liver Function Test</td>
</tr>
<tr>
<td>INR</td>
<td>International Normalised Ratio</td>
</tr>
<tr>
<td>BP</td>
<td>Blood Pressure</td>
</tr>
</tbody>
</table>

| Key words | Deep Vein Thrombosis, DVT, Venous Thromboembolism, VTE, Thromboprophylaxis, Thrombosis, Anticoagulation, LMWH, Warfarin, Rivaroxaban, Apixaban, Wells score. |

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<tr>
<td>2</td>
<td>4.12.2015</td>
<td>Updated following NICE guidance</td>
</tr>
<tr>
<td>3</td>
<td>16.9.2016</td>
<td>Correction on page 11</td>
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<tr>
<td>4</td>
<td>1.6.2018</td>
<td>Full review</td>
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<tr>
<td>5</td>
<td>25.7.2018</td>
<td>Minor amendments</td>
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1. INTRODUCTION
Deep vein thrombosis (DVT) is a common disorder with an annual incidence of 1 or 2 cases per 1000 persons in the general population. Anticoagulation is an effective treatment but on discontinuation the risk of recurrence remains and can reach 10% during the first year.

2. SCOPE
This procedure is to be used by competent staff for the assessment, diagnosis and treatment of suspected or proven deep vein thrombosis in adults in the outpatient setting. It does not include the management of pulmonary embolus.
The management of deep vein thrombosis in children and obstetric patients are excluded from this procedure.

- All medically qualified doctors are able to follow the procedure as they are competent in history taking, clinical examination and are able to prescribe the required medications.
- Counselling following diagnosis can be carried out by competent nurses who have completed the Birmingham anticoagulant course.

3. AIM
The aim of the procedure is to standardise the diagnosis and management of DVT across the Health Board, so that all patients presenting with suspected or proven deep vein thrombosis are assessed, diagnosed and treated appropriately, and therefore do not come to avoidable harm.

4. OBJECTIVES
The aim of the procedure is achieved by:

- The appropriate assessment of patients with suspected DVT
- The timely diagnosis of patients with proven DVT
- The appropriate treatment of patients with proven DVT

5. MONITORING COMPLIANCE
The NICE audit tool (NICE CG144 2012) must be used, with an annual audit undertaken in each acute hospital.

6. PROCEDURE
6.1 Overview of deep vein thrombosis
6.1.1 Clinical Features:
The clinical features of a deep vein thrombosis are variable. Patients may present with the following symptoms in their leg:
- Swelling
- Pain
- Redness
- Warmth

Signs of a DVT on examination include:
- Tenderness
- Warmth
- Erythema
- Cyanosis
- Palpable thrombotic vein
- Superficial venous dilation
6.1.2  **Risk Factors:**
The cause of a DVT is often multifactorial.
- Surgery
- Malignancy
- Prolonged bed rest
- Immobility/Pregnancy/recent childbirth
- Family history of venous thromboembolism
- Obesity
- Inherited thrombophilic defect
- Antiphospholipid syndrome
- Advanced age
- Chronic obstructive airways disease (COAD)
- Congestive cardiac failure
- Oral contraceptive pill/Hormone replacement therapy
- Intravenous drug users
- Steroid treatment

6.2 **Criteria for assessment**

6.2.1  **Inclusion criteria:**
- Patients presenting with a clinical suspicion of a DVT

6.2.2  **Exclusion Criteria:**
- Suspected or confirmed pulmonary embolus
- Thrombus in the iliac veins or vena cava
- Active bleeding e.g. intracranial bleed within last 6 months, gastro-intestinal bleed within 1 month, oesophageal varices
- Verified bleeding disorder e.g. haemophilia or thrombocytopenia (Platelets <90x10/L)
- Pregnancy
- Known liver failure
- Hypertension, systolic BP>180mm Hg or diastolic BP 115mmHg
- Age < 16 years
- No fixed address
- Not contactable by phone
- Inability to understand instructions
- Anticipated compliance problems e.g. mental illness or alcohol misuse

6.3 **Diagnosis**
Refer to Appendices 1, 2 and 3 for the Wells Score table algorithm and assessment proforma for the outpatient assessment of patients with suspected DVTs

Appendix 3 – the DVT Assessment Proforma must be completed accurately and fully, as failure to do so may result in delays in scanning.

Referrals from Primary Care for Doppler investigations, must be accompanied with the completed DVT Assessment Proforma.
6.4 Treatment

6.4.1 Treatment for a first episode DVT:
The choice of treatment for a first episode DVT is:
1. Apixaban
2. Rivaroxaban
OR
3. Low molecular weight heparin initially followed by Warfarin. (agent of choice for patients below 40kg or above 120kg of weight)

All patients initiated on anticoagulation need the Anticoagulation Discharge Referral Form completed; refer to Hywel Dda UHB Procedure 482 - Anticoagulation Discharge Referral Information

6.4.2 Treatment for recurrent DVT:
The choice of treatment for recurrent DVT is:
1. Low molecular heparin and Warfarin

6.5 Monitoring of treatment
Patients on Warfarin will have INRs performed either in Primary Care if the GP practice is a ‘level 3 or 4 Centre’ or Secondary Care.

6.6 Duration of anticoagulation
The current all Wales adult in-patient Warfarin chart outlines the current recommended length of treatment for venous thromboemboli as follows:
- 1\textsuperscript{st} idiopathic VTE: proximal DVT or PE >3months or longer (as determined by the consultant in charge of the patient)
- 1\textsuperscript{st} proximal VTE/PE with precipitating factors e.g. trauma, surgery, pregnancy: 3 months
- 1\textsuperscript{st} idiopathic, calf vein DVT: 3 months
- 1\textsuperscript{st} calf vein DVT, with precipitating factors eg trauma, surgery: 6 weeks
- Recurrent VTE: long term
- VTE whilst taking Warfarin (discuss with haematologist): long term

6.7 Investigations for Patients with Cancer.
All patients with an unprovoked DVT must have a full history and examination to guide further investigations. Other investigations to perform are:

- A chest X-ray and
- Blood tests (FBC, serum calcium and LFT) and
- Urinalysis

Consider further investigations for cancer with an abdomino-pelvic CT scan (and a mammogram for women) in all patients aged over 40 years with a first unprovoked DVT who do not have signs or symptoms of cancer based on initial investigation

Cancer needs to be considered as a possible cause of a DVT particularly in the elderly, patients with bilateral DVTs, recurrent DVTs, markedly raised D-dimers at presentation or raised inflammatory markers.

Patients with cancer-associated VTE are at high risk of recurrence and LMWH has been shown to be more effective than warfarin for the first 6 months of treatment (Lee et al, 2003). The British Journal of Haematology recommends that patients with cancer-associated VTE
should initially be treated for 6 months with therapeutic dose LMWH rather than warfarin.
7 REFERENCES


APPENDIX 1: TWO-LEVEL DVT WELLS SCORE FOR DIAGNOSIS OF DEEP VEIN THROMBOSIS (DVT)

Adapted by NiCE (CG144) with permission from Wells PS et al (2003).

<table>
<thead>
<tr>
<th>Clinical feature</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active cancer (treatment ongoing, within 6 months, or palliative)</td>
<td>1</td>
</tr>
<tr>
<td>Paralysis, paresis or recent plaster immobilisation of the lower extremities</td>
<td>1</td>
</tr>
<tr>
<td>Recently bedridden for 3 days or more or major surgery within 12 weeks requiring general or regional anaesthesia</td>
<td>1</td>
</tr>
<tr>
<td>Localised tenderness along the distribution of the deep venous system</td>
<td>1</td>
</tr>
<tr>
<td>Leg swollen</td>
<td>1</td>
</tr>
<tr>
<td>Calf swelling at least 3cm larger than asymptomatic side</td>
<td>1</td>
</tr>
<tr>
<td>Pitting oedema confined to the symptomatic leg</td>
<td>1</td>
</tr>
<tr>
<td>Collateral superficial veins (non-varicose)</td>
<td>1</td>
</tr>
<tr>
<td>Previously documented DVT</td>
<td>1</td>
</tr>
<tr>
<td>An alternative diagnosis is at least as likely as DVT</td>
<td>-2</td>
</tr>
</tbody>
</table>

**Clinical probability simplified score**

| DVT likely                                                                 | 2 points or more |
| DVT unlikely                                                               | 1 point or less  |
APPENDIX 2: ALGORITHM FOR DIAGNOSIS OF DVT
(Adapted from NICE CG144)

Patient with signs or symptoms of DVT

Other causes excluded by assessment of general medical history and physical examination

DVT suspected

Two-level DVT Wells score

**DVT likely (≥ 2 points)**

Is proximal leg vein ultrasound scan available within 4 hours of being requested?

Yes → Proximal leg vein ultrasound scan

No → D-dimer test

D-dimer test

Yes → Was the D-dimer test positive?

No → Is a proximal leg vein ultrasound scan available within 4 hours of being requested?

Yes → Proximal leg vein ultrasound scan within 24 hours of being requested

No → Interim 24-hour dose of anticoagulant

Was the proximal leg vein ultrasound scan positive?

Yes → Diagnose DVT and treat

No → Was the D-dimer test positive?

Yes → Repeat proximal leg vein ultrasound scan 6–8 days later if clinically indicated

No → Was the repeat proximal leg vein ultrasound scan positive?

Yes → Diagnose DVT and treat

No → Advise the patient it is not likely they have DVT. Discuss with them the signs and symptoms of DVT, and when and where to seek further medical help. Take into consideration alternative diagnoses.

**DVT unlikely (≤ 1 point)**

D-dimer test

Yes → Was the D-dimer test positive?

No → Is a proximal leg vein ultrasound scan available within 4 hours of being requested?

Yes → Proximal leg vein ultrasound scan within 24 hours of being requested

No → Interim 24-hour dose of anticoagulant

Was the proximal leg vein ultrasound scan positive?

Yes → Offer proximal leg vein ultrasound scan

No → Diagnose DVT and treat

Advise the patient it is not likely they have DVT. Discuss with them the signs and symptoms of DVT, and when and where to seek further medical help. Take into consideration alternative diagnoses.

No Doppler scanning available on the weekend.
Interim anticoagulation will need to be continued until Doppler scan performed.
# APPENDIX 3: PRO FORMA FOR THE ASSESSMENT OF AN OUT-PATIENT WITH SUSPECTED DVT

<table>
<thead>
<tr>
<th>DVT Investigation Proforma</th>
<th>Hywel Dda Health Board</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hospital:</td>
</tr>
<tr>
<td></td>
<td>Name of Clinician:</td>
</tr>
</tbody>
</table>

## 1. Patient Identifier:

<table>
<thead>
<tr>
<th>Referred by (please tick):</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP ☐</td>
<td>A&amp;E ☐</td>
</tr>
<tr>
<td>AMAU ☐</td>
<td>Other ☐</td>
</tr>
</tbody>
</table>

## 2. Pre-test probability (PTP) Two level DVT Wells score

<table>
<thead>
<tr>
<th>Active cancer in the last 6/12</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paralysis, paresis or recent leg plaster</td>
<td>1</td>
</tr>
<tr>
<td>Bedridden for &gt;3 days or major surgery in last 4/52</td>
<td>1</td>
</tr>
<tr>
<td>Tenderness along deep venous system</td>
<td>1</td>
</tr>
<tr>
<td>Entire swollen leg</td>
<td>1</td>
</tr>
<tr>
<td>Calf circumference difference &gt;3cm (measured 10cm below tibial tuberosity)</td>
<td>1</td>
</tr>
<tr>
<td>Pitting Oedema (greater in symptomatic leg)</td>
<td>1</td>
</tr>
<tr>
<td>Collateral superficial veins (non-varicose)</td>
<td>1</td>
</tr>
<tr>
<td>Previously documented DVT</td>
<td>1</td>
</tr>
<tr>
<td>Alternative diagnosis seems more likely than DVT (minus)</td>
<td>-2</td>
</tr>
</tbody>
</table>

## 3. Are they suitable for OPD treatment?

- No, for the reasons below: ☐
- Suspected or confirmed pulmonary embolus ☐
- Thrombus in the iliac veins or vena cava ☐
- Active bleeding (e.g. intracranial bleed within last 6 months, GI bleed within 1 month, oesophageal varices) ☐
- Verified bleeding disorder (e.g. Haemophilia or thrombocytopenia – platelets <90x10/L) ☐
- Pregnancy ☐
- Heparin hypersensitivity or a history of HIT ☐
- Creatinine clearance <15ml/min ☐
- Known liver failure ☐
- Hypertension, Systolic BP >180mm Hg or diastolic BP >115mm Hg ☐
- Age <16 years ☐
- No fixed address ☐
- Not contactable by phone ☐
Inability to understand instructions ☐
Anticipated compliance problems e.g. mental illness or alcohol misuse. ☐
Yes, as none of the above ☐

4. D-Dimer Result:
Negative ☐ Positive ☐

5. Action (see table 1B)
- If DVT ‘unlikely’ perform D-dimer test, if positive perform proximal vein ultrasound within 4 hours or offer interim anticoagulation prior to ultrasound scan (within 24 hours if possible). If scan positive treat DVT. If scan negative- unlikely to have DVT consider other diagnosis.
- If DVT ‘likely’- Request proximal leg ultrasound within 4 hours. If available proceed with imaging and treat DVT if confirmed. If negative and only a proximal leg scan was performed, perform a D-dimer test and if positive repeat scan in 7 days. If D-dimer negative consider other diagnosis.
- If no proximal leg vein ultrasound scan is available within 4 hours of being requested perform D-dimer and offer interim anticoagulation. If scan positive –treat DVT, if negative and D dimer was positive consider repeating the scan in 7 days.

6. Medical notes
7. Risk factors

<table>
<thead>
<tr>
<th>History</th>
<th>☐</th>
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</thead>
<tbody>
<tr>
<td>Malignancy</td>
<td>☐</td>
</tr>
<tr>
<td>Surgery in last 6 weeks</td>
<td>☐</td>
</tr>
<tr>
<td>Prolonged bed rest</td>
<td>☐</td>
</tr>
<tr>
<td>Long haul flight</td>
<td>☐</td>
</tr>
<tr>
<td>Pregnancy/recent childbirth</td>
<td>☐</td>
</tr>
<tr>
<td>Family history of venous thromboembolism</td>
<td>☐</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Past medical history</th>
<th>☐</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obesity</td>
<td>☐</td>
</tr>
<tr>
<td>Inherited thrombophilic defect</td>
<td>☐</td>
</tr>
<tr>
<td>Antiphospholipid syndrome</td>
<td>☐</td>
</tr>
<tr>
<td>Smoker</td>
<td>☐</td>
</tr>
<tr>
<td>HRT/OCP</td>
<td>☐</td>
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8. Examination (please tick)

<table>
<thead>
<tr>
<th>Medication:</th>
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<tbody>
<tr>
<td>Affected leg</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>no</td>
</tr>
<tr>
<td>Pain</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>no</td>
</tr>
<tr>
<td>Swelling</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>no</td>
</tr>
<tr>
<td>Temperature</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>no</td>
</tr>
<tr>
<td>Colour change in leg/foot/toe</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>no</td>
</tr>
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### Allergies:

<table>
<thead>
<tr>
<th>Calf circumference:</th>
<th>Right:………..</th>
<th>Left:………..</th>
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<tbody>
<tr>
<td>Temperature:</td>
<td>…………..</td>
<td>Pulse:………..</td>
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<tr>
<td>Blood Pressure:</td>
<td>…………..</td>
<td>Weight:………..</td>
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### Diagnosis and Management of Venous Thromboembolism Procedure – deep vein thrombosis (DVT)

### 9. Blood results

<table>
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<tr>
<th>Fbc</th>
<th>U&amp;E</th>
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</thead>
<tbody>
<tr>
<td>Hb</td>
<td>Na</td>
</tr>
<tr>
<td>Wbc</td>
<td>K</td>
</tr>
<tr>
<td>Plt</td>
<td>Urea</td>
</tr>
</tbody>
</table>

### 10. Ultrasound Results

<table>
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<tr>
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<th>Coag screen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bili</td>
<td>PT</td>
</tr>
<tr>
<td>Alb</td>
<td>APPT</td>
</tr>
<tr>
<td>ALT</td>
<td>Fibrinogen</td>
</tr>
</tbody>
</table>

**Cockcroft-Gault creatinine clearance:**

\[(140-\text{age}) \times \text{weight (kg)} \times \text{factor}^*\]

* Creatinine (um/l)

* female=1.04, male=1.23

**Reason for repeat scan:**

**Result of USS scan:**

**First:**

**Second (if applicable):**

### Action taken

- Information sheet given to patient
- If post-op inform surgeon
- Treat patient
- Discharge to GP and letter sent
- Discuss with GP
- Refer to A&E
- Copy filed in patient’s notes

### Additional notes

- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
- [ ]