

# DEEP VENOUS THROMBOSIS (DVT)

## RECOGNITION AND ASSESSMENT

### Symptoms and signs

- Swelling of limb (arm, calf or leg)
  - Pain and stiffness of affected limb
  - Pitting oedema
  - Increased skin temperature
  - Erythema
  - Tenderness (especially over the deep venous system).
  - Mild fever
- In rare cases when swelling from DVT is extensive, arterial circulation may be **severely** compromised – characterised by severe pain, swelling, cyanosis and rapid development of tense oedema (phlegmasia caerulea dolens) elevate bed foot to 40° and ensure fluid replacement adequate to compensate for extravasation. These cases require urgent senior review and referral to on-call surgical team.

### Risk factors

- See **Pulmonary embolism** guidelines

### Differential diagnosis

- Ruptured Baker's cyst (history of knee arthritis or trauma, swelling behind knee).
- Torn calf muscles/damage to Achilles tendon (sudden pain in calf following twisting of leg with or without evidence of haematoma. Disruption of tendon indicates severe rupture and should be discussed with orthopaedic team SPR on-call).
- Cellulitis – see **Cellulitis** guideline

## INVESTIGATIONS AND DIAGNOSIS

- FBC, INR and APTT
- D-dimer (please refer to table 1 for causes of elevated d-dimers other than DVT)

**Table 1: Examples of common conditions/situations in which D-dimer concentration is raised**

<ul style="list-style-type: none"> <li>• Acute myocardial infarction (MI)</li> <li>• Chronic subdural haematoma</li> <li>• Disseminated intravascular coagulation</li> <li>• Gram-negative bacteraemia</li> <li>• Leukaemia</li> <li>• Liver disease</li> <li>• Metastatic malignancy</li> <li>• Peripheral vascular disease</li> </ul>	<ul style="list-style-type: none"> <li>• Pregnancy</li> <li>• Recent surgery</li> <li>• Renal disease</li> <li>• Rheumatoid disease</li> <li>• Sickle cell crisis</li> <li>• Subarachnoid haemorrhage</li> <li>• Thrombolytic therapy</li> <li>• Trauma with pathological thrombosis</li> </ul>
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***Whereas a normal D-dimer concentration virtually rules out thrombosis, a raised D-dimer concentration cannot be used confidently to confirm that thrombosis has occurred***

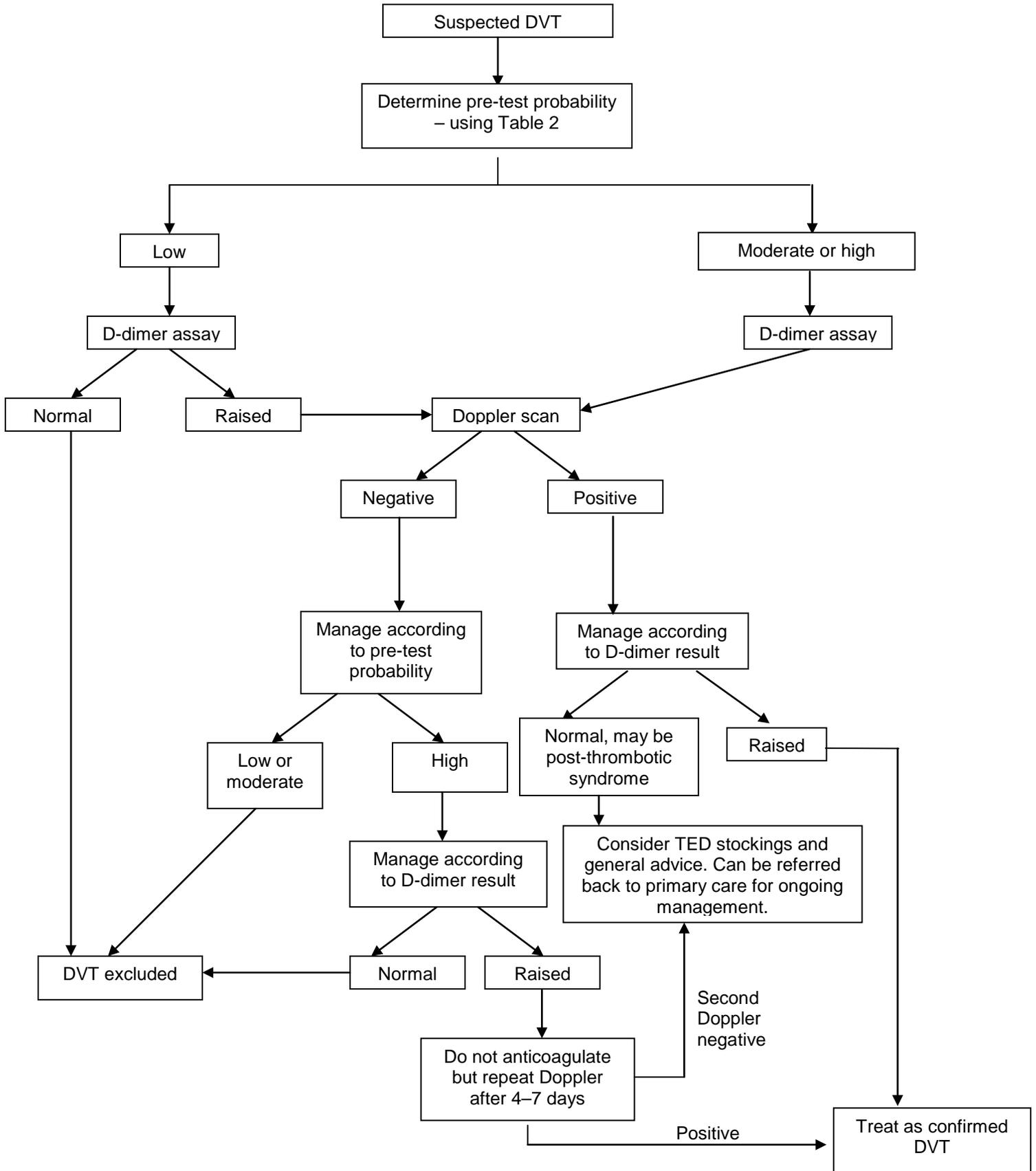
- Determine pre-test probability (Table 2)
  - Refer to **algorithm** for guidance
  - Low pre-test probability and normal D-dimer excludes DVT, no further investigations required
  - In all other cases, request Doppler ultrasound scan. This can be organised by direct liaison with ultrasound (extension 5921). For patients presenting to EAU before 2pm slots are available for same-day scanning. After 2pm direct liaison with ultrasound may still allow for same day scanning.
  - If Doppler ultrasound scan cannot be arranged on day of presentation but patient can otherwise be discharged give suitable dose of SC enoxaparin. In most cases such patients will be those presenting in the afternoon, and in this case should be given **half treatment dose enoxaparin** (i.e 1.5mg/kg divided by 2).
  - Following liaison between ultrasound and nursing staff please advise the patient of what time to return to EAU for their scan. **DO NOT ask people to go home and return unless you have requested the scan and been given a time slot for it to be done.**
- **Table 2: Clinical model for predicting pre-test probability for DVT**

Clinical features (Score 1 point for each of the following features. In patients with symptoms in both legs, derive measurement from more symptomatic leg)
<ul style="list-style-type: none"> <li>• Previously documented DVT</li> <li>• Active cancer (treatment within six months, ongoing or palliative)</li> <li>• Paralysis, paresis or recent plaster immobilisation of legs</li> <li>• Recent immobilisation (bedridden for &gt;3 days, major surgery under GA within last 4 weeks)</li> <li>• Localised tenderness along distribution of deep venous system</li> <li>• Entire leg swollen</li> <li>• Calf circumference &gt;3 cm greater than asymptomatic leg (measured 10 cm below tibial tuberosity)</li> <li>• Pitting oedema confined to symptomatic leg</li> <li>• Collateral superficial veins (non-varicose)</li> </ul>

***Deduct 2 points if an alternative diagnosis is at least as likely as DVT***

Score	Pre-test probability
≥3	75% (high)
1-2	17% (moderate)
<0	3% (low)

Algorithm for DVT management



## IMMEDIATE TREATMENT

- Unless symptoms severe or patient requires admission to hospital for reasons other than suspected DVT, treat as out-patient
- Encourage ambulation
- Elevation of leg when seated
- Simple analgesia (e.g. co-codamol)

***If out-patient, ensure paperwork completed for authorisation of daily injections of enoxaparin, and for referral to anticoagulation service (plus warfarin book). Also ensure that a TTO is completed for a warfarin starter pack.***

### Compression hose

- Assess suitability for Class 3 (European standard) graduated compression hose (40 mmHg at ankle) to reduce risk of post-thrombotic syndrome (chronic oedema). If in doubt about suitability, do **not** recommend hose. Document decision in notes
- Absolute contraindications include advanced peripheral arterial disease (feel for foot pulses, but note that pulses may be impalpable because of oedema), heart failure, septic phlebitis, phlegmasia caerulea dolens (see **Recognition and assessment**)
- Relative contraindications include chronic arthritis of affected leg, leg ulcers numbness / paralysis of affected leg, suppurative dermatosis, prognosis <6 months, intolerance of elastic stocking fabric.

### Enoxaparin.

- If platelet count  $<100 \times 10^9/L$ , seek advice from on-call haematologist.
- If platelet count  $\geq 100 \times 10^9/L$ , or if advised by haematologist, start enoxaparin 1.5mg/kg.
- Arrange out-patient anticoagulation via CICT team (via WUCTAS – Wolverhampton Urgent Care Triage and Assessment Service). If community anticoagulation not possible then arrangements can be made for patients to return to EAU for further injections. This option should not be used routinely.

***If anticoagulation contraindicated, consultant physician or SpR must make a decision as to which carries most risk – complications of therapy, or the DVT***

***Risk of bleeding is increased in patients with severe liver or renal failure (eGFR <20), thrombocytopenia or defective platelet function, and following surgery, trauma or haemorrhagic stroke. Adjust enoxaparin dose accordingly with advice from appropriate team e.g. renal, liver or haematology***

**ALWAYS weigh patient – do NOT guess the body weight or rely on patient's own estimate**

## **SUBSEQUENT MANAGEMENT**

### **Enoxaparin.**

- Continue enoxaparin at a suitable dosage alongside warfarin until INR established within therapeutic range 2–3 for two consecutive days.
- Initiate warfarin as out-patient. Baseline INR must be known.

### **Initiating Warfarin.**

- Fax completed anticoagulant referral form to CICT and community anticoagulation team. Advice on specific forms can be obtained from clerical and nursing staff on EAU.
- Give patient yellow anticoagulant treatment record book containing details of all results. Ensure the following information is discussed with the patient and documented in yellow book and clinical notes: indication for warfarin, target INR, start date and duration of therapy, previous four INR results and date of next INR.
- For detailed advice on commencement of warfarin treatment please see Warfarin guideline. This can be accessed via the following link  
<http://intranet/pdf/policies/AdultMedicalGuidelines/Warfarin.pdf>

### **Duration of warfarin**

- If DVT occurred post-operatively in an otherwise healthy patient, continue for six weeks for calf DVT and for 3 months for proximal DVT
- After a first proximal DVT without a clear underlying cause or if permanent risk factors present, continue for six months
- Recurrent DVT and in patients with co-existent active malignant disease, continue indefinitely

### **Further investigations**

- If no clear precipitating cause for thrombosis, particularly if this is a recurrent event, consider occult malignancy or other cause of thrombophilia
- if patient aged <45 yr, discuss screening for inherited or acquired thrombophilia with haematology consultant. Once warfarinisation commenced thrombophilia screening is challenging and so need for testing should be discussed prior to anticoagulation commencement.

## **DISCHARGE AND FOLLOW-UP.**

- Ensure INR in appropriate range and stable, unless anticoagulation is being achieved as an out-patient.
- Record last 4 in-patient INR results in yellow anticoagulant book
- Arrange follow-up appointment in appropriate medical clinic after 10–12 weeks unless a shorter course of treatment or need for investigation requires earlier follow-up; patients with confirmed DVT will remain under the care of duty physician for the day on which diagnosis was confirmed
- on receipt of referral form (which must give date on which warfarin to be stopped), anticoagulation management service contacts referring clinician in writing advising that, unless notified of any change, warfarin will be stopped on the planned date
- copy of letter is sent to patient's GP
- Advise patient that many drugs (including alcohol) interact with warfarin and to remind their GP, if additional medication is added, that they are taking warfarin. Advise patient of small risk of significant (potentially life-threatening) bleeding and what to do in the event of any concerns. Clearly document this in clinical records.

- If hospital supervision planned, ensure discharge letter includes diagnosis, dosage of warfarin and date of clinic appointment
- Supply GP with written information covering indication, proposed target range, duration of anticoagulation and planned follow up.

## **DVT IN PREGNANT PATIENTS.**

- Pregnancy carries an increased risk of DVT. Risk increases as pregnancy progresses. Left leg is predominantly affected.
- D-dimers are usually elevated in pregnancy. Therefore D-dimers should not be used to diagnose DVT in pregnancy.
- Use clinical risk score (see above) to risk stratify and determine need for Doppler scanning.
- If DVT Confirmed then commence enoxaparin with dose titrated against woman's booking weight or most recent weight.
- Dosage based on early pregnancy weight(kg) for enoxaparin is shown in table 3.
- Liaise with obstetric team for follow-up

<b><u>Weight (kg).</u></b>	<b><u>Dose of Enoxaparin.</u></b>
<50.	40mg BD.
50 -69.	60mg BD.
70 -89	80mg BD.
>90.	100mg BD.

**Table 3: Enoxaparin Treatment Dose in Pregnancy.**

### **After delivery**

- Continue either heparin or warfarin for 6 weeks post partum – **at least** 3 months in total
- Recommend wearing of elasticated compression stocking on any affected leg for 2 yr after delivery to reduce risk of post-thrombotic syndrome

### **Monitoring treatment**

- If patient underweight or very overweight (<50 kg or >90 kg) either now or during early pregnancy, or has bleeding problems or renal impairment, discuss need for anti-Xa monitoring with haematology consultant.

### **Further Information.**

- Further information can be obtained by discussion with haematology team, obstetric team or by reference to RCOG guidelines via the link below.

<http://www.rcog.org.uk/files/rcog-corp/uploaded-files/GT28ThromboembolicDisease2007.pdf>