**STEP 1**

Determine pretest probability (two level Wells Criteria)

<table>
<thead>
<tr>
<th>Clinical Feature</th>
<th>SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active cancer (treatment ongoing or within the previous 6 months or palliative)</td>
<td>1</td>
</tr>
<tr>
<td>Paralysis, paresis or recent plaster immobilization of the lower extremities</td>
<td>1</td>
</tr>
<tr>
<td>Recently bedridden for more than 3 days or major surgery, within the last 12 weeks</td>
<td>1</td>
</tr>
<tr>
<td>Localized tenderness along the distribution of the deep venous system</td>
<td>1</td>
</tr>
<tr>
<td>Entire lower limb swollen</td>
<td>1</td>
</tr>
<tr>
<td>Calf swelling by more than 3cm when compared to the asymptomatic leg (measured 10cm below the tibial tuberosity)</td>
<td>1</td>
</tr>
<tr>
<td>Pitting oedema (greater in the symptomatic leg)</td>
<td>1</td>
</tr>
<tr>
<td>Collateral superficial veins (non-varicosite)</td>
<td>1</td>
</tr>
<tr>
<td>Previously documented DVT</td>
<td>1</td>
</tr>
<tr>
<td>Alternative diagnosis as likely or more likely than that of DVT</td>
<td>-2</td>
</tr>
</tbody>
</table>

**STEP 2**

Investigations

- **DVT unlikely** (1 or less)
- **DVT likely** (2 or more)

**D-dimer**

<table>
<thead>
<tr>
<th>Negative</th>
<th>Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVT excluded</td>
<td>DVT Confirmed</td>
</tr>
<tr>
<td>consider alternative diagnosis</td>
<td>See STEP 3 – other Ix</td>
</tr>
</tbody>
</table>

**Ultrasound**

<table>
<thead>
<tr>
<th>Negative</th>
<th>Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entire lower limb Doppler venous scan</td>
<td>See note below re timing of scan and limitations of above knee only scans</td>
</tr>
</tbody>
</table>

**STEP 3**

Additional investigations for proven DVT

- **Massive (iliofemoral) DVT**
  - CT venogram for phlegmasia / pre lysis consideration
  - Assessment of contraindications to treatment
    - FBE / U+E / LFT / Coags
  - Malignancy screen
    - History / Examination
    - FBE / Ca++ / LFT / UA / CXR
    - Ensure age / sex appropriate cancer screening up to date
      - Mammogram / PAP / prostate + PSA / FOB
    - If not refer to GP to arrange
  - Thrombophilia screen
    - To be determined at DVT clinic follow up
  - Anatomical variants
    - Consider investigation (eg. May Thurner)

- **Unprovoked or any recurrent DVT**
  - Assessment of contraindications to treatment
    - FBE / U+E / LFT / Coags
  - Malignancy screen
    - History / Examination
    - FBE / Ca++ / LFT / UA / CXR
    - Ensure age / sex appropriate cancer screening up to date
      - Mammogram / PAP / prostate + PSA / FOB
    - If not refer to GP to arrange
  - Thrombophilia screen
    - To be determined at DVT clinic follow up

- **Provoked DVT**
  - Assessment of contraindications to treatment
    - FBE / U+E / LFT / Coags

- **Upper limb DVT with no intravascular device**
  - Basilic, brachial, axillary or subclavian veins
  - Consider CT venogram thoracic inlet (for cervical rib / fibrous band)

**NOTES – Assessment of bleeding risk**

- **Bleeding Risk - HAS-BLED score** (Validated for AF)
  - 1 point for each; high risk = 3 or more (3.74% / yr bleed); (2 = 1.88% / yr bleed)
  - Uncontrolled hypertension (SBP>160)
  - Impaired renal function (Cr>200)
  - Impaired liver function (ALT/ALP>3x normal)
  - History of stroke
  - History of major bleeding
  - Labile INRs
  - Elderly (>65 years)
  - Drugs (NSAIDS or Antiplatelets) 1 point each
  - Alcohol consumption (>8 std/week)

- **Additional high risk factors for bleeding**
  - Recent surgery / trauma (discuss with surgical team)
  - Active GI disease
  - Inherited or acquired bleeding disorder

**NOTES – D-Dimer exclusion and timing of USS**

- **If unable to perform ultrasound on the same day**
  - DVT likely group - Treat with LMWH overnight and have patient return to ED the next morning (unless high bleeding risk – discuss with senior clinician)

- **For DVT Likely group**
  - If below knee component of whole lower limb USS not possible for technical reasons then further assessment / follow up is required:
    - Perform high sensitivity D-dimer
      - D dimer negative then no further investigation for DVT required
      - D dimer positive then repeat proximal lower limb USS at one week
### SCGH Emergency Department

#### Deep Vein Thrombosis Management

<table>
<thead>
<tr>
<th>Thrombus location / type</th>
<th>Massive DVT</th>
<th>Proximal DVT</th>
<th>Proximal DVT</th>
<th>Below knee DVT$</th>
<th>Calf muscle vein thrombus$</th>
<th>Superficial vein thrombus / thrombophlebitis$</th>
<th>Upper limb DVT</th>
<th>Upper limb DVT Intravenous device present</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>* Iliofemoral +/- IVC</td>
<td>* Unprovoked or * Recurrent $</td>
<td>* Provoked +</td>
<td>* Provoked or first unprovoked</td>
<td>* Not associated with IV infusions or co-existent DVT</td>
<td>* No intravenous device</td>
<td>* Basic, brachial, axillary or subclavian</td>
<td>* See CCHT Guideline form</td>
</tr>
</tbody>
</table>

#### Disposition
- Admit
- Discharge if good social support
- Discharge if good social support
- Discharge
- Discharge
- Discharge
- Discharge

#### Referral
- Vascular (urgent review if phlegmasia)
- eReferral to DVT clinic (refer oncology pts to own team)
- GP
- GP
- GP
- Vascular
- Own team

#### Anti-coagulation
- 3 months minimum (ongoing Rx to be determined at DVT clinic follow up)
- 3 months minimum (ongoing Rx to be determined at DVT clinic follow up)
- 3 months
- 3 months #
- 6 weeks anticoagulation NOAC or LMWH (unless contraindication) #
- 6 weeks anticoagulation NOAC or LMWH (unless contraindication) #
- 3 months

#### Below knee stockings
- Offer HASS will arrange
- Offer HASS will arrange
- Offer HASS will arrange
- Offer if symptomatic HASS will arrange
- No
- No (if anticoagulated)
- No
- No

## Treatment Options for DVT
Prior to commencing anticoagulation all patients require a full clinical assessment, FBE, U&E, LFTs & coag to assess for any contraindication to therapy

<table>
<thead>
<tr>
<th>NOACs</th>
<th>LMWH</th>
<th>Warfarin</th>
<th>Catheter directed lysis</th>
<th>IVC filter</th>
</tr>
</thead>
</table>
| Choice of either
  - Apixaban
  - Dabigatran
  - Rivaroxaban
  - eReferral to HASS for follow up
  - See WATAG ‘Prescribing a NOAC’ quick reference below
  - For more detailed information see the WATAG New Oral Anticoagulant Prescribing Guidelines
  - (WATAG – Western Australian Therapeutics Advisory Group) |
| • In pregnant patients
  • In oncology patients
  • Dalteparin preferred in oncology patients
  • In patients with failed oral therapy
  • Whilst starting warfarin
  • Enoxaparin 1.5mg/kg daily or 1mg/kg bd (modify in renal impairment – see MR401/805.2)
  • Refer to HASS if pt not self administering otherwise eReferral to HASS for follow up
  • Caution: Renal impairment, high bleeding risk
  • Contraindications: HITTS |
| • Consider as first line in patients with lupus anticoagulant
  • CI to Rivaroxaban / Apixaban / Dabigatran
  • Initiate whilst on LMWH
  • See MIR401/805.2 for commencement regimen
  • eReferral to HASS for follow up
  • Target INR 2-3 (if VTE whilst on warfarin aim 2.5-3.5)
  • Caution: multiple, high bleeding risk
  • Contraindications: Pregnancy, allergy |
| • Consider when iliofemoral DVT
  • Symptomatic with symptoms less that 2 weeks
  • Good functional status
  • Life expectancy > 1 year
  • Low bleeding risk
  • Discuss with vascular surgeon who will liaise with interventional radiology |
| May be considered in those with:
  - Acute DVT or PE who have a contraindication to anticoagulation
  - In setting a conventional course of anticoagulation should be given if the risk of bleeding resolves
  - Recurrent proximal DVT or PE despite adequate anticoagulation (alternate options such as LMWH or high intensity oral anticoagulant therapy should be explored prior to considering IVC filter)
  - Remove filter when able to anticoagulate |

### Notes

- $ Provoked DVT – occurring in a patient with an antecedent (within 3 months) and transient major clinical risk factor for VTE (eg. Surgery / trauma / significant immobility (travel > 8 hours) / pregnancy or puerperium / HRT or OCP).
- * In patients already on blood thinners a decision needs to be made whether symptoms are due to clot extension or post-thrombotic changes. If thought due to clot extension, intensification of Rx is required e.g. LMWH cover for 5 days and increase target INR.
- # In patients with acute isolated distal DVT or calf vein thrombosis without severe symptoms or risk factors for extension serial imaging over two weeks is an alternative to anticoagulant therapy. Anticoagulation should be initiated if there is evidence of thrombus extension, even if it remains confined to the distal veins.
  - Risk factors for extension = positive D-Dimer, clot >5cm in length, involves multiple veins, >7mm diameter or close to proximal veins, unprovoked, cancer, thrombophilia, history of VTE, inpatient admission, ongoing immobilisation.
- ^ In patients with superficial vein thrombosis and a contraindication to anticoagulation or short, distal thrombus anti-inflammatory medications and compression stockings, with follow up ultrasound scan in one week if there is worsening of symptoms or signs, is an alternative.
- $ HASS – Home anticoagulation support service. Contact on 0424 181 640 between 0730-2130 or after hours send eReferral (sub-division of HITH) attention Michaela Walters
Adapted from WATAG ‘Prescribing a NOAC’ quick reference – www.watag.org.au

**Dabigatran (Pradaxa)**
- Treatment or prevention of recurrent DVT/PE
  - CrCl ≥ 50ml/min – 150mg bd
  - CrCl 30-49ml/min or ≥ 75yrs – 110mg bd

**Apixaban (Eliquis)**
- Treatment of recurrent DVT/PE
  - CrCl > 25ml/min – 10mg bd for first 7 days then 5mg bd thereafter
- Prevention of recurrent DVT/PE (note – this would be a decision made by Haematology at follow up)
  - CrCl > 25ml/min – 2.5mg bd after at least 6 months of treatment

**Rivaroxaban (Xarelto)**
- Treatment or prevention of recurrent DVT/PE
  - CrCl ≥ 30ml/min 15mg bd for 3 weeks then 20mg od thereafter

**Lab CONTRAINDICATIONS:**
- Poor renal function (dabigatran, rivaroxaban: CrCl <30 ml/min, apixaban: <25 ml/min)
- Liver disease (e.g. ALT >2x upper limit of normal)

**CONTRAINDICATED concomitant medications:**
- Dabigatran
  - Systemic azole antifungals (except fluconazole)
  - dronedarone
  - cyclosporin and tacrolimus
  - HIV-protease inhibitors e.g. ritonavir
- Rivaroxaban / apixaban
  - Systemic azole antifungals (except fluconazole)
  - HIV-protease inhibitors e.g. ritonavir

**EXCLUSION Criteria:**
- Known hypersensitivity to NOAC preparation
- Active significant bleeding
- Pregnant or breastfeeding
- Valvular Atrial Fibrillation: prosthetic heart valve, valve repair or stenosis
- Recent stroke

**Bleeding Risk CONTRAINDICATIONS:**
- Disorder of haemostasis e.g. Von Willebrand disease or coagulation factor deficiency
- Recent surgery ≤ 1 month ago (except VTE prophylaxis following elective hip or knee surgery)
- GI bleed ≤ 12 months, ulcer ≤ 30 days
- Skin ulcer ≤ 30 days ago
- Fibrinolytic treatment last 10 days
- Dual antiplatelet therapy

**Prior to NOAC initiation:**
- Record: FBC, renal and liver function

**Take detailed history:**
- Ensure patient doesn’t have any exclusion criteria

**Assess bleeding risk**

**Consider concomitant medications**

**If the patient is on warfarin:**
- Discontinue warfarin and start NOAC when INR is 2.0 or less
References

- Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: Chest Evidence Based Clinical Practice Guidelines
- Baglin et al. Duration of anticoagulation therapy after a first episode of an unprovoked pulmonary embolus or deep venous thrombosis: Guidance from the SSC of the ISTH. Journal of Thrombosis and Haemostasis; 10: 698-702

Guideline designed by:
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