Patients with suspected DVT of the lower limb – how to exam the patient

Johannes Godt
Dep. of Radiology and Nuclear Medicine
Oslo University Hospital Ullevål
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Content

• Anatomy and pathophysiology of deep vein thrombosis
• Local experiences from OUS/Ullevål
• How do we examine the patient?
• Conclusions: What the clinician wants to know ??
• Virchow’s triad (1846)
  – Blood vessel / wall affections – trauma, surgery, venous catheterisation, IV drug abuse
  – Changes in coagulation – hypercoagulability from previous thromboembolic disease, dehydration, oestrogen increase, or malignancy
  – Changes in blood flow/stasis – bed rest, paralysis, travel

Rudolf Virchow, 1821-1902
• Other factors
  – Trauma
  – Cardiac disease
  – Surgery
  – Age > 60
  – Obesity

Bulger CM, Jacobs C, Patel NH. Teach Vasc Interv Radiol 2004; 7: 50-4
Epidemiology of acute deep vein thrombosis
Pathophysiology and the clinical picture

• Venous hypertension – reduced or blocked blood flow back to the heart

• Complications: Postthrombotic syndrome

• Pulmonary embolism (10 % accompanying)

Bulger CM, Jacobs C, Patel NH., Tech Vasc Interv Radiol 2004;7:50-4
Epidemiology of acute deep vein thrombosis
The clinical picture – often insecure

• Not all signs are present in all patients
• Some patients may be asymptomatic.
• The more risk factors and signs, the more likely the possibility of DVT.

Geersing GJ et al., BMJ 2014; 348 : g1340
Exclusion of deep vein thrombosis using the Wells rule in clinically important subgroups: individual patient data meta-analysis
Differential diagnosis

- Almost every reasons for pain in the lower extremity?
- Red flags: Arterial occlusion
- Other: Muskuloskeletal, neurological, vascular...
Epidemiology

Incidence of DVT:
- appr. 1 / 1000 persons / year

(study in Nord-Trøndelag county 1995-2001)

Næss IA, Christiansen SC et al., J Thromb Haemost 2007;5:692-9
Incidence and mortality of venous thrombosis: a population-based study

Venous thromboembolism:
- app. 1-3 / 1000 persons/ year, of this 2/3 DVT

Compression - ultrasonography

Sensitivity 94%  Specificity 98%

Femoral-popliteal scan vs. complete examination incl. leg veins:
- Similar performance

Complete compression ultrasonography


Is it worth diagnosing and treating distal deep vein thrombosis? No

BUT: 50% are isolated, distal DVTs.
False-positive findings: Risk of anticoagulation. Side effects, severe bleeding.

Proximal or whole-leg US? Both methods equal results, both with their advantages and disadvantages.

Is it useful to also image the asymptomatic leg in patients with suspected deep vein thrombosis?

2804 patients, symptoms on one side

0.8% (20) bilateral thrombus

0.2% (5) thrombus on asymptomatic side

CT venography

Sensitivity: 96%  Specificity: 95%

Our protocol:

• 2ml contrast /kg body weight
• Delay 180 sek
• Scan of both lower extremities, including pelvis/iliac veins

Thomas SM, Goodacre SW et al.: Diagnostic value of CT for deep vein thrombosis: Result of a systematic review and meta-analysis Clin Radiol 2008; 300: 1653-9
RIS-check

All DVT lower extremity – exams from 9–12/2014

Based on information given on admission paper and RIS-report

Beware: population included just patients admitted for an US exam.
<table>
<thead>
<tr>
<th>Parameters</th>
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<tbody>
<tr>
<td><strong>Result</strong></td>
</tr>
<tr>
<td><strong>Sex</strong></td>
</tr>
<tr>
<td><strong>Location (if positive)</strong></td>
</tr>
<tr>
<td><strong>Further diagnostics</strong></td>
</tr>
<tr>
<td><strong>Other conditions/diseases named on the admission</strong></td>
</tr>
<tr>
<td><strong>Outpatient?</strong></td>
</tr>
<tr>
<td><strong>D-Dimer?</strong></td>
</tr>
<tr>
<td><strong>Information om anticoagulation yes/no?</strong></td>
</tr>
<tr>
<td><strong>Requested side: uni- or bilateral?</strong></td>
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## Results

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
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<tbody>
<tr>
<td>Male</td>
<td>162</td>
<td>46,0</td>
</tr>
<tr>
<td>Female</td>
<td>190</td>
<td>54,0</td>
</tr>
<tr>
<td>Total</td>
<td>352</td>
<td>100,0</td>
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2,88 exams per day
<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>anticoagulation yes</td>
<td>23</td>
<td>6.5</td>
</tr>
<tr>
<td>anticoagulation no / no info</td>
<td>329</td>
<td>93.5</td>
</tr>
</tbody>
</table>

Further diagnostics:

- Venography / fluoroscopy - 0
- CT venography – 11
Ultrasound examination: The Ullevål way

Cinefilming method after L. Thorelius (Sweden)
6Mhz or 9Mhz-probe (GE)

1) Doppler-exam and Valsalva-maneuver proximal femoral vein

2) Thereafter 3 aksial films with compression of femoral vein
Patient position: slightly external rotation and flexion
Doppler and valsalva
Vena femoralis
Ultrasound technique (cont.)

3) Film and compression of v. poplitea, including one of the confluence from leg veins to popliteal vein

4) Identify leg veins (v. fibularis and v. tib. posterior), take 3 short compression films from distal to proximal
Lower leg: Patient sitting, leg bended, foot on the bench.
Vena poplitea
Last but not least- our CT venography protocol

- 2ml contrast /kg body weight
- Delay 180 sek
- Scan of both lower extremities, including pelvis/iliac veins
Conclusion

- Ultrasound is a cheap, and relatively not very time-consuming procedure
- Always good to have sufficient clinical information

What the clinician wants to know:
- DVT or not?
- Other diagnoses?
Thank you