Update on ED Diagnosis of DVT

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airplane ride
Air Travel and Venous Thromboembolism: A Systematic Review

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- Air travel is a risk for VTE
- Long haul flights > 6 hours
- Avoid dehydration, exercise if possible
- TED hose or shot of lovenox (not whiskey)
53 yo f c/o left leg pain
recent cholecystectomy
how do you make the diagnosis?

learning objectives
- discuss methods for detecting DVT
- understand how to apply the Wells CPR/d-dimer
- focus on details of performing DVT studies
- compare strategies to detect or rule out DVT
venous anatomy

impression: non-occlusive clot in the superficial femoral vein

natural history of VTE disease

Table 3—Probability of VTE Without Prophylactic Therapy*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Acute MI</th>
<th>Hip Fracture</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVT of calf vein†</td>
<td>25</td>
<td>60</td>
</tr>
<tr>
<td>Proximal DVT‡</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>PE</td>
<td>2–3</td>
<td>6</td>
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*Values given as No. of cases per 100 patients. MI = myocardial infarction; PE = pulmonary embolism.
†Of these patients, 20% progress to proximal DVT.
‡Of these patients, 50% develop PEs.
Calf DVT

- DVTs start in the calf
- 20% extend proximal DVT
- calf not detected by proximal leg US
- serial exam strategy
- ACCP, hematologists recommend coumadin

whole leg US - the emerging gold std

- detects DVT in proximal system + calf
- whole leg - 1 visit rule out
- detects 10% more DVT - calf
- to treat or not to treat?
Wells Prediction Rule for DVT

- Does this patient Have a DVT? Wells 2006

- take home point about Wells

  - low risk (5%) is not low enough to rule out DVT
  - high risk (53%) is not high enough to initiate treatment*
  - CONFIRMATORY STUDY IS NEEDED
  - *5-10% bleeding, 1% major bleeding, 0.1% death

**d-dimer facts**

- Product of fibrinolysis
- Sensitive but non-specific
- Hemorrhage, trauma, pregnancy, cancer, surgery
- Used to rule out DVT in low and moderate risk groups

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**is it safe to use wells + d-dimer?**

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<th>Potential testing scheme</th>
<th>Three month cumulative incidence of venous thromboembolism in % (95% CI)</th>
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<td>Normal SimpliRED d-dimer result plus:</td>
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Table 5  Thromboembolic outcomes using SimpliRED or the highly sensitive d-dimer test

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using the d-dimer in practice

- perform Wells
- use the correct d-dimer assay
- only apply in low/moderate risk groups

pitfalls of the d-dimer assay

- consider the likelihood of false positive (hospitalized, cancer, aged)
- cannot use test to rule in DVT
Bedside Ultrasound for DVT

- performed by ED physicians
- 2-point exam vs entire vein
- femoral and popliteal vein segments
- core application, taught in residency

ACEP Policy Statement
Emergency Ultrasound Imaging Criteria Compendium

Approved by ACEP Board of Directors
April 2006

This compendium contains the following criteria:
- Aorta
- Biliary
- Echocardiography
- Pelvic Ultrasound
- Renal
- Trauma
- Ultrasound-Guided Procedures
- Venous Thrombosis
- compression: basis of the test
- vein should be fully obliterated in near-far dimension
- adequate pressure = arterial effacement
- arterial flattening = too much force
indications

- suspicion for acute DVT
- first time episode
- ambulatory outpatients

contraindications

- known acute DVT
getting ready

- 3 P's of DVT US
- position patient
- select probe
- estimate position

frog-leg position

1) Patient positioning
2) Patient positioning.
Details of scanning - 2006 ACEP guidelines

- Scan 2 segments
- 3-4 compressions/segment
- FV (inguinal crease to its bifurcation)
- PV - above crease to its trifurcation
popliteal vein

- more difficult view
- reverse trendelenburg, prone or decubitus, knee slightly flexed
- light touch - avoid compression
- pop on top
limitations/pitfalls

- operator dependent, with imperfect sensitivity
- incomplete compression
- difficult in obese patients, limited mobility,
- entire leg not visualized - ?calf vein
troubleshooting

- difficult popliteal:
  - prone patient
  - reverse t-berg
  - light touch
  - use color flow to detect vessels

my recommendations

- ACEP guidelines - CME and 25-50 exams
- be sure to clearly visualize vessels
- full compression in femoral and popliteal vein segments
- obtain follow up study in 1 week
- if uncertain - act conservatively
comparison of strategies

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<th>rads US</th>
<th>Wells + d-dimer</th>
<th>ED US</th>
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<td>study of choice</td>
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<td>well validated approach</td>
<td>fast low cost always available</td>
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<td>study unavailability increases LOS calf DVT?</td>
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<td>nonspecific unlikely patients only cannot rule in</td>
<td>operator dependent misses calf dvt not fully validated</td>
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- understand the limitations of different strategies to r/o DVT
- know the test that you have at your ED
- practice BUS for DVT!
- check your calves when you get home!