Diagnosis, Management, and Disposition of Patients with Acute DVT

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Full disclosures

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Patents: Novel assays for HIT laboratory testing
Objectives

Discuss the diagnostic approach to the patient with suspected DVT

- Clinical assessment
- D-dimer
- Imaging

Identify which patients may be safely treated as outpatients

Case

A healthy 22-year-old college student seeks treatment in the emergency department because she has had pain in the posterior aspect of her left calf for the past 24 hours. She played a game of intramural soccer two days ago and thinks that she may have "overdone it." She reports no leg swelling, and she has no chest symptoms. She has been taking a third-generation oral contraceptive for the past year. She has no personal or family history of venous thromboembolism.

On physical examination, both calves are equal in circumference. Mild tenderness to palpation is noted in the posterior aspect of the left calf. Remaining examination findings are normal.
Case

Which of the following is the best course of action?

- (A) Reassurance only
- (B) Plasma d-dimer measurement
- (C) Compression ultrasonography of the left leg
- (D) Plasma d-dimer measurement and compression ultrasonography of the left leg

Clinical assessment

Modified Wells Score

- Paralysis or recent casting of lower extremity (1 point)
- Bedridden (> 3 days) or major surgery in past 12 wks (1 point)
- Localized tenderness along deep venous system (1 point)
- Swelling of entire leg (1 point)
- Calf swelling 3 cm greater than contralateral leg measured 10 cm below the tibial tuberosity (1 point)
- Pitting edema confined to symptomatic leg (1 point)
- Collateral non varicose superficial veins (1 point)
- Active cancer or cancer treatment within 6 months (1 point)
- Prior DVT
- Alternative diagnosis more likely than DVT (-2 points)

≥2 points: DVT likely
<2 points: DVT unlikely

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D-dimer in “DVT unlikely” patients

DVT unlikely (Modified Wells Score <2) (n=801)

Randomization

D-dimer (n=317)

+ D-dimer (n=99)

U/S

+ for DVT (n=14)

- for DVT (n=85)

VTE at 90 day follow-up (n=0)

NPV 99.3%, 216 unnecessary U/S avoided

- D-dimer (n=218)

No U/S

- for DVT (n=273)

+ for DVT (n=12)

VTE at 90 day follow-up (n=2)

NPV 93.5%

Evidence-based diagnosis of DVT

Validated clinical prediction rule
(e.g., Modified Wells DVT Score)

Age-adjusted cut-off is under investigation.

D-dimer

DVT unlikely

DVT likely

DVT excluded

Ultrasound

DVT excluded

Ultrasound

D-dimer

DVT unlikely

DVT likely

DVT excluded

Ultrasound
Outpatient therapy

- Outpatient therapy is safe in selected patients

Consider outpatient therapy if the patient meets all of the following:

- Hemodynamically stable
- Low risk of bleeding
- No renal insufficiency
- Conducive home environment

Outpatient therapy is not appropriate if the patient meets any of the following:

- Limb-threatening DVT
- High risk of bleeding
- Comorbidities that warrant inpatient care
- Non-conducive home environment
Outpatient treatment options

<table>
<thead>
<tr>
<th>Oral anticoagulant</th>
<th>Requires lead-in with parenteral anticoagulant</th>
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</thead>
<tbody>
<tr>
<td>Warfarin</td>
<td>Yes (overlap for ≥ 5 days and until INR is ≥ 2.0)</td>
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<tr>
<td>Dabigatran</td>
<td>Yes (start after ≥ 5 days of parenteral anticoagulation)</td>
</tr>
<tr>
<td>Rivaroxaban</td>
<td>No</td>
</tr>
<tr>
<td>Apixaban</td>
<td>No</td>
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</tbody>
</table>

Take-home points

The first step in evaluation of a patient with suspected DVT is an estimation of clinical probability using a validated clinical prediction rule (e.g. Modified Wells score)

“DVT likely” patients should proceed directly to ultrasound.

“DVT unlikely” patients should undergo D-dimer measurement. If the D-dimer is positive, they should proceed to ultrasound. If the D-dimer is negative, DVT is effectively ruled out and imaging is not indicated.

Outpatient therapy for DVT is safe in selected patients.

Rivaroxaban and apixaban facilitate outpatient treatment by providing options for oral anticoagulation that do not require parenteral lead-in therapy.