How to Approach a Patient with Venous Thrombosis

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UNC Chapel Hill, NC

ISTH Advanced Training Course
Atlanta, Nov 3, 2016
## Disclosures

<table>
<thead>
<tr>
<th>Category</th>
<th>Conflicts</th>
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<tr>
<td>Research Support/P.I.</td>
<td>No conflicts</td>
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<td>Employee</td>
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<tr>
<td>Consultant</td>
<td>Boehringer-Ingelheim, Janssen Pharmaceuticals, Stago Diagnostics</td>
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<td>Major Stockholder</td>
<td>No conflicts</td>
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<td>No conflicts</td>
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<td>Scientific Advisory Board</td>
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Off-label use of a drug or medical device: None
20 Teaching points
Inpatient consult:

“Quick curbside: How long would you anticoagulate a 64 year old man with a basilic vein DVT after a phlebotomy stick?”
Arm Clots – Basics of Anatomy

Superficial Veins

- Cephalic vein
- Median cephalic vein
- Cephalic vein
- Basilic vein
- Median cubital vein
- Median forearm vein

Deep Veins

- Subclavian vein
- Axillary vein
- Brachial veins
- Radial veins
- Ulnar veins
**VTE History**

*MD call:*

“Quick curbside: Superficial clot in the right leg superficial femoral vein; not very symptomatic. My plan was to observe.”
**Leg Clots – Basics of Anatomy**

- **Greater saphenous vein** (GSV; medial thigh + calf)
- **Lesser saphenous vein** (LSV; in back of calf)

**Superficial veins**

- Deep Veins
  - Common iliac vein
  - Internal iliac vein
  - External iliac vein
  - Common femoral vein
  - Deep femoral vein
  - Femoral vein *(Superficial femoral vein)*
  - Popliteal vein
  - Gastrocnemius vein
  - Anterior tibial vein
  - Soleus vein
  - Peroneal vein
  - Posterior tibial vein

**Proximal veins**

**Distal veins**
Teaching point

Know arm and leg venous anatomy
Doppler Ultrasound Caveats

Caveats

- “Acute” = acute or subacute (day to wks, up to 3 months)
  - Dilated vein
  - “spongy” appearance
  - Non-hyperechoic intraluminal material

Diagnosing recurrent DVT

- Decision is conglomerate of new clinical symptoms, DD, Doppler US

[Bates SM. ACCP guidelines, Chest 2012;141:351S-418S]
1. Chronic or acute appearing?
   (acute: spongy, hypo-echogenic, dilated vein)
2. Comparison to previous Doppler US study
3. How big is the clot?
Doppler Ultrasound Caveats

- Size of the clot: “Brachial vein DVT”

Phone call to Doppler tech who did the study (or senior tech):

“0.5 cm clot, partially occlusive, behind a vein valve”
Caveats

- If CTA results do NOT match pre-test clinical assessment: CTA is wrong in ca. 50% of cases

  [Stein P. NEJM 2006;354:2317-27]

- Review CTA with best radiologist - sub-segmental PE

- Acute vs chronic PE
CTEPH Screening

Radiological Imaging

1. CXR
2. CTA
3. VQ scan
VQ Scan

- CTA is insensitive to detect chronic PE (CTEPH)
- VQ scan is test of choice

VQ Caveats

- VQ scan can **NOT** differentiate between acute and chronic
- VQ abnormalities frequently **persist** for months
  (of 157 PE patients, 66 % had VQ abnormality at 3 months)

Know limitations of Doppler ultrasound and CTA
From: ..........  
Date: Wed, May 14, 2014 at 6:10 PM  
Subject: Seek valued opinion  
To: "Moll, Stephan" <stephan_moll@med.unc.edu>

Hi Dr Moll,

I need your recommendations about a 56 yr old man; 2013: R leg DVT + PE. Heterozygous FVLeiden. Long-term warfarin? Thanks!

With warm regards,

......
a), (b), (c),

Conglomerate decision of:

1. Risk of recurrent VTE
   (a), (b), (c),

2. Risk for Bleeding
   (a), (b), (c),

3. Patient preference

Warfarin “Hate Factor”

Blood Thinner “Dislike Factor”
Teaching points

Define clot.

List clot risk factors: (a)…, (b)…, (c) …

EXAMPLE

**VTE:** R leg prox DVT in 3-2011. VTE risk factors: (a)… (b)…, (c)…

**Arterial thromboembolism:** wedge-shaped L renal infarct. Arterial thromboembolic and arteriosclerosis risk factors: (a)…, (b)…, (c)…
Teaching points

Define clot.

List clot risk factors: (a)…, (b)…, (c) …

“Warfarin Hate Factor”
Step back! First question: Does pt really need to be on long-term anticoagulation?

2. Obtain previous Doppler/CTA report, d/c summary.
3. Then decision: “superficial clot” vs “DVT”, proximal or distal.
4. List all VTE risk factors: (a)…. (b)…. (c)…. 

Inpatient: Came in on warfarin – GI bleed. Consult: “When to restart anticoagulation?”
Reviewing the History

Teaching points

Question/revisit the indication/diagnosis!

- In the patient on long-term anticoagulation: Detailed h/o each clot. Get objective records.
Question or revisit the indication/diagnosis!

• In the patient on long-term anticoagulation: Detailed h/o each clot. Get objective records.
• “Protein C, S, AT deficiency; APLA syndrome”
• “Previous leg clot”: Was it DVT or superficial clot? Prox. or distal?
There is no family history of bleeding or clotting.

Nobody in the family had a clot.

Obtain a detailed family history.
Social History
Examination

Mid-calf circumference: R > L by 2 cm
Postthrombotic Syndrome

1. Stockings (30/40 mm Hg)
2. CT or MR venogram
3. Angioplasty, stenting
4. Home compression pump
5. Pain Clinic, gabapentin
6. Disability assistance
History and Work-up After PE

1. Good history
2. 3 flights of stairs with pulse oximeter
3. Cardiac echo
4. VQ

Pulmonary HTN Clinic
- 6 min walk test
- Pulmonary pressure measurements and angiogram
After a DVT or PE

Teaching points

1. PTS: 30/40 mm stockings; venogram + stenting
2. Recognize post-PE syndrome and CTEPH
VTE: Duration of Anticoagulation

- VTE due to major transient risk factor
- Woman with VTE on hormones
  - Non-major transient risk factor
  - Woman with unprovoked VTE
    - DVT
    - PE
  - Man with unprovoked VTE
    - DVT
    - PE


ACCP, AHA, ISTH, BJH, ACF

Strong

D-dimer

LABS

Thrombophilia

Long-term

3 months
VTE: Duration of Anticoagulation

- **VTE due to major transient risk factor**
  - Woman with unprovoked VTE
  - Woman with VTE on hormones
  - Man with unprovoked VTE
  - Non-major transient risk factor

- **Teaching point**
  - Recurrence triangle
    - PE
    - DVT
    - Thrombophilia

- **LABS**
  - VTE: Duration of Anticoagulation


- **ACCP, AHA, ISTH, BJH**
Do NOT test ….

1. … during an acute thrombotic episode.
2. … a hospitalized patient.
3. … while patient is on an anticoagulant.
4. … if you don’t know how to interpret test or what to do with results.
### Table 7: Influence of acute thrombosis and anticoagulants on thrombophilia test results

<table>
<thead>
<tr>
<th>Test</th>
<th>Acute thrombosis</th>
<th>Unfractionated heparin</th>
<th>Low molecular weight heparin</th>
<th>Vitamin K antagonists</th>
<th>DOACs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor V Leiden genetic test</td>
<td>Reliable</td>
<td>Reliable</td>
<td>Reliable</td>
<td>Reliable</td>
<td>Reliable</td>
</tr>
<tr>
<td>APC resistance assay</td>
<td>Reliable&lt;sup&gt;a&lt;/sup&gt;</td>
<td>???&lt;sup&gt;a&lt;/sup&gt;</td>
<td>???&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Reliable</td>
<td>Unreliable&lt;sup&gt;h&lt;/sup&gt;</td>
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<tr>
<td>Prothrombin G20210A genetic test</td>
<td>Reliable</td>
<td>Reliable</td>
<td>Reliable</td>
<td></td>
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<tr>
<td>Protein C activity</td>
<td>???&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Reliable</td>
<td>Reliable</td>
<td>Low</td>
<td>Elevated&lt;sup&gt;f&lt;/sup&gt;</td>
</tr>
<tr>
<td>Protein C antigen</td>
<td>???&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Reliable</td>
<td>Reliable</td>
<td>Low</td>
<td>Elevated&lt;sup&gt;f&lt;/sup&gt;</td>
</tr>
<tr>
<td>Protein S activity</td>
<td>May be low</td>
<td>Reliable</td>
<td>Reliable</td>
<td>Low</td>
<td>Elevated&lt;sup&gt;f&lt;/sup&gt;</td>
</tr>
<tr>
<td>Protein S antigen</td>
<td>May be low</td>
<td>Reliable</td>
<td>Reliable</td>
<td>Low</td>
<td>Elevated&lt;sup&gt;g&lt;/sup&gt;</td>
</tr>
<tr>
<td>Antithrombin activity</td>
<td>May be low</td>
<td>May be low</td>
<td>May be low</td>
<td>May be elevated&lt;sup&gt;h&lt;/sup&gt;</td>
<td>Elevate&lt;sup&gt;g&lt;/sup&gt;</td>
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<tr>
<td>Lupus anticoagulant</td>
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<td>???&lt;sup&gt;e&lt;/sup&gt;</td>
<td>???&lt;sup&gt;f&lt;/sup&gt;</td>
<td>???&lt;sup&gt;g&lt;/sup&gt;</td>
<td>False positive&lt;sup&gt;i&lt;/sup&gt;</td>
</tr>
<tr>
<td>Anticardiolipin antibodies</td>
<td>Accurate&lt;sup&gt;d&lt;/sup&gt;</td>
<td>Reliable</td>
<td>Reliable</td>
<td>Reliable</td>
<td>Reliable</td>
</tr>
<tr>
<td>Anti-β&lt;sub&gt;2&lt;/sub&gt;-glycoprotein-I antibodies</td>
<td>Accurate&lt;sup&gt;d&lt;/sup&gt;</td>
<td>Reliable</td>
<td>Reliable</td>
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<tr>
<td>Homocysteine</td>
<td>Reliable</td>
<td>Reliable</td>
<td>Reliable</td>
<td>Reliable</td>
<td>Reliable</td>
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Teaching points

• Be clear whom to test and when to test ("4 rules")
• Be aware of influence of anticoagulants on thrombophilia labs
Summary: Duration of Anticoagulation

Conglomerate decision of:

1. Risk of recurrent VTE
   (a)....., (b)....., (c) .....  
2. Risk of Bleeding
   (a)....., (b)....., (c) ..... 
3. Patient preference
   “Warfarin Hate Factor”
Patient Education

Deep Vein Thrombosis and Pulmonary Embolism

ClotConnect.org

Information for Newly Diagnosed Patients

C Treatment

The treatment of deep vein thrombosis (DVT) and pulmonary embolism (PE) are similar.

The goals of treatment are:
- To prevent an existing clot from growing in size
- To prevent the formation of new clots
- To prevent a DVT from breaking off, traveling through the bloodstream, and becoming a PE
- To prevent or minimize long-term complications.

a) Blood-Thinning Medications

The primary treatment for blood clots is blood-thinning medication, known as an anticoagulant or ‘blood-thinner’.

These medications increase the time it takes for your blood to clot.

F Common Questions

1) When will my clot and pain go away?

Blood thinners themselves do not dissolve the clot. The body slowly reabsorbs a blood clot over the course of several weeks to months, which accompanied the blood clot gradually improves and disappears.

- Most patients with DVT or PE recover within several weeks with no significant complications. Or long-term effects.

For you and your doctor: Anatomy of veins

Superficial Veins
- Superficial femoral vein
- Greater saphenous vein (GSV)
- Lesser saphenous vein (LSV) (in lack of call, not shown on image)
- Femoral vein
- Popliteal vein
- Gastrocnemius vein
- Anterior tibial vein
- Sural vein
- Percutaneous vein
- Posterior tibial vein

Deep Veins
- Common femoral vein
- Common iliac vein
- Internal iliac vein
- External iliac vein
- Inferior vena cava (IVC)
Patient Education

Did you know?
One person is diagnosed with a blood clot every minute. One person dies from a blood clot every six minutes.

Featured content:
A series of education videos from Clot Connect's recent patient webinar is now available.

Watch “DVT and PE: What Patients Need to Know”

Information and Support

Clot Connect is an education and outreach project of the University of North Carolina at Chapel Hill Blood Clot Outreach Program. Clot Connect's mission is to increase knowledge of blood clots and clotting disorders by providing education and support resources for patients and healthcare professionals.

Blood clot survivors face many unique challenges including risks associated with anticoagulant use (blood thinners), the development of post-thrombotic disorders and increased risks for future clots. Blood clot survivors and their families need information and support to manage the effects of a blood clot and to prevent future clots.

Health care professionals also need easy access to the latest treatment and scientific research related to the

Help Support Clot Connect

NEWSLETTER SIGN-UP

TWITTER FEED

Fantastic news! RT @less_roland I'm officially cleared from my dvt's and pes today! I'm off my Coumadin! #notfree

Want to hear Goose on affected by


2. “Long-term” anticoagulation = extended = lifelong. But:
   Re-evaluation every so often (once per year).

3. Offer and encourage clinical trial participation.
Dr. Moll from UNC:

He is the a)..., b..., (c) ... guy;

with the “Recurrence triangle”;

and the “Warfarin hate factor”.
Comments?

Questions?
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UNC Thrombosis Program

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