(PBL) Venous Thromboembolism Management: VTE & PE - The Clot Thickens

David Schneider, MD, FAAFP

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Dr. Schneider cares for the underserved in Santa Rosa, California, serving Latino, Southeast Asian, and Eritrean populations. He has taught the breadth and depth of family medicine for more than 20 years, and his professional interests include the physician-patient relationship and clinical skills. Cardiovascular system conditions are one of his specialty topics, and he points to "the growing body of evidence suggesting that lifestyle is as effective as, or more effective than, pharmacologic interventions in primary prevention." Dr. Schneider also focuses on conditions of the endocrine system (especially thyroid); skin conditions and dermatology; primary prevention, with a focus on lifestyle; and procedures. Board certified in both family medicine and integrative holistic medicine, he produces Dr. Dave's To Your Health segments for Wine Country Radio and BlogTalkRadio.com.

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Learning Objectives

1. Practice applying new knowledge and skills gained from Venous Thromboembolism Management sessions, through collaborative learning with peers and expert faculty.

2. Identify strategies that foster optimal management of venous thromboembolism, within the context of professional practice.

3. Formulate an action plan to implement practice changes, aimed at improving patient care.

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Associated Session

- Venous Thromboembolism Management: VTE & PE - The Clot Thickens

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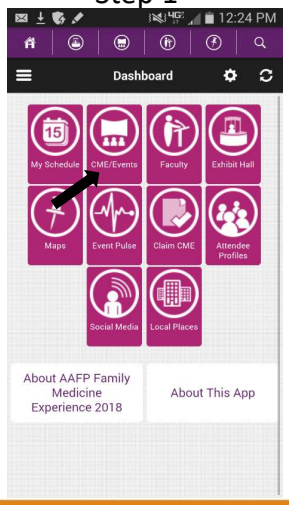
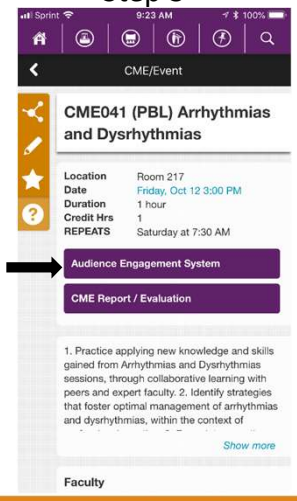
Audience Engagement System

Step 1



Step 2

Step 3



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Chief Complaint

- 47 yo WF presents to office w/LLE pain X5 days. She thinks it getting a bit worse.

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History of Present Illness

- L lower leg pain started ~ 5 days ago, maybe walking too much lately (trying to lose wt & get healthier).
- No improvement w/ibuprofen or naproxen Na.
- No F/C, no N/V. No bowel/bladder sx.
- No back pain.
- Normal activity level.

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Past Medical History

- HTN, controlled – 12 years.
- Former smoker, 1 ppd age 19 – 41.
- Reports some mild varicose veins in recent years, asymptomatic.

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Medications, Allergies

- HCTZ 25 mg daily, lisinopril 10 mg daily.
  - BP has been controlled on this regimen.
- NKDA,

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Family History

- Both parents have HTN.
- No known VTE in family.
- Father w/COPD (chronic smoker).

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Social History

- Former smoker, 1 ppd age 19 – 41.
- Occasional ETOH.
- No pets. 2 high school aged kids.

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Review of Systems

- No HA, visual sx.
- No CP/SOB.
- No F/C, no N/V. No bowel/bladder sx.
- No back pain.
- Normal activity level.

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Physical Examination

- BP 142/82, T98.7, P 88, R 16/reg. NAD.
- HEENT & neck WNL.
- H—RRR, no m or g. Lungs clear.
- Ext: LLE tender & bluish cord over calf, reproducing pain; lower leg w/pitting edema.

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Decision Point / Question

- What is your DDx?

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DVT DDx

- Muscle strain, tear, injury: 40%.
- Leg swelling in paralyzed limb: 9%.
- Lymphangitis or lymph obstruction: 7%.
- Venous insufficiency: 7%.
- Popliteal (Baker's) cyst: 5%.
- Cellulitis: 3%.
- Knee abnormality: 2%.
- DVT vs superficial vein thrombosis.

Circulation 1981;64:622-5

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Laboratory/Radiology

- You send her to ED for eval.
  - CBC ➔ WBC 11.2, o/w WNL.
  - Comp met panel WNL.

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Decision Point / Question

- What's your workup?

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Pre-Test Probability: Wells DVT Score

- 2-level Wells:
  - Low prob (unlikely) 0-1.
  - DVT likely ≥2.
- 3-level Wells:
  - <0 ➔ low probability.
  - 1-2 ➔ intermediate probability.
  - ≥3 ➔ high probability.
- May be less useful in ofc, hosp (?!?), elderly, ? comorbidities.

- **Wells DVT Score:**
- Paralysis, paresis, recent immobilization of LE =1 point.
- Bedridden >3 days or major surgery w/in 4 wks =1.
- Localized tenderness along deep veins = 1.
- Swelling of entire leg = 1.
- Calf swelling 3 cm >other, 10 cm below tibial tuberosity =1.
- Pitting edema greater in sx leg = 1.
- Collateral nonvaricose superficial veins = 1.
- Active CA or CA Tx'd w/in 6 mo = 1.
- Alternative Dx more likely than DVT = -2.

NEJM 2003;349:1227-35; Lancet 1997;350:1795-8; JAMA Intern Med 2015;175:1112-7; Ann Intern Med 2005;143:100-7; Ann Intern Med 2005;143:129-39

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High Pre-Test Probability

- Go directly to US w/compression.
  - Normal D-dimer does not R/O DVT➔ no help.
  - US ➔ she has a **distal DVT** (posterior tibial vein).

European Heart Journal 2017;00:1–14 or doi:10.1093/eurheartj/ehx003

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Decision Point / Question

- How should we treat her?

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Anticoagulation in Distal DVT

- Symptomatic + low bleeding risk.
- Unprovoked DVT.
- Extensive thrombosis involving multiple veins (eg, >5 cm in length, >7 mm in diameter).
- Thrombosis close to, or extension to, proximal veins.
- Persistent/irreversible risk factors (e.g., active CA).
- Prior DVT or PE.
- Prolonged immobility.
- Inpatient status.

Chest 2016;149:315-52; Chest 2014;146:1468-77; Thromb Haemost 2010;104:1063-70; Ann Surg 2010;251:735-42; J Vasc Surg 2007;46:513-9

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Management—1

- You have an informed discussion, and you both agree to treat her w/rivaroxaban 15 mg bid X21 days, then 20 mg daily.
- She's hemodynamically stable, low bleeding risk, normal renal func.
- You send her home w/rivaroxaban Rx.

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F/U Visit 1 Week

- Pain & swelling are worse.
- She is taking her meds.
  - How do you assess med adherence in pts?

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F/U Visit 1 Week—2

- She sheepishly admits that she did not pick up med right away, did some Internet review, picked it up 3 days after ED visit, but read the PI and still didn't start. She started the 15 mg rivaroxaban once daily since yesterday.

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F/U Visit 1 Week—3

- Pain & swelling are worse, and she is more tender. You note extension of her DVT above the knee and medially up the thigh. Very tender in these areas, w/firm cord-like, tender masses.

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Decision Point / Question

- Next steps?

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Worsening Clinical Status

- You send her by ambulance to ED, call ED physician &/or charge nurse.
- You are on call for admitting your own pts today, anyway.

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Wells DVT Scores

- 2-level Wells:
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ED Course

- Wells score now 5.
- Compression US w/doppler (Duplex scan w/compression) ➔ distal posterior tibial vein DVT has extended to popliteal & superficial femoral veins (NOTE: SFV is a deep vein!).

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ED Course—2

- While in ED, you come to see her. ED Dr has cleared her for admission, wants to write orders. You come by during lunch & meet pt in ED.
- Your questioning ➔ no CP, but she endorses a tight, sharp feeling R mid-chest.

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Decision Point / Question

- Next steps? W/U & treatment?

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ED Course—3

- BP 118/72, T 99.2, P 112/reg, RR 20.
- O2 Sat = 91% RA.
- Is she hemodynamically stable?
  - Yes. Continue eval.

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ED Course—4

- High risk pt, not eligible for PERC.

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Stable Pt ➔ Wells PE

- 3-tiered Wells PE Criteria:
  - Low probability: score <2.
  - Intermediate probability: score 2 – 6.
  - High probability: score >6.
  - Can use PERC if low risk.
- 2-tiered Wells PE Criteria:
  - >4.0 ➔ PE likely.
  - ≤4.0 ➔ PE unlikely.
  - Less accurate >60 yo (mean 76).

- **Wells PE Criteria**
- Clinical sx DVT (leg swelling, pain w/palpation) = 3.
- Other Dx less likely than PE = 3.
- Heart rate >100 = 1.5.
- Immobilization ≥3 days or surg in previous 4 wks = 1.5.
- Previous DVT/PE = 1.5.
- Hemoptysis = 1.
- Malignancy = 1.

JAMA 2006;295:172-9; J Am Geriatr Soc 2014;62:2136-41

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ED Course—5

- Wells = 9 ➔ high probability.
- Go direct to CT Angio (if no contraindication).
- Large, segmental PE R 2nd order (not main) pulmonary artery.

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Decision Point / Question

- Management plan?
  - Initial management.
  - Longer term mgmt, incl types, durations, etc.

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Which Agent for PE?

- Hemodynamically stable:
  - LMWH (Tx dose, not prophylactic).
  - Fondaparinux.
  - DOAC—**rivaroxaban**, apixaban.
    - No heparin needed.
    - Effective w/in 1-4 hrs.
    - Dabigatran or edoxaban require heparinoid 1st.

Chest 2016;149:315-52; Chest 2012;141:e419S-94S

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PE Acute Management

- You start her back on the **rivaroxaban** 15 mg bid, plan for 21 days. Then switch to 20 mg once daily.
- O2 sat dropped to 86%, pt feels SOB & scared.
- Pt is now committed to taking her meds.

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Continuing Anticoagulation—2

- Factor Xa inhibitors: (apixaban, edoxaban, rivaroxaban; betrixaban for prophylaxis, not Tx).
  - Apixaban & rivaroxaban active w/in 1-4 hrs.
- Direct thrombin inhibitors: dabigatran.
  - No routine monitoring.
  - No bridging.
  - Not reversed w/FFP (idarucizumab = Praxbind™ for dabigatran).
  - Still drug interactions.

Chest 2016;149:315-52; Chest 2012;141:e419S-94S

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Duration of Anticoagulation

- **3 Months (Min):**
- 1st VTE, unprovoked.
- *1st VTE, provoked/transient risk factor = 3 mo!.
- *Isolated distal DVT.
- *Subsegmental or incidental PE.
- *High bleeding risk.
  - *➔3 mo only

- **Consider 6-12 mo:**
- Phlegmasia cerulea dolens.
- Persisting but reversible risk factor??
- No known benefit of 6-12 mo vs indefinite for avg risk pt, but trials excluded pts.

Blood 2014;123:1794-801; JAMA 2014;311:717-28; Chest 2016;149:315-52; Int Angiol 2013;32:111-260; Chest 2012;141(2 Suppl):e419S-496S

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Indefinite Anticoagulation

- **General Agreement:**
- Poor data—expert opinion.
- **Unprovoked proximal DVT & symptomatic PE.**
- Recurrent unprovoked VTE.
- Active cancer.

- **Some Agreement:**
- Recurrent provoked VTE.
- Provoked VTE with persistent risk factors.
- **Unprovoked isolated distal DVT.**

- **???**
- Unprovoked incidental or subsegmental PE

Blood 2014;123:1794-801; JAMA 2014;311:717-28; Chest 2016;149:315-52

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Hospital Course

- She remains in hospital for 4 days, O2 sats increase to 90% on RA.
- Discharged home on no O2 and rivaroxaban, w/explicit instructions.
- Pt verbalizes understanding & summarizes plan & reasoning back to you.

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Follow-Up

- 6 months later she is back to full activity.
- No SOB or chest symptoms.
- Reports chronic, intermittent LLE pain, frequent edema, hyperpigmentation, and occasional open sores which heal relatively well w/OTC Abx ointment + bandage.

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Decision Point / Question

- Diagnosis?
- Management?

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Post-Thrombosis Syndrome

- Signs of chronic venous insufficiency after DVT.
- Common—up to 50% w/in 1st yr after DVT.
- Rx:
  - Exercise, compression, horse chestnut (escin).
  - Invasive treatment (IR, cardiology) or surgery if refractory.

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Questions

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Contact Information

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