

OBJECTIVES

1. Determine IF a venous thrombo-embolus warrants anticoagulation versus further evaluation.
 2. Determine WHERE anticoagulation should be initiated, inpatient or outpatient.
 3. Select WHICH anticoagulation agent to use.
 4. Develop a framework for determining HOW LONG to anti-coagulate.
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TEACHING INSTRUCTIONS

Plan to spend at least 30 minutes preparing for this talk. It is designed to be delivered on a chalkboard/whiteboard, but could easily be projected on a display instead. This chalk talk uses 4 cases to highlight the If, WHERE, WHICH and HOW LONG decisions in the initial anticoagulation management of VTE. Each segment could be presented on its own, and we have provided expected presentation times for each. The entire chalk talk will take 40-50 minutes to deliver.

Draw the "Board Set-up" on the whiteboard along with abridged learning objectives before starting the presentation. Also print out enough copies of the Learner's handout on double-sided sheets. You will give one of the four cases to each learner or small group. **Ask them not to look at the back. The evolving clinical vignette and associated questions are on the front, the answer is on the back.** The final page is a copy of the final chalkboard for their reference...but, you should really recommend they just come back to teachIM.org as a reference.

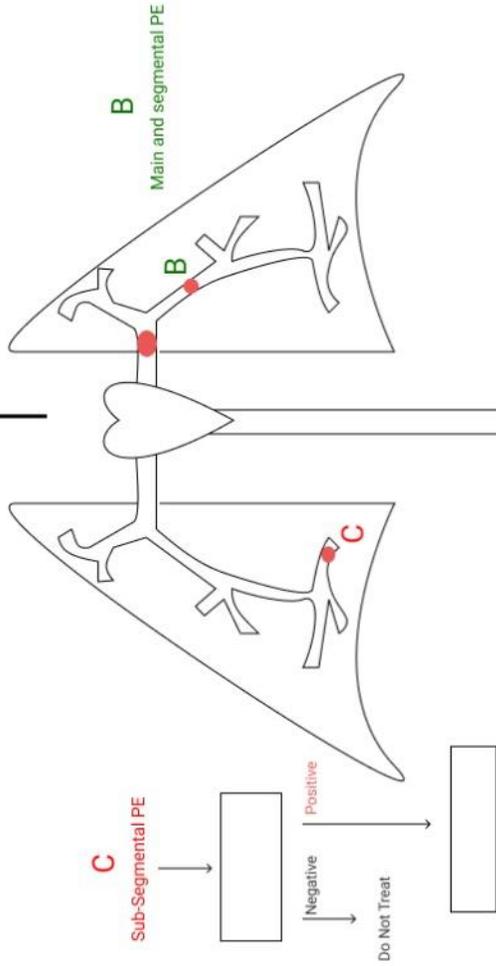
INTRODUCTION

Initial management of venous thromboemboli (VTE) depends on vascular location, an individual's ongoing thrombosis risk and their risk of bleeding. We will work through four separate cases and in the process, answer four basic questions: 1. **IF** the thrombus should be treated with anti-coagulation, 2. **WHERE** the anti-coagulation should be initiated, 3. **WHAT** is the most appropriate long-term agent and 4. **HOW LONG** to anti-coagulate.

CHALK TALK
Board Set-up:

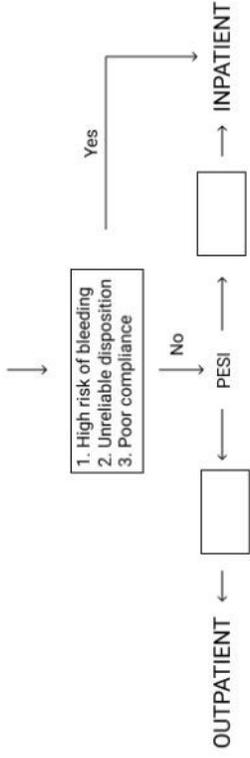
1) IF (should treat)?

Potentially Treat | **Definitely Treat**



2) WHERE (to initiate Rx)?

PE

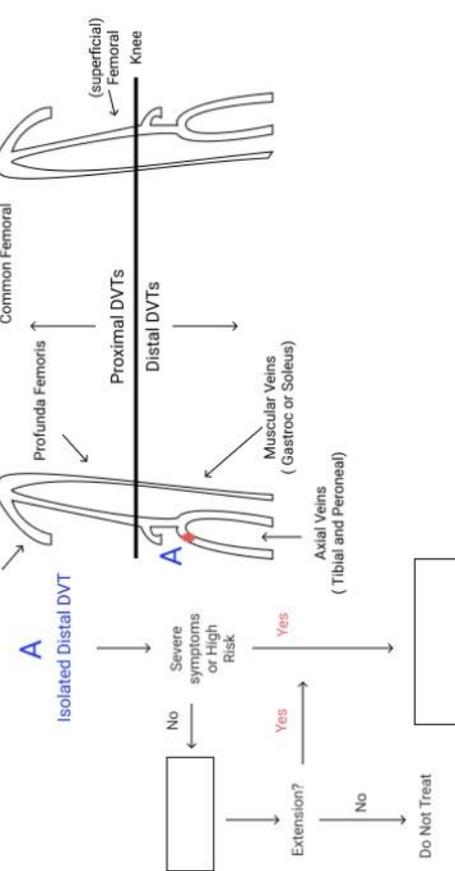
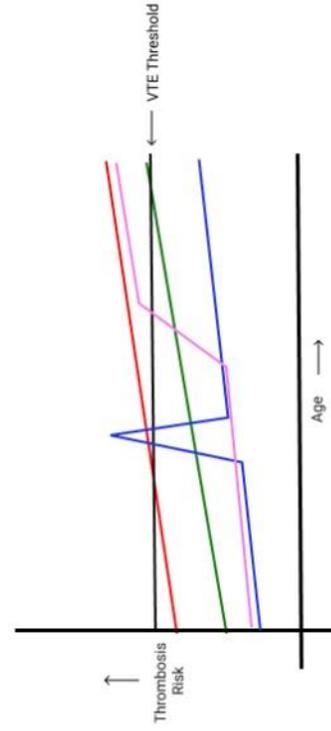


3) WHICH (agent)?

	Bridge?	Primary Use?
LMWH		
DOAC		
Warfarin		

4) HOW LONG?

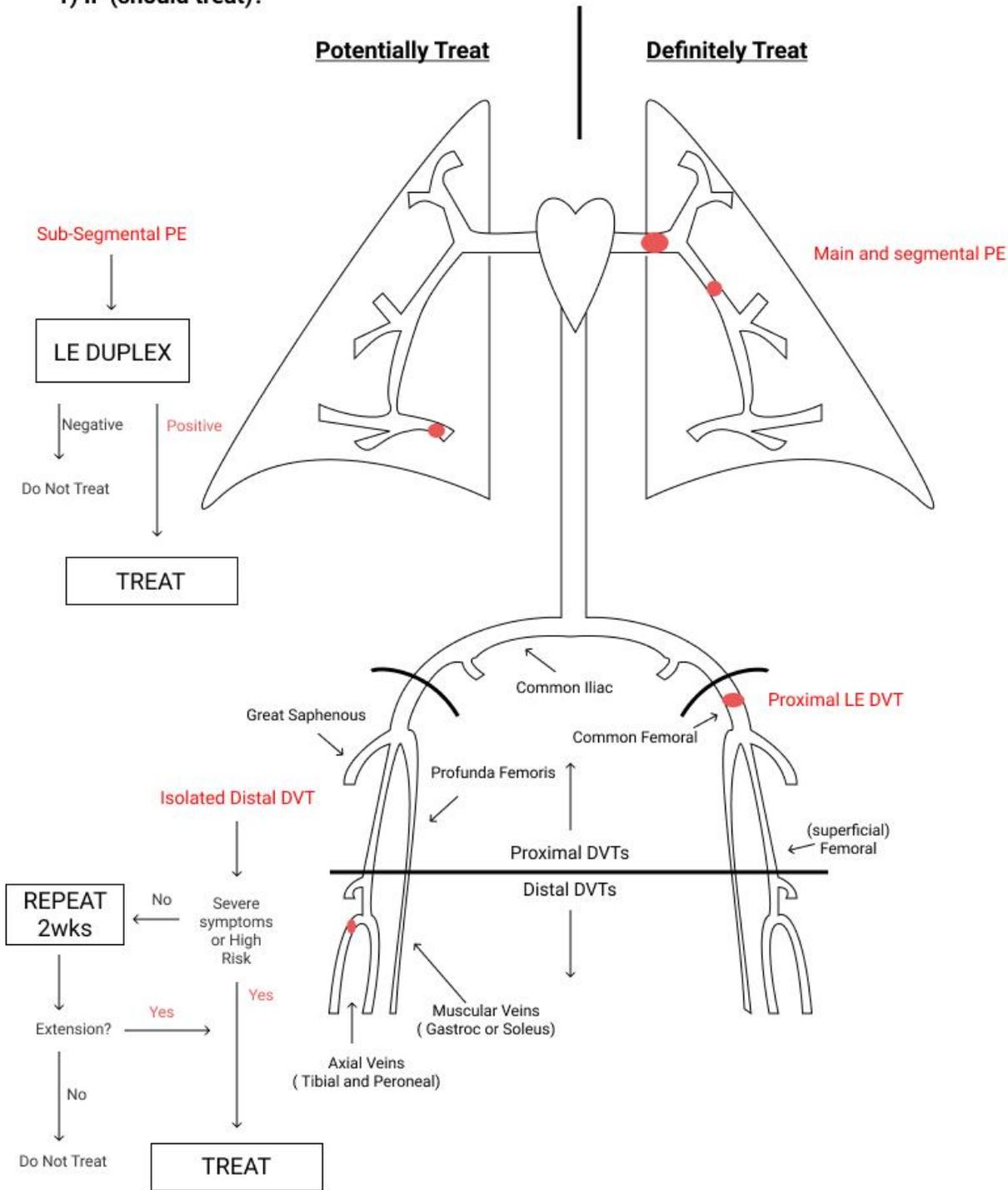
THREE MONTHS → RE-EVAL | INDEFINITELY



Stage 1 - IF (immediate anti-coagulation)?

Which VTEs require immediate anti-coagulation and which may require further evaluation or monitoring?

1) IF (should treat)?



Case A

A 45-year-old man involved in a motor vehicle accident suffers a right humerus fracture and multiple rib fractures along with a tension pneumothorax. He is admitted to the surgical ICU following surgery and chest tube placement. On hospital day five, the anticipated day of discharge, he is noted to have a slightly swollen ankle. A venous duplex study reveals an acute 2cm non-occlusive DVT in his posterior tibial vein without any proximal thrombi identified. He is ambulating independently and expected to spend the majority of the day out of bed over the subsequent weeks.

How would you classify this VTE? Do you want to initiate anti-coagulation?

Low to moderate risk, acute, below the knee DVT with reversible provoking factor -> continue orthopedic DVT prophylaxis, repeat duplex in 1-2 weeks.

High risk for progression or recurrence:

- Severe pain
- Hospitalized
- Elevated d-dimer
- Active malignancy
- History of VTEs
- Irreversible provoking factor
- >5cm long or in multiple veins

Repeat duplex in 1 week reveals progression of DVT into his popliteal vein, now measuring 7cm in length. -> initiate anti-coagulation

Case B

An 82-year-old man with COPD and recent diverticular bleed presents to the ED with increased shortness of breath and left-sided pleuritic chest pain. HR is 95bpm, BP 120/80 and SpO2 92%. His ECG reveals sinus tachycardia and CXR with slightly increased lung volumes but otherwise unremarkable. He is found to have multiple left-sided segmental PEs on a chest CTA. He denies any recent history of prolonged travel, surgery or immobility.

How would you define this VTE? Do you want to initiate anticoagulation?

Acute unprovoked segmental PE -> initiate anticoagulation

Case C

A 38-year-old woman presents to the ED with three days of right-sided chest pain and shortness of breath. She is afebrile, HR 100bpm, BP 110/75, SpO2 94%. Her CXR, ECG, and troponins are unremarkable. A CT PE reveals two sub-segmental PEs in the right lower lung base. When asked, she admits to possibly having slight swelling in her right leg last week. She denies any recent history of prolonged travel, immobilization or surgery. She is pre-menopausal and not on hormonal birth control. Her mother had an unprovoked VTE at age 48, it is unknown if she has an inheritable hypercoagulation mutation.

How would you define this VTE? Do you want to initiate anticoagulation?

Acute symptomatic, unprovoked sub-segmental PE -> obtain bilateral venous duplex

She is found to have an acute non-occlusive right common femoral DVT -> initiate anticoagulation

Case D

A 65-year-old man with prostate cancer metastatic to his spine presents to clinic with increased swelling and mild pain in his LEFT leg over the past week. The RIGHT leg is unchanged, and he is still able to walk on both feet. He denies shortness of breath, orthopnea/PND, significant weight gain, fevers or chills. He lives with his wife who is healthy and available to take care of him 24/7. A lower extremity duplex reveals an acute occlusive DVT in the left common femoral vein.

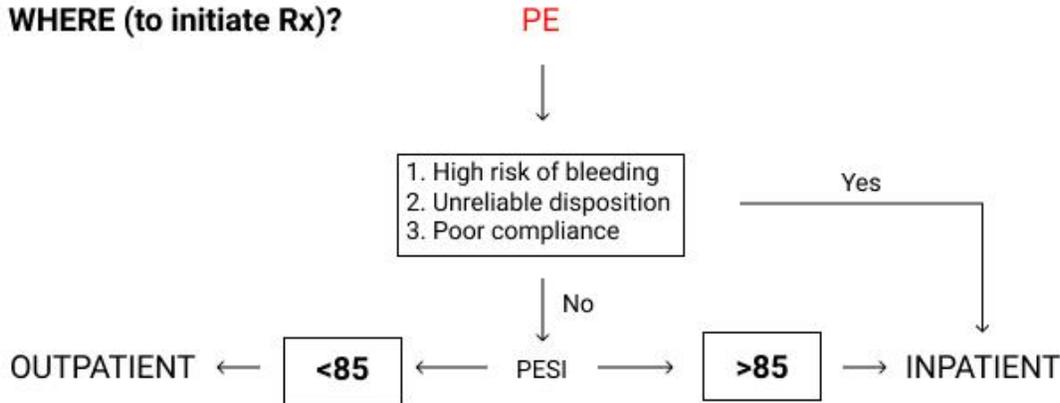
How would you define this VTE? Do you want to initiate anticoagulation?

Acute proximal LE DVT with irreversible provoking factor -> initiate anticoagulation

Stage 2 – WHERE (to initiate treatment)?

Which VTEs are safely managed as outpatients? The Pulmonary Embolism Severity Index (PESI) is a validated risk score used to triage acute VTE management to outpatient vs inpatient. A score of <65 suggests a low risk for outpatient complications (<1.6% 30 day mortality). With the use of LMWH and DOACs it is possible to initiate anticoagulation without hospitalization in patients at low risk for complications, stable social setting, good compliance with reliable follow-up.

2) WHERE (to initiate Rx)?



Case A? [showhide type="case2a" more_text="Show Answer" less_text="Hide Answer"] Outpatient initiation. This is a LE DVT, not a PE. The only DVTs that warrant inpatient initiation of anticoagulation are those with severe symptoms, unreliable compliance or high risk for bleeding. [/showhide]

Case B?

Inpatient initiation of anticoagulation. PESI score of 105 (>65) and high risk of bleeding.

Case C?

Outpatient initiation of anticoagulation. PESI of 38 (<65) without other complicating issues.

Case D?

Outpatient initiation of anticoagulation. So long as he does not have severe pain, risk of bleeding, has reliable follow-up and there are no concerns for poor compliance.

Stage 3 – WHICH (anticoagulation agent)?

*This topic will be covered more in-depth in “Inpatient Management of VTE” (expected Jan 2019)

All VTEs need immediate anticoagulation to reduce the risk of thrombus propagation and, most importantly, the risk of death from large pulmonary embolus. There are three anticoagulation options that can be delivered at home:

3) WHICH (agent)?

	Bridge?	Common Use?
LMWH	NO	Bridge and Cancer-Associated
DOAC	NO (except dabigatran)	First-Line
Warfarin	YES	GFR <30

1. Low Molecular Weight Heparin (LMWH) subcutaneous injections
2. Direct Oral Anti-Coagulants (DOACs)
3. Warfarin.

The first two offer immediate anticoagulation while warfarin requires a bridge with either a continuous heparin drip or LMWH injections. DOACs are often the preferred agent given the improved risks (less intracranial bleeds) and benefits (lower rates of recurrent thrombus) compared to warfarin, their ease of administration (one or two pills a day without monitoring) and very few drug-drug or drug-food interactions. CHEST guidelines recommend DOACs over warfarin or LMWH for non-cancer associated VTE. However, not all insurances cover DOACs and they are renally cleared, thus contraindicated in GFR <30.

Stage 4 - HOW LONG (to treat)?

All patients with VTEs should be treated with at least 3 months of anticoagulation to improve the likelihood of resolving the thrombus and decrease the likelihood for recurrence. However, the decision to continue anticoagulation beyond 3 months is based on their individual risk for thrombosis and bleeding. In general, thrombosis risk increased with age. So, it is appropriate to visualize a patient's trajectory towards recurrent VTEs based on a positive curve with increasing age against time. Otherwise put, if conditions were such that a thrombus developed at age x, and prothrombotic conditions have not been reversed, it is increasingly likely that a thrombus will occur over time.

If the initial VTE is attributable to a provocation that has since been reversed, anticoagulation should be stopped. If the provocation cannot be reversed (i.e. metastatic cancer) anticoagulation should be continued, assuming the patient is not at high risk for bleeding, in which case the decision should be weighed on the patient's preferences. An unprovoked VTE is at high risk of recurrence (30% in the first 5 years), independent of whether it is attributable to inheritable hypercoagulability. Thus, heritable thrombophilia work-up should not influence the decision of whether to continue anticoagulation but may help inform testing for the patient's children or change management in cases of anti-phospholipid syndrome.

1. Identify which thrombosis risk curves correlate with Cases A-D.
2. Define it by whether it is provoked, if the provocation is reversible and high risk for bleeding or not high risk for bleeding.
3. Determine if the patient warrants three months of anticoagulation or indefinite anticoagulation.

Case A?

1. Blue
2. Provoked, reversible
3. Three months of anticoagulation

Case B?

1. Green
2. Unprovoked, high risk for bleeding
3. Three months of anticoagulation, then re-assess

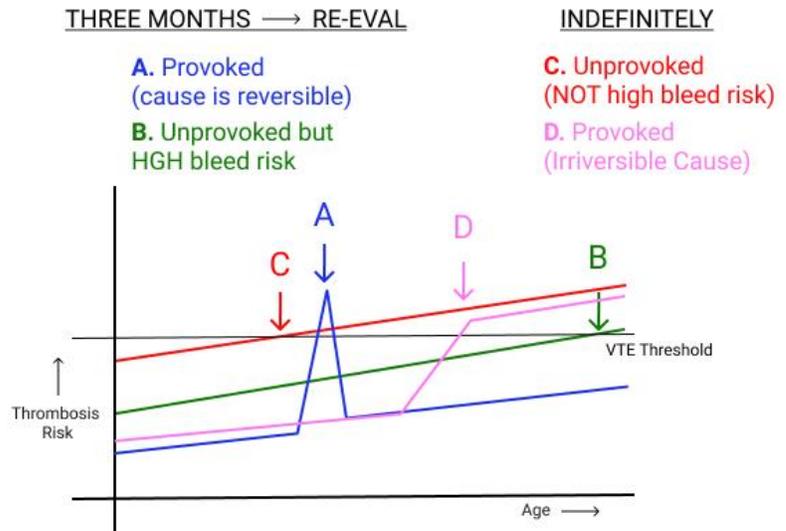
Case C?

1. Red
2. Unprovoked, not at high risk for bleeding
3. Indefinite anticoagulation

Case D?

1. Pink
2. Provoked but irreversible provocation, not at high risk for bleeding.
3. Indefinite anticoagulation

4) HOW LONG (to treat)?



TAKE HOME POINTS

1. Low risk below the knee DVT may be re-evaluated with repeat duplex in 1-2 weeks before starting anticoagulation.
2. An uncomplicated PE with a PESI score below 85 may be managed as an outpatient.
3. DOACs are first line treatment of stable non-cancer associated VTEs.
4. Unprovoked VTEs without high bleed risk should receive indefinite anticoagulation.

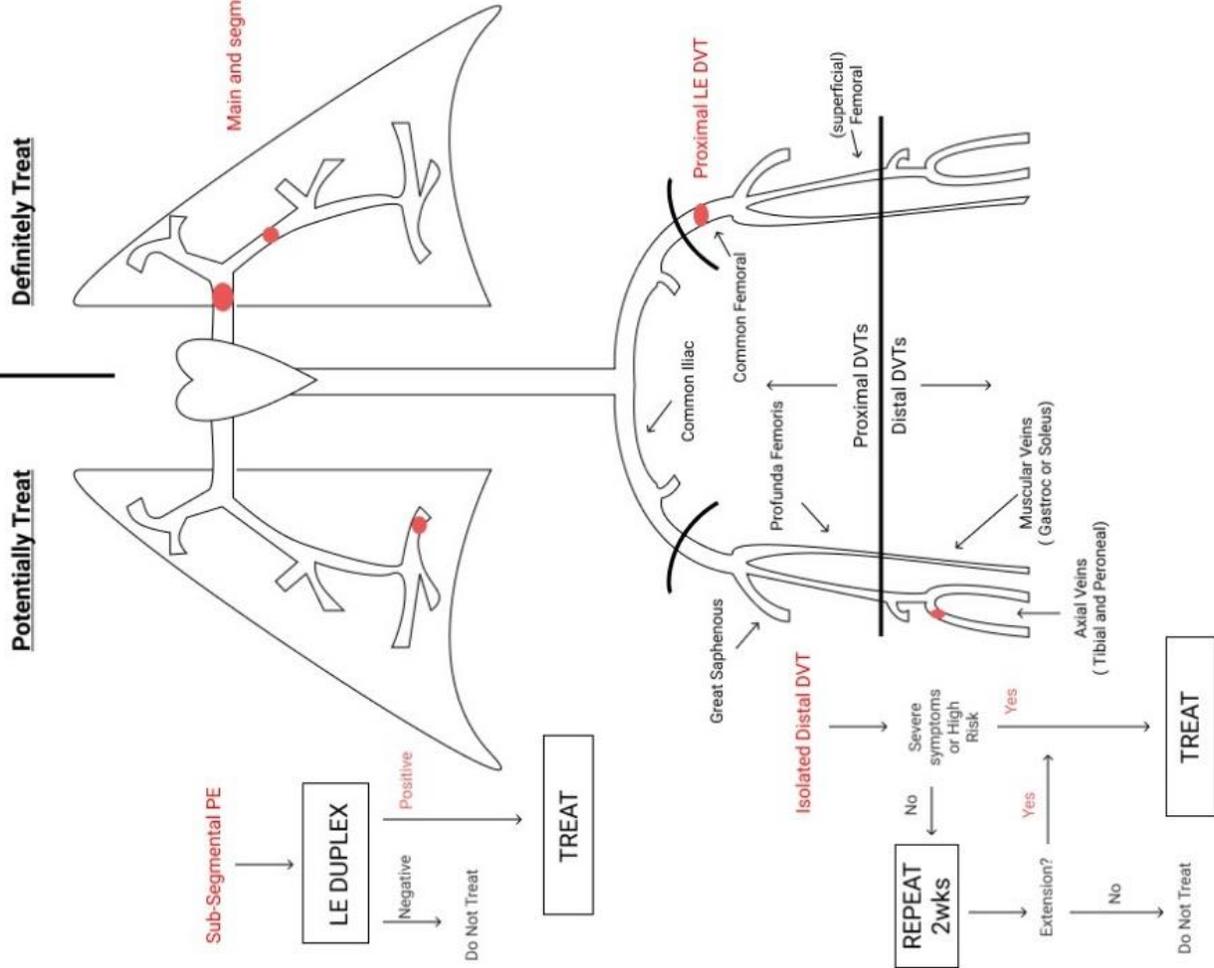
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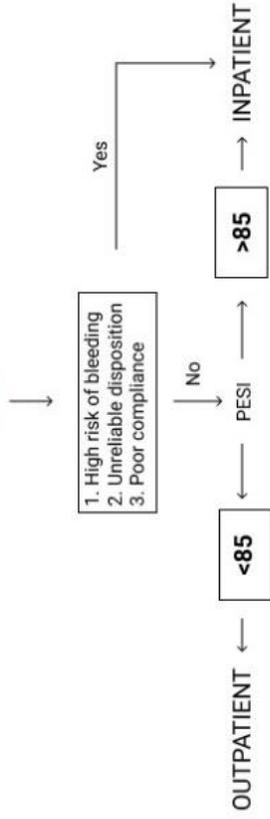
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2) WHERE (to initiate Rx)?



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4) HOW LONG?

