

## ACEP Simulation Case Template

**SIMULATION CASE TITLE:** Deep Vein Thrombosis

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**PATIENT NAME:** Jake Smith

**PATIENT AGE:** 60-year-old male

**CHIEF COMPLAINT:** Leg Pain

**Brief narrative description of case**

*Include the presenting patient chief complaint and overall learner goals for this case*

60 year old male with PMH of HTN, HLD, obesity, osteoarthritis, presenting with right leg pain, determined by learners on POCUS to have a DVT. The goals of this case are to think through a broad differential for unilateral lower extremity pain, recognize the risk factors for DVT, and to review the ultrasound findings in DVT.

**Primary Learning Objectives**

*What should the learners gain in terms of knowledge and skill from this case? Use action verbs and utilize Bloom's Taxonomy as a conceptual guide*

- Identify risk factors for DVT
- Discuss POCUS findings consistent with DVT
- Identify physical exam findings that are consistent with DVT
- Discuss limitations of POCUS for DVT

**Critical Actions**

*List which steps the participants should take to successfully manage the simulated patient. These should be listed as concrete actions that are distinct from the overall learning objectives of the case.*

- IV access
- Place on monitor and obtain full set of vitals
- Perform bedside US for DVT
- Start appropriate anticoagulation

**Learner Preparation**

*What information should the learners be given prior to initiation of the case?*

- **60-year-old male presents to the ED with leg pain**

<b>Required Equipment</b> <i>What equipment is necessary for the case?</i>	Bedside Ultrasound, Monitor, IV, Stethoscope
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INITIAL PRESENTATION			
<b>Initial vital signs</b>	HR: 105 BP: 155/85 RR: 16/min O <sub>2</sub> SAT: 97% T: 37°C		
<b>Overall Appearance</b> <i>What do learners see when they first enter the room?</i>	Middle aged man lying on the stretcher in moderate discomfort, non-diaphoretic		
<b>Actors and roles in the room at case start</b> <i>Who is present at the beginning and what is their role? Who may play them?</i>	Patient is historian, no family members or EMS presence		
<b>HPI</b> <i>Please specify what info here and below must be asked vs what is volunteered by patient or other participants</i>	60 year old male presents by private vehicle for 3 days worth of worsening leg pain. It now has started to hurt with ambulation although he can still get around alright, but is holding onto things which he has never done before. (volunteered) Pain localizes to right lower extremity, more specifically posterior knee down to calf (asked) Never had similar episodes (asked) Has had recent right sided total knee replacement approximately 1 month ago (asked) Was prescribed 14 day course of Eliquis following surgery but had not been taking this medication (asked) Social drinker, 1 pack a year for 10 years, but quit 20 years ago (asked) No trauma (asked) No fever/chills (asked) Unilateral swelling only (asked) No history of DVT/PE (asked) Missed morning amlodipine dose (asked) No URI or otherwise infectious symptoms (asked)		
<b>Past Medical/Surg History</b>	<b>Medications</b>	<b>Allergies</b>	<b>Family History</b>
HLD, HTN, obesity, osteoarthritis, 1 month	Amlodipine, atorvastatin, ibuprofen	NKDA	HTN, HLD, T2DM

prior total knee replacement for arthritic changes	as needed		
<b>Physical Examination</b>			
<b>General</b>	Moderate distress and appears to wince in pain, otherwise well appearing		
<b>HEENT</b>	PERRL, normocephalic, atraumatic		
<b>Neck</b>	Supple, no JVD, no lymphadenopathy		
<b>Lungs</b>	Clear to auscultation, no stridor		
<b>Cardiovascular</b>	Mildly tachycardic to 105, RR, no M/R/G, <b>1+ pitting edema to the right leg below the level of the knee with calf approximately 3cm larger than left if measured</b>		
<b>Abdomen</b>	Soft, nontender, non-distended		
<b>Neurological</b>	No motor or sensation deficits, AOx3		
<b>Skin</b>	<b>Mild warmth extending from posterior right knee to distal calf with no well defined borders or crepitus</b>		
<b>GU</b>	Normal, appropriate rectal tone		
<b>Psychiatric</b>	Linear, pleasant		
<b>MSK</b>	<b>Full ROM of all extremities including R. knee, No swelling or warmth over knee itself, mild tenderness to palpation over posterior right calf, positive Homan's sign if tested specifically by learners</b>		

- 1) **SCENARIO STATES, MODIFIERS AND TRIGGERS**
- 2) *This section should be a list with detailed description of each step than may happen during the case. If medications are given, what is the response? Do changes occur at certain time points? Should the nurse or other participant prompt the learners at given points? Should new actors or participants enter, and when? Are there specific things the patient will say or do at given times?*

<b>PATIENT STATUS</b>	<b>LEARNER ACTIONS, MODIFIERS &amp; TRIGGERS TO MOVE TO THE NEXT STATE</b>	
1. Baseline State Rhythm: Regular HR: 105 BP: 155/85 RR: 16/min O <sub>2</sub> SAT: 97% T: 37°C	<u>Learner Actions</u> <ul style="list-style-type: none"> <li>● Place patient on monitor, IV, O<sub>2</sub> as needed</li> <li>● Give pain medications</li> <li>● Obtain risk factors of DVT including recent surgery and not taking prescribed anticoagulation following his surgery</li> </ul>	<u>Modifiers</u> <i>Changes to patient condition based on learner action</i> <ul style="list-style-type: none"> <li>● Self-reported pain improvement and HR to 80 after pain is controlled</li> <li>● BP improved to 135/80 if amlodipine given early in course</li> </ul> <u>Triggers</u> <i>For progression to next state</i>

		<ul style="list-style-type: none"> <li>● Pain controlled and full history obtained</li> </ul>
<p>2.</p> <p>Rhythm: Regular HR: 80 BP: 135/80 RR: 14/min O<sub>2</sub>SAT: 97% T: 37°C</p>	<p><u>Learner Actions</u></p> <ul style="list-style-type: none"> <li>● Learner identifies physical exam findings including unilateral pain, edema, warmth</li> <li>● Learner considers DVT as well as infectious etiologies of physical exam findings</li> </ul>	<p><u>Modifiers</u></p> <ul style="list-style-type: none"> <li>● If learners administer antibiotics, the nurse asks if they want to do testing first</li> <li>● Learner can either order D Dimer or POCUS</li> <li>● D Dimer may delay care and Well's Score for DVT would recommend all patients receive US for this patient in high risk category if calculated.</li> </ul> <p><u>Triggers</u></p> <ul style="list-style-type: none"> <li>● POCUS performed (D Dimer must result with other labs if ordered before POCUS)</li> </ul>
<p>3.</p> <p>Rhythm: Regular HR: 80 BP: 135/80 RR: 14/min O<sub>2</sub>SAT: 97% T: 37°C</p>	<p><u>Learner Actions</u></p> <ul style="list-style-type: none"> <li>● Recognize Popliteal DVT on POCUS, obtain kidney function labs to direct anticoagulation, discuss admission or discharge criteria, prescribe anticoagulation</li> <li>● Determine criteria for discharge including ability to ambulate and good follow up</li> </ul>	<p><u>Modifiers</u></p> <ul style="list-style-type: none"> <li>● If learner does not evaluate for kidney function, the nurse should ask whether they have to specially dose the medications</li> <li>● If learner attempts to admit this patient who is ambulatory, hemodynamically stable, low risk of bleeds, no renal failure, and able to arrange follow up, the hospitalist gives pushback and recommends discussing further with the patient a safe discharge plan</li> </ul> <p><u>Triggers</u></p> <ul style="list-style-type: none"> <li>● Patient prescribed DOAC and discharged home</li> </ul>

**SUPPORTING DOCUMENTS, LAB RESULTS AND MULTIMEDIA**

Lab Results	BMP: WNL, normal creatinine of 0.8 CBC: WBC 12.8, otherwise unremarkable D-Dimer: Elevated (units depend on hospital) Any additional labs WNL
EKG	Sinus tach 105
CXR CT imaging	Not performed during this case
Ultrasound Video Files	Popliteal DVT present

SAMPLE QUESTIONS FOR DEBRIEFING
<ol style="list-style-type: none"> <li>1) What is on the differential for unilateral leg pain?</li> <li>2) What findings on bedside ultrasound confirm DVT study and what are techniques to help differentiate between vein and artery on ultrasound.</li> <li>3) What are the different ways of performing a DVT POCUS, and how far down the leg do we go on POCUS? (ie: 2 sites, 3 sites, or every 1 cm)</li> <li>4) What are the anticoagulation options for both outpatient and inpatient treatment based on kidney function?</li> <li>5) What would warrant admission for DVT?</li> </ol>

### **Ideal Scenario Flow**

*Provide a detailed narrative description of the way this case should flow if participants perform in the ideal fashion.*

*Learner enters the room to find patient who appears in moderate pain. Learner ensures patient is on the monitor, with IV, and O2 as needed. Learner gathers history after primary survey and recognizes importance of recent surgical history and patient not taking prescribed anticoagulation. Learner treats the pain of the patient and potentially gives home HTN medication. After performing thorough physical examination, the learner recognizes differential for the patient that includes DVT. Learner does not perform unnecessary procedures in this patient such as arthrocentesis, and instead performs a POCUS*

which confirms Popliteal DVT. Patient's renal function is checked and is normal. Learner evaluates which anticoagulation is appropriate for this patient and what the most likely safe disposition is. With no other contraindications and ambulating, patient is likely okay for discharge home with DOAC and close outpatient follow up.

### **Anticipated Management Mistakes**

1. Difficulty with bedside monitors: We found when using this case with medical students that many of our learners did not know how to properly connect EKG leads to the bedside monitor. We modified our sessions to include an introduction to simulation cases that includes a tutorial for connecting patients to bedside monitoring.
2. Failure to recognize high risk of DVT s/p orthopedic surgery: The risk of DVT after orthopedic surgery such as total knee replacement is very high, and many patients will be prescribed anticoagulation prophylaxis if there are no contraindications.
3. Jumping to infectious etiologies: Although cellulitis is probably also high on the differential for learners, this should not blind learner to other etiologies of unilateral leg swelling
4. Not checking renal function before anticoagulation: This will greatly determine which anticoagulation patients can be placed on, especially if considering outpatient management