Suspected Pulmonary Embolism Algorithm

Providence HEALTH CARE
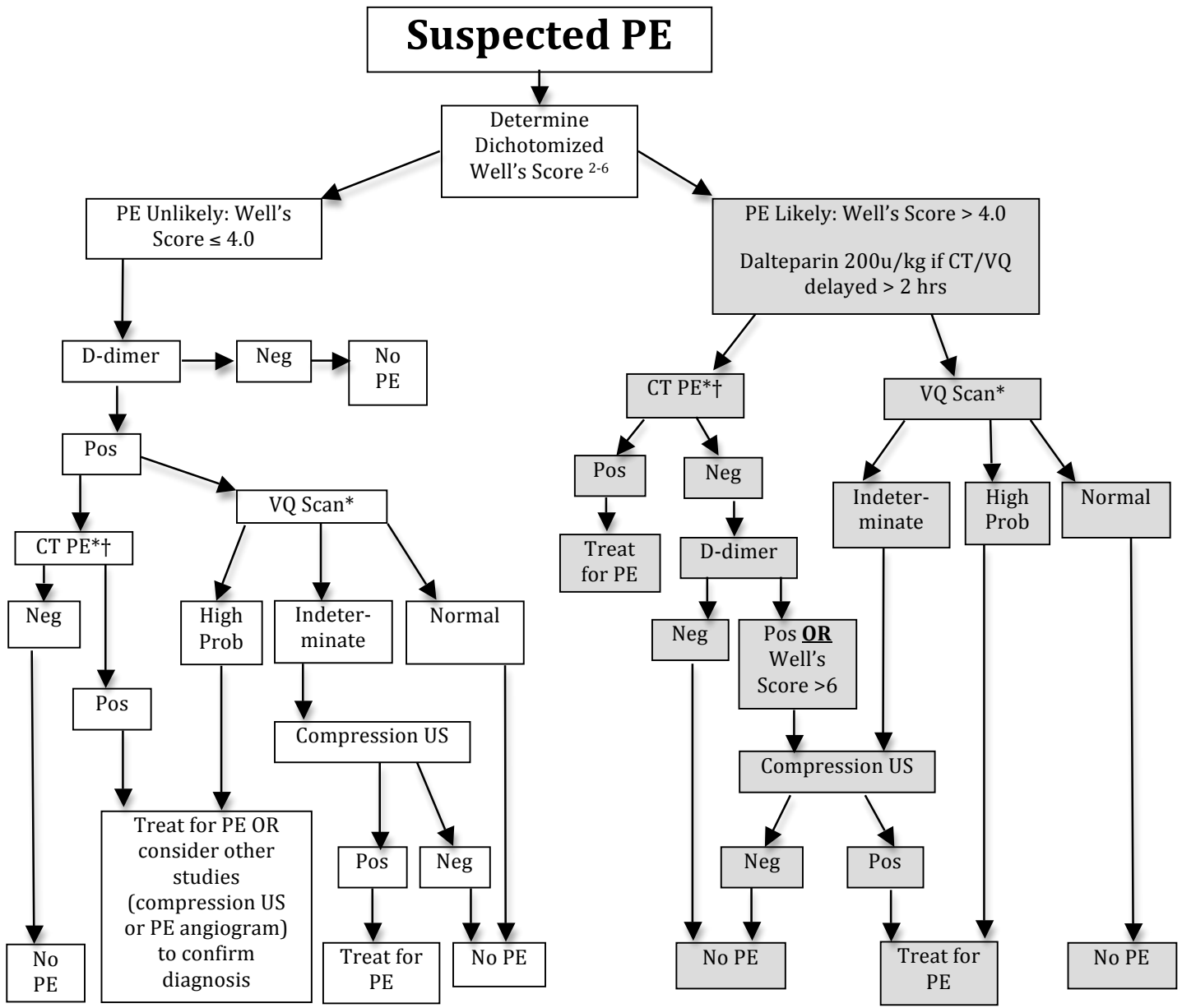
Emergency Dept. Adapted in part from reference 1-3.

Well's Criteria for assessment of pretest probability for PE

Criteria	Points
Signs and Symptoms of DVT (minimum of leg swelling and pain with palpation of the deep veins)	3.0
PE as or more likely than alternative diagnosis	3.0
HR > 100/min	1.5
Immobilization or surgery in previous 4 weeks	1.5
Previous DVT or PE	1.5
Hemoptysis	1.0
Malignancy (on treatment in the past 6 months or palliative)	1.0

PREGNANT patients: D-dimer and Well's score should be used. Compression US should be the first imaging modality. CT or VQ scan can be used if US is negative.[1]

Radiation exposure.[1]

Examination	Effective whole body dose (mSv)
CT PE	1.6-8.3
VQ scan	1.2-2.0
Perfusion scan only	0.8

Suspected PE

Determine Dichotomized Well's Score [2-6]

PE Unlikely: Well's Score ≤ 4.0

- D-dimer → Neg → No PE
- D-dimer → Pos
  - Pos → CT PE*† → Neg → No PE
  - Pos → CT PE*† → Pos → Treat for PE OR consider other studies (compression US or PE angiogram) to confirm diagnosis
  - Pos → VQ Scan*
    - High Prob → Treat for PE OR consider other studies (compression US or PE angiogram) to confirm diagnosis
    - Indeterminate → Compression US
      - Pos → Treat for PE
      - Neg → No PE
    - Normal → No PE

PE Likely: Well's Score > 4.0

Dalteparin 200u/kg if CT/VQ delayed > 2 hrs

- CT PE*†
  - Pos → Treat for PE
  - Neg → D-dimer
    - Neg → No PE
    - Pos **OR** Well's Score >6 → Compression US
      - Neg → No PE
      - Pos → Treat for PE
- VQ Scan*
  - Indeterminate → Compression US
    - Neg → No PE
    - Pos → Treat for PE
  - High Prob → Treat for PE
  - Normal → No PE

*Compression US can be considered before imaging. US is positive in 13-15% of patients with suspected PE and 29% of patients with proven PE.[1]

† Consider VQ scan, compression US if CT PE is indeterminate

1. Stein P, Woodward P, Weg J, et al. Diagnostic pathways in acute pulmonary embolism: Recommendations of the PIOPED II investigators. Am J Med. 2006;119:1048-55.
2. Anderson D, Kahn S, Rodger M, et al. Computed tomographic pulmonary angiography vs ventilation-perfusion lung scanning in patients with suspected pulmonary embolism. JAMA. 2007;298:2743-53.
3. Wells PS. Integrated strategies for the diagnosis of venous thromboembolism. J Thromb Haemost. 2007;5(suppl. 1):41-50.
4. Wells P, Anderson D, Rodger M, et al. Derivation of a simple clinical model to categorize patients probability of pulmonary embolism: Increasing the models utility with the SimpliRED D-dimer. Thromb Haemost. 2000;83:416-20.
5. The Writing Group for the Christopher Study Investigators. Effectiveness of managing suspected pulmonary embolism using an algorithm combining clinical probability, D-dimer testing, and computed tomography. JAMA. 2006;295:172-9.
6. Goekoop R, Steeghs N, Niessen R, et al. Simple and safe exclusion of pulmonary embolism in outpatients using quantitative D-dimer and Well's simplified decision rule. Thromb Haemost. 2007;97:146-50.