



Society of Hospital Medicine

Empowering hospitalists.
Transforming patient care.

Rapid Clinical Updates: Navigating the Management of Incidental/Subsegmental Pulmonary Emboli

Speakers

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Professor of Medicine

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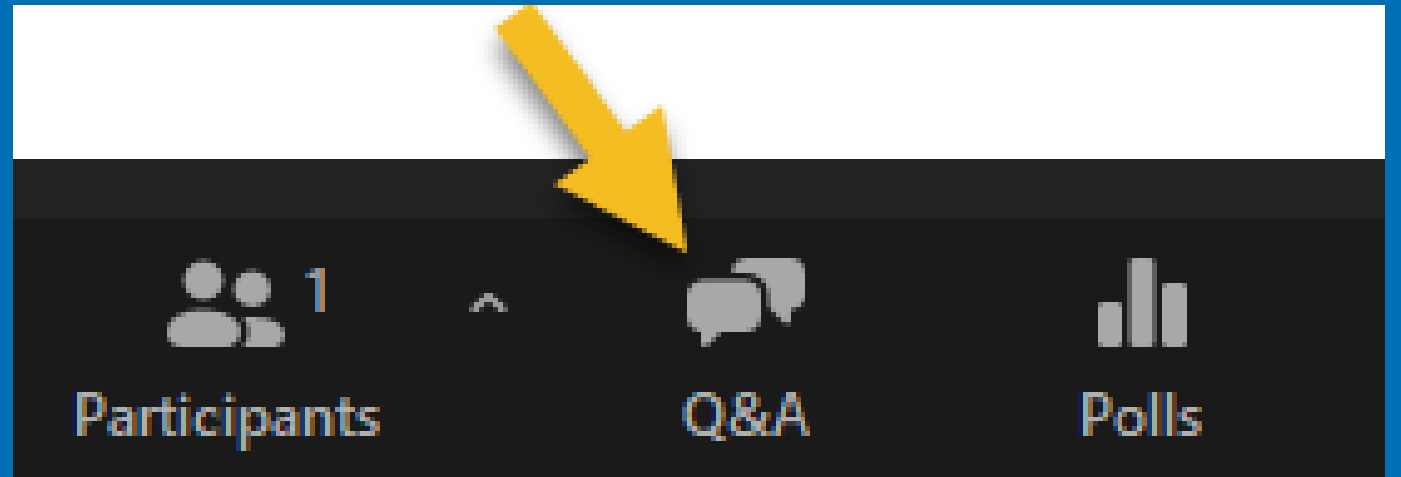
Dr. W. Graham Carlos, MD

- Pulmonary and Critical Care physician
- Division of Pulmonary, Allergy, Critical Care, and Sleep Medicine at the Indiana University School of Medicine



Please submit questions using Q&A feature

We will have Q&A time after



A blurred photograph of a hospital hallway. In the center, a woman in a white lab coat and a man in blue scrubs are looking at a tablet together. Other people in white coats and scrubs are walking in the background, creating a sense of a busy medical environment. The lighting is bright and natural, coming from large windows in the background.

QUESTIONS

Question 1

1. **For which patient with isolated subsegmental pulmonary embolism (ISSPE) discovered on chest CT is it appropriate to withhold anticoagulation and follow by surveillance?**
 - A. 68-year-old male with prostate cancer on hormonal therapy
 - B. 68-year-old female with distant history of breast cancer in remission
 - C. 55-year-old female with interstitial cystitis and multiple subsegmental pulmonary emboli initially seen on abdominal C
 - D. 55-year-old male with calcified lung nodule
 - E. 55-year-old female with clear cell uterine cancer

Question 2

2. A 67-year-old woman with a history of hypertension, Type 2 diabetes, and COPD on chronic supplemental oxygen presents to the emergency department following a motor vehicle collision. After being cleared by the trauma service, she is admitted to the observation unit for pain control and monitoring. One hour after admission, the radiologist informs the team that the patient has bilateral/multiple subsegmental pulmonary emboli incidentally found on the trauma protocol chest/abdomen/pelvis CT scan with contrast. The patient is hemodynamically stable, and all biomarkers are negative. What should the hospitalist do next?
- A. Obtain an ultrasound doppler of the lower extremities
 - B. Start anticoagulation with a direct oral anticoagulant after discussion of risks and benefits with the patient
 - C. Given subsegmental nature, withhold anticoagulation until follow up appointment for lower extremity ultrasound (1 week post discharge)
 - D. Consult Interventional Radiology for placement of an inferior vena cava filter
 - E. None of the above



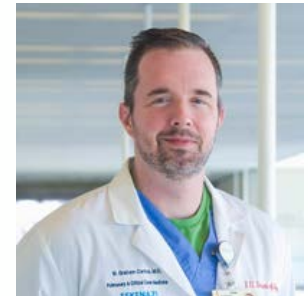


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Navigating the Management of Incidental/Subsegmental Pulmonary Emboli



Dr(s). Adrian Umpierrez & W. Graham Carlos





TODAY'S MENU

1. **Case**
2. **Incidence**
3. **Definition**
4. **Clinical Presentation**
5. **High-Risk Population(s)**
6. **Historical Perspective**
7. **Treatment Recommendations**
8. **Future Considerations**

CASE

A 25-year-old man with no past medical history presents to the hospital with acute onset chest pain and shortness of breath. Physical examination reveals a heart rate of 107 bpm, a respiratory rate of 25 breaths per minute, and a pulse oximetry reading of 93% saturation. Cardiac and respiratory auscultation are unremarkable, and there is no elevated jugular venous pressure or lower extremity edema. Laboratory data shows an elevated D-Dimer level of 3.9 mg/L. Computed tomography of the chest demonstrates a single subsegmental pulmonary embolism.

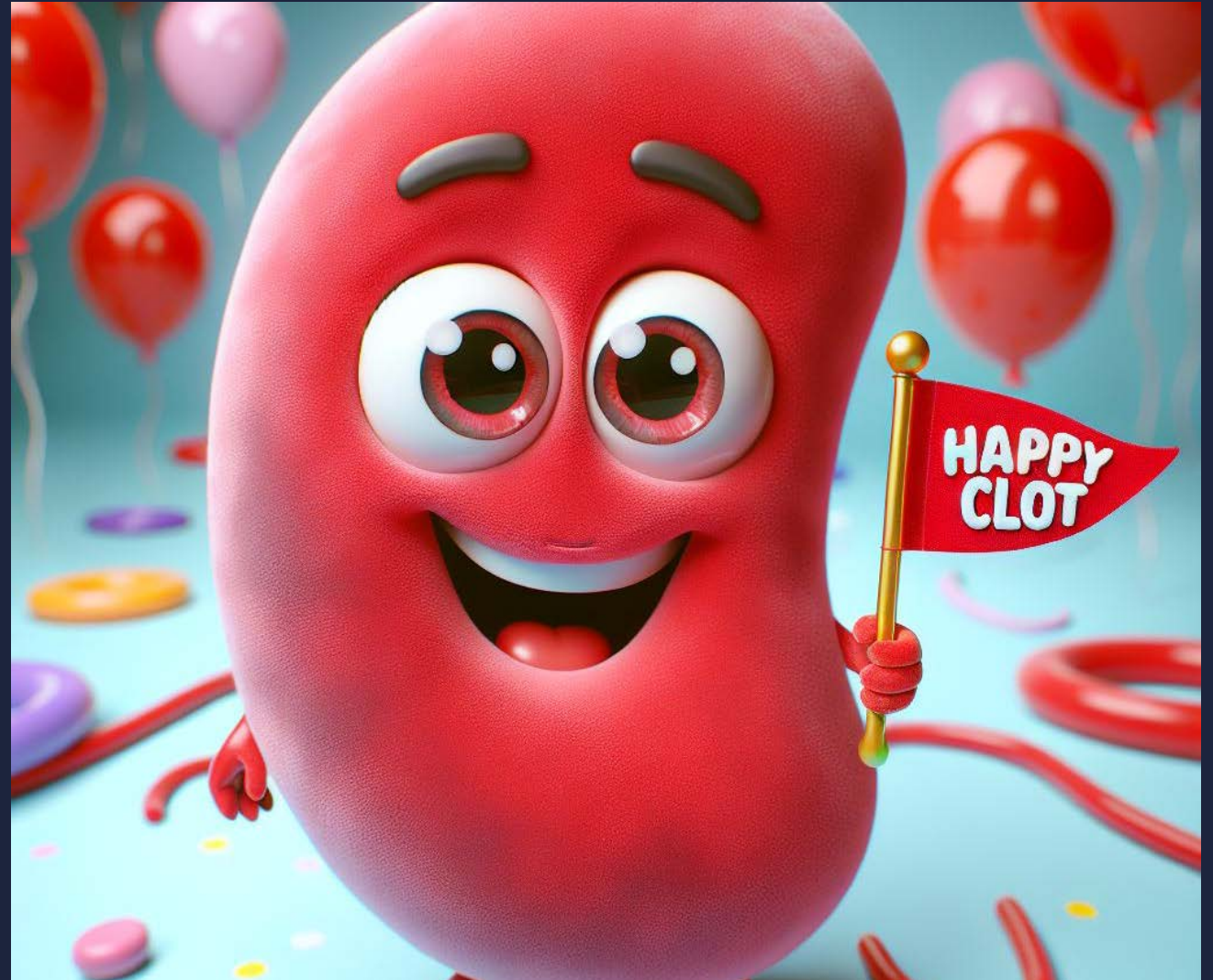
What is the next best step in the management of this patient?

- a) Start anticoagulation with heparin while bridging to warfarin and treat for 3 to 6 months
- b) Start a direct oral anticoagulant and treat for 6 months
- c) Obtain an echocardiogram to evaluate for RV strain
- d) Obtain a Doppler ultrasound of the lower extremities
- e) None of the above

Incidence of Pulmonary Embolism (PE) and Isolated Sub-Segmental PE

- **Incidence of PE in the USA**

- General Incidence:
 - 60 to 120 cases per 100,000 people annually
- Incidence of Isolated Subsegmental PE (ISSPE):
 - 3.8% to 10% of all PE cases



So... What's an ISSPE?



Definition:

Pulmonary embolism confined to subsegmental branches of the pulmonary arteries.

Smaller, more peripheral branches of the pulmonary arterial tree.



Detection:

Increased detection with computed tomography pulmonary angiography (CTPA).

Emboli typically 2-3 mm in size.

Clinical Presentation ISSPE

Generally benign compared to more proximal emboli.

Patients usually hemodynamically stable.

Lower serum biomarker levels.

Fewer associated proximal deep vein thromboses (DVTs).

High-Risk Populations for ISSPE

Hospitalized patients or those with reduced mobility or with multiple SSPE



Patients with active cancer (especially those with metastases or undergoing chemotherapy)



Patients older than 65 or Pregnant



Patients without reversible risk factors for venous thromboembolism (VTE) such as recent surgery

What next?

Graham and the Grammys....

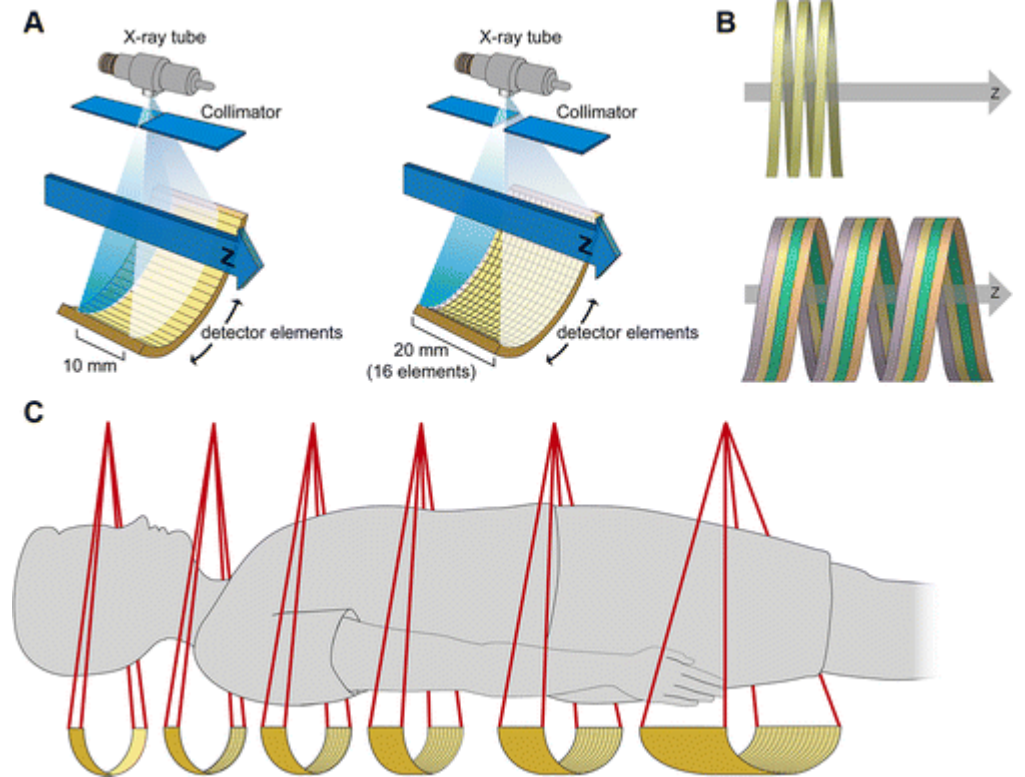
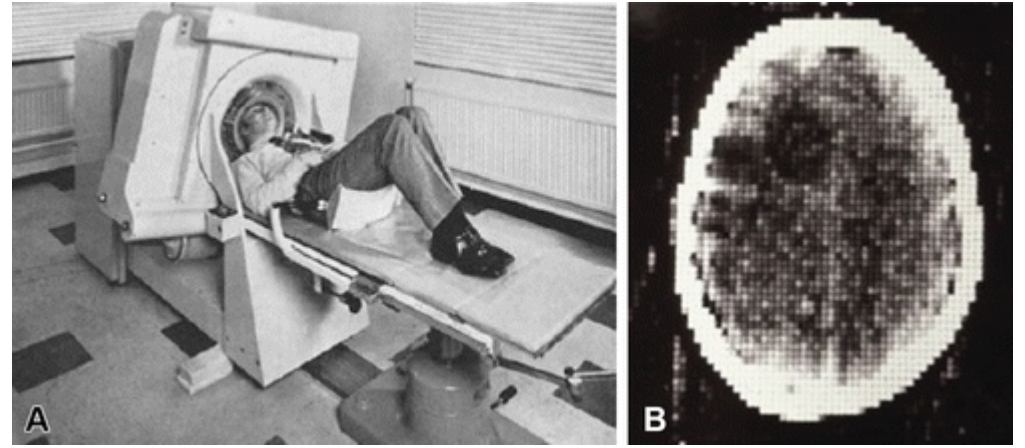




Tony Bennett
1963 Grammy
Winner



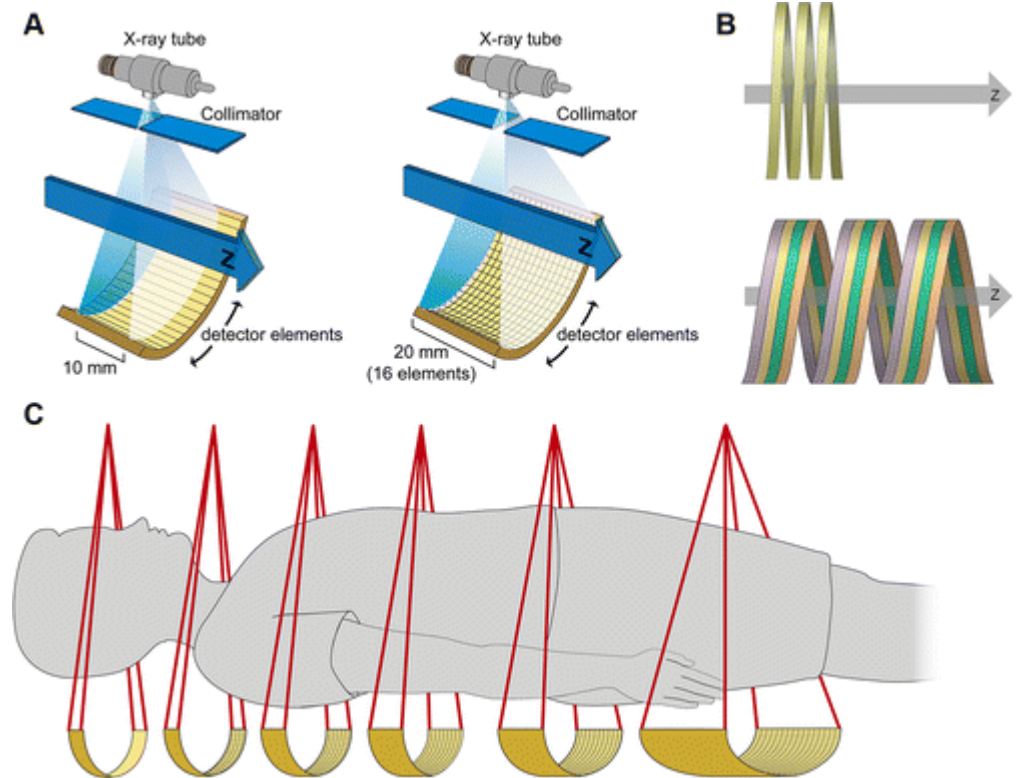
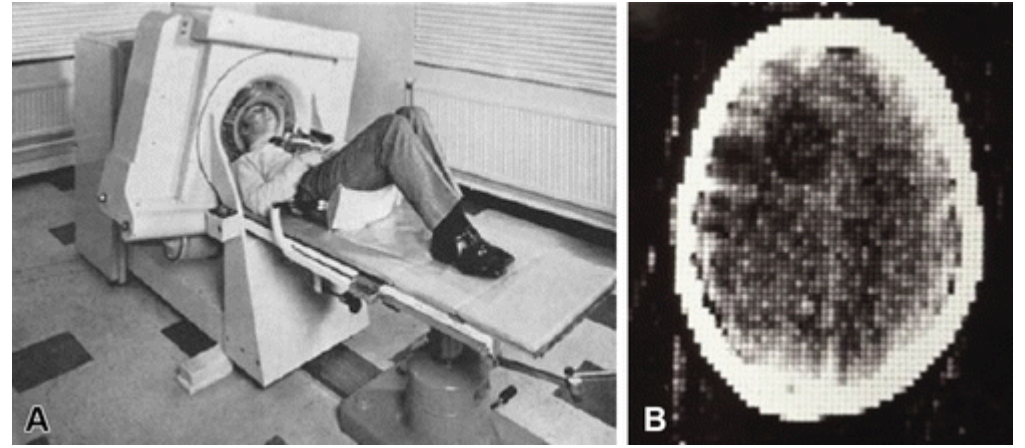
- 1963 • Cormack publishes paper describing computed tomography (4)
- 1971 • Hounsfield and Ambrose perform first human CT scan (5,6)
- 1972 • CT Introduced at RSNA meeting (7)
- 1973 • First US CT scanner installation (8)
- 1984 • Electron beam CT (9)
- 1990 • Spiral CT (10,11)
- 1999 • Multi-detector-row CT (12-15)
- 2004 • 64-slice CT (16,17)
- 2006 • Dual-source CT (18)
- 2007 • Dual-energy CT (19,20)
- 2008 • 256/320-slice CT (21)
- 2010 • Iterative reconstruction (22,23)
- 2021 • Photon counting CT (24,25)



Rehab – Amy Winehouse 2008 Record of Year



- 1963 • Cormack publishes paper describing computed tomography (4)
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Multiple-detector CTs “see” more PE

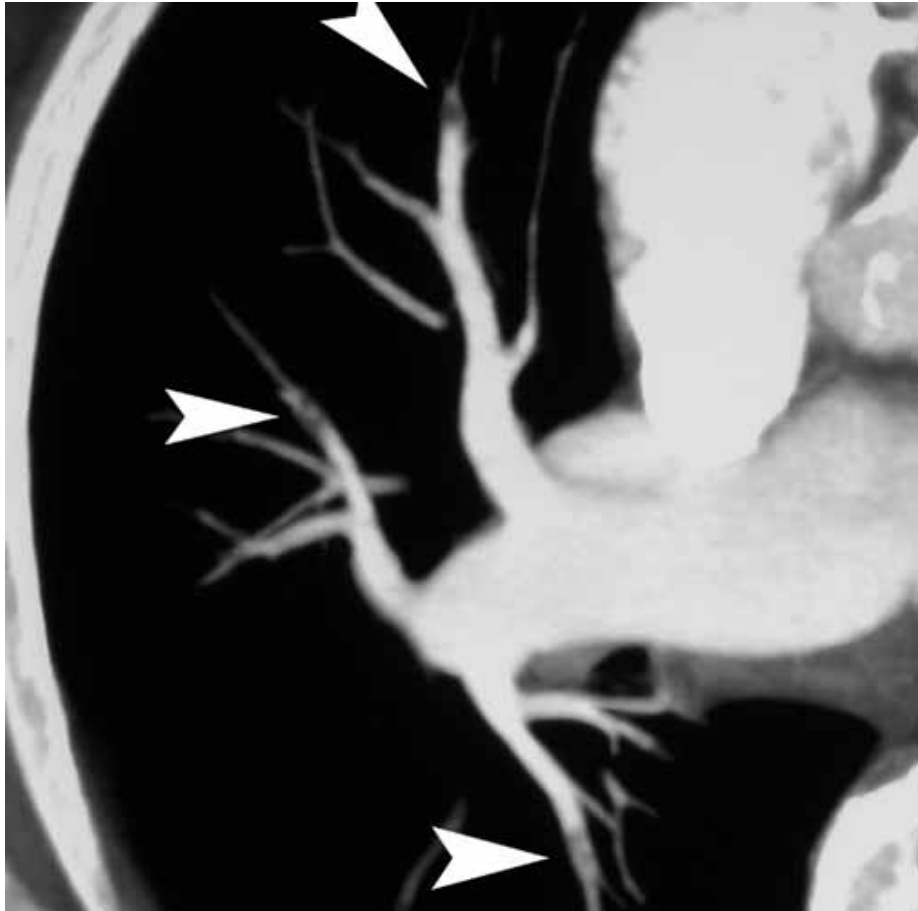


Table 3. Rates of subsegmental pulmonary embolism diagnosis

	SDCT	All MDCT	MDCT 4 detectors	MDCT 16 detectors	MDCT 64 detectors
Number of patients	1123	1534	461	207	100
Proportion of SSPE (%, 95% CI)	4.7 (2.5– 7.6)	9.4 (5.5– 14.2)	7.1 (3.8–11.3)	6.9 (0.7–23.3)	15.0 (7.7–24.1)

What is “subsegmental?”

Fourth order of branches.



- central
- proximal lobar
- distal lobar
- segmental
- subsegmental

2015



American Society of Hematology

Helping hematologists conquer blood diseases worldwide

shm.
Society of Hospital Medicine

ISSPE =
Isolated subsegmental
pulmonary embolism



*“To anticoagulate or not to
anticoagulate?”*

2015



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ISSPE =

Isolated subsegmental pulmonary embolism



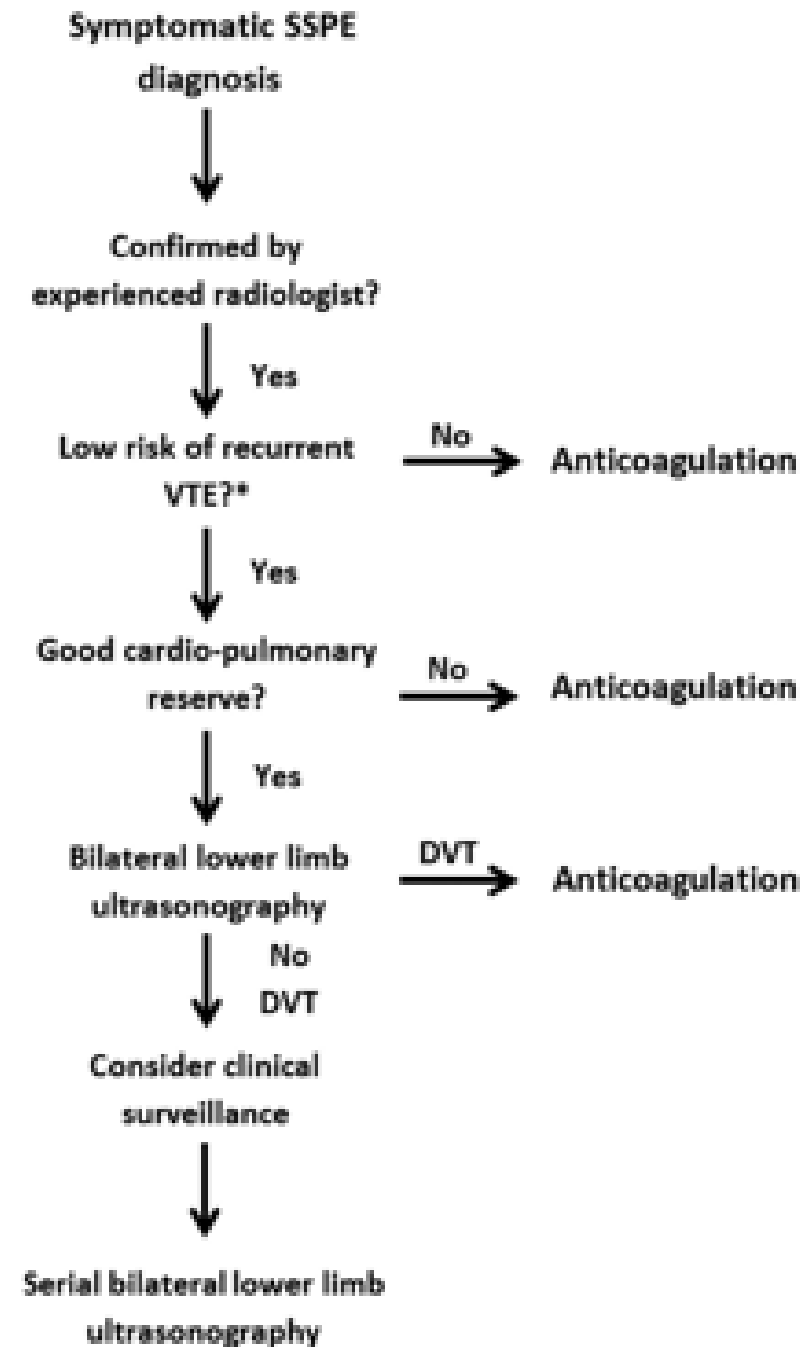
“Reasonable to anticoagulate if malignancy or DVT and withhold if asymptomatic and educate.”

2015



American Society of Hematology

Helping hematologists conquer blood diseases worldwide



2016



 CHEST™

Antithrombotic Therapy for VTE Disease Guidelines



“For ISSPE and no DVT we suggest clinical surveillance over anticoagulation with low risk of recurrent VTE and anticoagulation for high risk”

2021



 CHEST™

Antithrombotic Therapy for VTE Disease: **2nd Update** Guidelines



*“For ISSPE and no DVT we suggest clinical surveillance over anticoagulation” (**weak recommendation, low-certainty**)*

2022



Risk of VTE in patients with ISSPE on surveillance



ISSPE (no DVT, no cancer)

- *educate (handouts)*
- *repeat LE-US 1 week*
- *call at weeks 2-4 and at 3 mos*
- *Any sx's → US or scan.*

2022



Risk of VTE in patients with ISSPE on surveillance



266 pts w/ISSPE and no a/c

- *DVT found in 8 (3.1%) in 90d*
- *Bleed in 2 (0.7%) in 90d off a/c*
- *Older patients higher risk (1.8% to 5.5% >65 yrs)*

2022



Risk of VTE in patients with ISSPE on surveillance



266 pts w/ ISSPE and no a/c

- *Single ISSPE 2.1% VTE in 90d*
- *Multiple ISSPE **5.7%** VTE in 90d*

2022



Risk of VTE in patients with ISSPE on surveillance



266 pts w/ ISSPE and no a/c

- *Single ISSPE 2.1% VTE in 90d*
- *Multiple ISSPE **5.7%** VTE in 90d*

The rate of VTE in 90d for patients receiving anticoagulation for proximal PE is ~3%!!!

2023



JAMA
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shm.
Society of Hospital Medicine

Prevalence of Surveillance in Patients with ISSPE



666 patients over 5 years after 2016 CHEST guideline....

Only 1 patient with ISSPE underwent surveillance in community setting with good follow-up access

2023



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Prevalence of Surveillance in Patients with ISSPE



“If future trials find surveillance safe and effective, substantial update into practice may require more than passive diffusion”

Recruiting ⓘ

Clinical Surveillance vs. Anticoagulation for Low-risk Patients With Isolated Subsegmental Pulmonary Embolism (SAFE-SSPE)

ClinicalTrials.gov ID ⓘ NCT04263038

Sponsor ⓘ Drahomir Aujesky

Information provided by ⓘ Drahomir Aujesky, Insel Gruppe AG, University Hospital Bern (Responsible Party)

Last Update Posted ⓘ 2024-05-16

STOPping Anticoagulation for Isolated or Incidental Subsegmental Pulmonary Embolism (STOPAPE)

ClinicalTrials.gov ID ⓘ NCT04727437

Sponsor ⓘ University of Birmingham

Information provided by ⓘ University of Birmingham (Responsible Party)

Last Update Posted ⓘ 2021-09-29



ISSPE: Past, Present, and Future? →

- ISSPE are likely to become more common as resolution improves (? AI)
- If ISSPE found:
 - Check LE-US; if DVT → anticoagulate
 - If “high risk” for recurrent VTE, anticoagulation is suggested
 - Malignancy
 - >65 yrs old
 - Multiple subsegmental PEs
 - If “low risk,” clinical surveillance is suggested (weak rec)
 - Consider serial LE US (I would)



BACK TO OUR CASE

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2015 - ASH Guidelines: [Incidentally found pulmonary embolism: what's the clinician to do? | Hematology, ASH Education Program | American Society of Hematology](#)

2015 - ASH Edit: [Symptomatic subsegmental pulmonary embolism: to treat or not to treat? | Hematology, ASH Education Program | American Society of Hematology](#)

2016 CHEST Guidelines: [Antithrombotic Therapy for VTE Disease – CHEST](#)

Chest. 2022 Jul;162(1):269. doi: 10.1016/j.chest.2022.05.028. PMID: 34352278.

2023 JAMA Saying 2016 CHEST Guidelines not followed: <https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2807924>

2024 SAFE SSPE Clinical Trial: [Study Details | Clinical Surveillance vs. Anticoagulation for Low-risk Patients With Isolated Subsegmental Pulmonary Embolism | ClinicalTrials.gov](#)

2024 STOPAPE Clinical Trial: [Study Details | STOPping Anticoagulation for Isolated or Incidental Subsegmental Pulmonary Embolism | ClinicalTrials.gov](#)
Antithrombotic Therapy for VTE Disease: Second Update of the CHEST Guideline and Expert Panel Report
<https://pubmed.ncbi.nlm.nih.gov/34352278>

Treatment and Long-Term Clinical Outcomes of Incidental Pulmonary Embolism in Patients With Cancer: An International Prospective Cohort Study
<https://pubmed.ncbi.nlm.nih.gov/31116676>

Challenging anticoagulation cases: A case of incidental subsegmental pulmonary embolism in a patient with cancer
<https://pubmed.ncbi.nlm.nih.gov/33190023>

Risk for Recurrent Venous Thromboembolism in Patients With Subsegmental Pulmonary Embolism Managed Without Anticoagulation : A Multicenter Prospective Cohort Study
<https://pubmed.ncbi.nlm.nih.gov/34807722>

JAMA. 2022;328(13):1336-1345. doi:10.1001/jama.2022.16815

J Thromb Thrombolysis. 2015 Apr;39(3):311-4. doi: 10.1007/s11239-015-1169-7. PMID: 25772115.

Armitage et al. J Thromb Thrombolysis. 2023;55(1):126-133. doi:10.1007/s11239-022-02714-5





Thank you