Weak Evidence, Rare Eligibility, and Complex Care Coordination Limit Application of Structured Surveillance for Subsegmental Pulmonary Embolism

To the Editor:

We appreciated the educational debate surrounding routine initiation of anticoagulation in patients with isolated subsegmental pulmonary embolism (PE).[1,2] The authors presented reasonable arguments supporting each side of this salient controversy. As a group of multidisciplinary PE researchers, we faced this conundrum in a pragmatic way when asked if our large United States integrated health system (serving 4.5 million patients across 21 community medical centers) would benefit from a clinical pathway to guide the management of subsegmental PE in ambulatory patients who were otherwise suitable for outpatient care.

The evidence supporting structured surveillance without anticoagulation for selected patients is limited. The only randomized trial comparing anticoagulation with no anticoagulation was (and is) still ongoing.[3] Leading guidelines offer weak recommendations on surveillance with varied and less than straightforward eligibility criteria.[4] When sketching out a clinical pathway including this unconventional approach, we drew on principles articulated in the American Society of Hematology's 2020 user guide to clinical practice guidelines. Implementation, however, would be cumbersome. Overcoming entrenched practice patterns is not easy. We would need to settle on which eligibility criteria to employ and then educate clinicians about the benefits and risks of structured surveillance. Our treating clinicians would need to be able to intelligibly communicate treatment options (1) to eligible patients in a shared decisionmaking discussion and (2) to follow-up clinicians who might default to standard anticoagulation if they were not convinced that withholding anticoagulation was the right approach for their patient. Timely follow-up would need to be reliably available, which includes surveillance imaging in 5 to 7 days. Even clinicians committed to selectively forgoing anticoagulation might find this constellation of tasks challenging, especially during a busy emergency department shift. The complexity is illustrated in a case whose discharging physician attempted (unsuccessfully) to treat subsegmental PE without anticoagulation.[4]

While considering whether pathway creation and implementation were the best way forward, we sought to understand how our colleagues had already responded to the 2016 American College of Chest Physicians (CHEST) recommendations for selective surveillance. Our system is particularly conducive to surveillance, with ready availability of interdepartmental communication and timely access to postdischarge appointments and imaging. We undertook a retrospective cohort study to answer 2 questions: (1) How prevalent was structured surveillance without anticoagulation for low-risk subsegmental PE, and (2) what proportion of patients were surveillance eligible using modified CHEST criteria?[5] We identified 666 outpatients with subsegmental PE from 2017-2021, 229 of whom were low-risk. Only one patient underwent proper structured surveillance without anticoagulation, showing the CHEST recommendations had no meaningful consequence on clinical practice in our community hospitals. Moreover, we found that only 35 ambulatory patients from 21 medical centers over 5 years were surveillance eligible.[5]

These results, combined with today's less-than-compelling evidence supporting structured surveillance, led us to put design of a clinical pathway and its needed decision support application on hold, pending the publication of stronger evidence and more clear society guidelines. Meanwhile, seeking input from individual or collaborative groups of radiologists, hematologists, and pulmonologists to assist with complex individualized decisionmaking currently represents best practice.

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In reply:

We thank Drs. Vinson, Rouleau, Balasubramanian, Roubinian, and Pai for their letter to the editor regarding *Anticoagulation Should Not Be Routinely Used for Isolated Subsegmental Pulmonary Embolism*.[1] The authors discuss their use of a clinical pathway to guide management of subsegmental pulmonary embolism, for which they should be congratulated. We would like to address several points they raise in their letter.

The authors begin by discussing the need for emergency clinicians to communicate options to patients using shared decisionmaking, which they note can be challenging on a busy emergency department (ED) shift. Although we agree this can take time, we believe shared decisionmaking is a vital component of ED evaluation and management.[2] Several studies, including patients with low-risk chest pain, syncope, atrial fibrillation, and pulmonary embolism, demonstrate that shared decisionmaking can improve patient knowledge, increase engagement, and safely decrease the rate of further testing and admission.[2-4] Based on present data, we believe shared decisionmaking is integral in ED management in situations with more than one reasonable option in patients who are willing and able to participate in the decision, and there is enough time to engage the patient in the discussion.[2] Subsegmental pulmonary embolism is an excellent opportunity for shared decisionmaking, discussing the risks and benefits of treatment with anticoagulation versus further evaluation and clinical surveillance, and we believe emergency clinicians should be champions of shared decisionmaking in appropriate patients.

Next, the authors raise concerns over low rates of outpatient management in practice, based on their study of 666 outpatients with subsegmental pulmonary embolism.[5] However, we caution that just because structured clinical surveillance does not commonly occur in practice at the present state, does not mean that it should not be pursued. The practice of medicine is constantly changing and improving. For example, in today's medical environment, patients with deep venous thrombosis are routinely discharged with anticoagulation, though 10 to 20 years ago, this was not the case. Moreover, with the development of scoring tools (eg, Simplified Pulmonary Embolism Severity Index, Hestia, etc), there are now more discharges from the ED with pulmonary embolism, which a decade ago was unusual. Furthermore, the widespread use of modern direct oral anticoagulant agents has greatly simplified the process by removing the need for a heparin-bridge and monitoring of anticoagulant efficacy (eg, warfarin and international normalized ratio). We believe advancing the care of subsegmental pulmonary embolism is vital through implementation science with clinical surveillance, which requires pathways and further study.

Moreover, many current health care systems are facing a boarding crisis, which can negatively influence patient care. This, coupled with rising health care costs and a shift toward value-based care, further informs the need for avoiding unnecessary hospitalizations. Using shared decisionmaking combined with appropriate clinical surveillance and follow-up can potentially reduce the burden on the health care system at large while improving patient experience.

Ultimately, we believe these issues highlight an opportunity and critical need for more work on subsegmental pulmonary embolism pathways and clinical surveillance. Emergency clinicians are at the forefront of medical care, and we are exceptionally well poised to pursue this.

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In reply:

We appreciate the thoughtful insights and commentary provided by Vinson et al[1] regarding our article, *Patients with isolated subsegmental pulmonary embolism should be treated with anticoagulation.*[2] Their experience within a large, US integrated health system highlights the concern we raised: despite suggestions for selective surveillance, the system processes demanded leave this management approach as impractical, given logistic constraints both during the encounter and after, during outpatient follow-up.

We concur that the evidence for surveillance without treatment is weak and eligibility—rare. Citing their retrospective cohort—only 1 of 666 patients with subsegmental pulmonary embolism had "proper structured surveillance without anticoagulation"—we believe this further underscores the difficulty for implementing surveillance without treatment, even for a large, coordinated health network with available resources.[1] Therefore, if a robust health system with internal coordination finds this approach difficult, it would be infeasible to expect the average community or rural emergency department (ED) to adopt this management plan.

We, emergency physicians, must carefully balance diagnostic uncertainty and patient safety with the added complexity of resource limitations, often having to choose between what ought to be done and what can be or likely will be done. To proceed with surveillance without anticoagulation requires reliable continuity of care, both in physician-to-physician communication with access to available health records and in obtaining follow-up diagnostic tests. Further still, the physician must weigh the medico-legal risk of adverse outcomes during their medical decisionmaking. As Vinson et al[1] note, even those clinicians who support surveillance and withholding anticoagulation may find the requirements to implement their plan impractical while contemporaneously managing the rest of their department.

The safety profile and ease of use of direct oral anticoagulants further shift the decisionmaking toward treatment, especially when the potential harm of disease progression may be disastrous.[3,4] Until larger studies and stronger society recommendations provide definitive guidance for appropriate management of patients with subsegmental pulmonary embolism, we maintain that the better management plan in most EDs is to proceed with anticoagulation in patients without significant bleeding risk.

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