

Editorial Focus

Pulmonary embolism diagnosis: Remember the history and physical exam

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The trickiest part of detecting acute pulmonary embolism (PE) is remembering to consider PE as a diagnostic possibility. But this does not mean that every patient in whom the diagnosis is considered should undergo chest computed tomography (CT) scanning with contrast or ventilation-perfusion lung scanning. Such an approach would cram our CT and Nuclear Medicine imaging laboratories with hundreds of thousands of unnecessary tests, expose patients to unnecessary irradiation and contrast agent, precipitate cases of renal failure and anaphylaxis from contrast, and slow our clogged Emergency Departments to a virtual standstill.

Ordering a chest CT with contrast as a reflex, as soon as the diagnosis of PE is added to the differential diagnosis, is becoming common practice even though it is not the ideal way to practice medicine. The motivations for this wayward approach may be difficult to figure out. Is it the new way to practice "defensive medicine" and avert the charge of medical malpractice as our society becomes more litigious? Is it a mistaken belief that imaging almost anyone with possible PE will lead to a hastier or more efficient workup? Is it a genuine belief that we can best advocate for our patients by ordering PE imaging even when the likelihood of PE is rare, so that we "leave no stone unturned"?

A more orderly and thoughtful approach to the PE work-up adheres to classical teachings and tradition. Namely, take a directed history, perform a relevant physical examination, establish a differential diagnosis, and then decide upon D-dimer testing versus PE imaging based upon the likelihood of finding PE.

If the likelihood of PE is low, then order a D-dimer test and rule out PE if the D-dimer test is normal. If the likelihood of PE is not low, or if the D-dimer is elevated, then PE imaging usually makes sense. But in most Emergency Departments, the majority of patients in whom the diagnosis is considered have a low clinical probability of PE.

How do we standardize our definition of "PE clinical probability"? The best way, proven time and time again in clinical trials, is to use the Wells criteria for clinical probability assess-

ment of PE (1). These criteria are used successfully in clinical trials. But in the real world of daily clinical medicine, Wells criteria are almost never employed to make clinical decisions.

It is unclear why the Wells criteria are not utilized. Each criterion requires a clinical skill set, as shown in Table 1. And there exists a broad consensus that clinical evaluation is important, as well as maintaining the fundamental approach of history, physical examination, and differential diagnosis.

The Wells criteria are awkward to employ. There are three different point scores assigned to the seven criteria: 1 point for two criteria, 1.5 points for three criteria, and 3 points for two criteria. And when summing the point score, it is difficult to remember how many points constitute low probability, intermediate probability, and high probability for PE.

So, we have a set of clinical probability criteria that work but that are rarely used outside of clinical trials. Simplification of the Wells criteria is in order (2). And validation of the simplification, even as done retrospectively in the current study by Douma et al. (3), provides reassurance and guidance.

Table 1: Wells criteria and required clinical skill for diagnosis of pulmonary embolism (PE).

Criterion	Clinical skill
Clinical signs of DVT	Physical examination
Heart rate > 100/minute	Physical examination
Recent surgery, immobilization	History
Previous PE or DVT	History
Hemoptysis	History
Cancer	History
Alternative diagnosis less likely than PE	Differential diagnosis

DVT=deep vein thrombosis. PE=pulmonary embolism.

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Douma and her colleagues show that, now, all we have to do is remember the Wells criteria, but not the different point scores. In Douma's algorithm, each criterion carries equal weight. And the diagnostic plan could not be easier. If there is only one criterion present, order a D-dimer and stop the workup if the D-dimer is negative. If two or more Wells criteria are present, order a chest CT scan or lung perfusion scan. Using this approach, Douma found that more than two-thirds of patients suspected of PE were classified as having low clinical probability. Thus, the simplified Wells criteria appear to have the same utility for identifying low probability patients who start off with a less intensive workup than the more complicated original Wells criteria.

The Douma paper will not satisfy all clinicians. Some will still argue that "gestalt" is as accurate as the Wells criteria, especially among experienced clinicians (4). Others will continue to criticize the one subjective Wells criterion, that "alternative diagnoses are less likely than PE" (5).

I hope that this simplified approach will be embraced and tried in daily clinical practice, even by skeptics. It is practical, quick, and easy. In the meantime, the Douma approach should be tested prospectively on a large-scale basis in different patient populations around the world.

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