



D-Dimer and Exhaled CO₂/O₂ to Detect Segmental Pulmonary Embolism in Moderate-Risk Patients

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Abstract:

Rationale: Pulmonary embolism (PE) decreases the exhaled end-tidal ratio of carbon dioxide to oxygen (etCO₂/O₂).
Objectives: To test if the etCO₂/O₂ can produce clinically important changes in the probability of segmental or larger PE on computerized tomography multidetector-row pulmonary angiography (MDCTPA) in a moderate-risk population with a positive D-dimer. **Methods:** Emergency department and hospitalized patients with one or more predefined symptoms or signs, one or more risk factors for PE, and 64-slice MDCTPA enrolled from four hospitals. D-dimer greater than 499 ng/ml was test(+), and D-dimer less than 500 ng/ml was test(-). The median etCO₂/O₂ less than 0.28 from seven or more breaths was test(+) and etCO₂/O₂ greater than 0.45 was test(-). MDCTPA images were read by two independent radiologists and the criterion standard was the interpretation of acute PE by either reader. PE size was then graded. **Measurements and Main Results:** We enrolled 495 patients, including 60 (12%) with segmental or larger, and 29 (6%) with subsegmental PE. A total of 367 (74%) patients were D-dimer(+), including all 60 with segmental or larger PE (posterior probability 16%). The

combination of D-dimer(+) and etCO₂/O₂(+) increased the posterior probability of segmental or larger PE to 28% (95% confidence interval [CI] for difference of 12%, 3.0–22%). The combination of D-dimer(+) and etCO₂/O₂(–) was observed in 40 patients (8%; 95% CI, 6–11%), and none (0/40; 95% CI, 0–9%) had segmental or larger PE on MDCTPA. No strategy changed the prevalence of subsegmental PE. Conclusions: In moderate-risk patients with a positive D-dimer, the etCO₂/O₂ less than 0.28 significantly increases the probability of segmental or larger PE and the etCO₂/O₂ greater than 0.45 predicts the absence of segmental or larger PE on MDCTPA.

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