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Commentary

Management and Treatment of High-Risk Pulmonary Embolism

Aaron Konstantinides*

Department of Cardiovascular Intensive Care, University Medical Center Mainz, Mainz, Germany

DESCRIPTION

The clinical appearance of acute Pulmonary Embolism (PE), a frequent and occasionally deadly illness, varies. It is crucial that medication be delivered in a timely way so that recurrent thromboembolism and mortality can be averted. The therapy, prognosis, and follow-up of individuals with acute PE are covered here. In order to increase the specificity of pre-test clinical probability and D-dimer testing and prevent needless pulmonary angiograms, improvements in diagnostic algorithms were suggested and tested. The majority of patients with PE are currently treated with Non-Vitamin K Antagonist Oral Anticoagulants (NOACs), both in the short-term and long-term. Only individuals who are hemodynamically unstable should get primary reperfusion. Additionally, multidisciplinary teams are encouraged by the 2019 Guidelines to coordinate the acute-phase therapy of high-risk and (in some circumstances) intermediate-risk PE. Physicians are encouraged to include the evaluation of the right ventricle to the clinical severity ratings for normotensive patients when risk stratifying them further, particularly if an early release from the patient is anticipated [1]. Guidelines on extended anticoagulation following PE, which take into account the improved safety profile of NOACs, and general care and follow-up of patients who have experienced PE, with the goal of preventing, detecting, and treating late sequelae of venous thromboembolism, are two additional significant updates.

The symptoms that PE presents with are diverse, making a diagnosis difficult. Once PE is suspected, the Wells or Geneva scores may be used to calculate the pretest likelihood. Testing D-dimer is beneficial when the pretest likelihood is low or intermediate since a negative result can be used to rule out PE. When the pretest probability is low, the PE rule-out criterion can still be applied. If any of the following are absent, PE may be ruled out using this criteria without additional imaging: Age 50; Heart rate 100; Room air saturation 95%; Leg edoema; Hemoptysis; Recent trauma or surgery; History of PE or DVT; Hormonal therapy. Hypotension is defined as a systolic blood pressure (BP) 90 mmHg for a period >15 minutes or a drop in systolic blood pressure substantially below baseline (typically a drop of >40 mmHg, hypotension requiring vasopressors, or clear evidence of shock). This type of PE is known as hemodynamically unstable PE, also known as high-risk or "massive" PE [2].

Recent multicenter management studies, in particular, were effective in validating the following strategies: A worldwide prospective cohort research examined a previously published age-adjusted cut-off (age 10 g/L for patients older than 50 years) in a cohort of 3346 individuals since the specificity of D-dimer testing in suspected PE declines significantly with age. Normal age-adjusted D-dimer patients did not get CTPA instead they were left without anticoagulation and monitored for three months. Using the age-adjusted D-dimer cut-off (instead of the conventional 500 g/L) boosted the proportion of individuals in whom PE could be eliminated from 6.4% to 30% without adding false-negative results in patients older than 75 years.

Another prospective management trial included the so-called "YEARS" clinical decision criteria, which combines D-dimer concentrations with the three clinical Wells score items of symptoms of DVT, hemoptysis, and "PE more likely than an alternate diagnosis." Patients without clinical items and D-dimer levels below 1000 ng/mL as well as those with at least one clinical item and D-dimers below 500 ng/mL had their PE diagnoses ruled out without additional testing. The remainder of the patients had CTPA. 18 individuals (0.61%, 95% Confidence Interval [CI] 0.36-0.96%) of the 2946 patients (85%) in whom PE was therefore ruled out and who were left untreated were identified as having symptomatic VTE during the 3-month follow-up. By applying the YEARS rule, 48% of the patients were able to rule out PE without CTPA, as opposed to 34% using the original Wells' rule and fixed D-dimer threshold of less than 500 ng/mL [3].

As soon as a diagnosis of PE is suspected, anticoagulation should be started. Patients who are suitable for more advanced therapy such thrombolysis, catheter-directed thrombolytic or embolectomy, or surgical embolectomy may choose unfractionated heparin since it offer more procedural flexibility.

Correspondence to: Aaron Konstantinides, Department of Cardiovascular Intensive Care, University Medical Center Mainz, Mainz, Germany, E-mail: aaronkondes@asmainz.de

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Once patients have attained hemodynamic stability, direct oral anticoagulants are the primary line of treatment for low-risk patients as well as intermediate- and high-risk patients. Because of the demonstrated decrease in mortality and recurrence, systemic thrombolytic treatment should be taken into consideration in major PE. Absent contraindications, systemic thrombolytic therapy may be considered in patients with high-risk submissive PE because it has been shown to enhance hemodynamics, reverse RV dilatation, and guard against hemodynamic decompensating, though no appreciable short-term mortality reduction has been noted [4].

There are catheter-directed methods for lowering the dose of thrombolytics used or avoiding thrombolytic entirely due to the severe dangers of systemic thrombolytic treatment, including ICH. The RV/left ventricular (LV) ratio improvement as the endpoint has been used in randomised controlled studies to assess this device since it is a predictor of mortality and unfavourable outcomes. Major bleeding, death, and recurring PE are safety endpoints. There are now primarily two methods in use. In the first, lytic treatment is delivered locally to the pulmonary arteries using catheter-directed thrombolytics. To deliver the lytics locally, either a regular pigtail catheter or a pulmonary artery catheter might be used. As an alternative, the EKOS EkoSonic catheter can be used to administer the lytics for catheter-directed thrombolysis with ultrasound assistance. This catheter breaks apart fibrin strands in the thrombus using locally administered ultrasound, perhaps improving thrombolytic penetration. According on the clinical situation, the mechanical thrombectomy component of the second catheter-directed technique may be utilised alone or in conjunction with lytic treatment [5].

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