[Ann Emerg Med. 2018;71:e59-e109.]

ABSTRACT

This clinical policy from the American College of Emergency Physicians addresses key issues in the evaluation and management of adult patients with suspected venous thromboembolism. A writing subcommittee conducted a systematic review of the literature to derive evidence-based recommendations to answer the following clinical questions: (1) In adult patients with suspected acute pulmonary embolism, can a clinical prediction rule be used to identify a group of patients at very low risk for the diagnosis of pulmonary embolism for whom no additional diagnostic workup is required? (2) In adult patients with low to intermediate pretest probability for acute pulmonary embolism, does a negative age-adjusted D-dimer result identify a group of patients at very low risk for the diagnosis of pulmonary embolism for whom no additional diagnostic workup is required? (3) In adult patients with subsegmental pulmonary embolism, is it safe to withhold anticoagulation? (4) In adult patients diagnosed with acute pulmonary embolism, is initiation of anticoagulation and discharge from the emergency department safe? (5) In adult patients diagnosed with acute lower-extremity deep venous thrombosis who are discharged from the ED, is treatment with a non–vitamin K antagonist oral anticoagulant safe and effective compared with treatment with low-molecular-weight heparin and vitamin K antagonist? Evidence was graded and recommendations were made based on the strength of the available data.

INTRODUCTION

Venous thromboembolism (VTE), a coagulation disorder encompassing both deep venous thrombosis (DVT) and pulmonary embolism (PE), is a major public health problem.[1,2] Undiagnosed, untreated patients are believed to be at substantial risk for progressive disease and sudden death, typically because of worsening right-sided heart strain and, ultimately, cardiovascular collapse. Treated patients are at risk for chronic sequelae (eg, vein scarring, leg swelling, pulmonary hypertension) and adverse events from ongoing anticoagulation (eg, hemorrhage, medication adverse effects).

Although the true incidence of VTE is not known, reports estimate that 600,000 to 900,000 individuals per year (1 to 2 per 1,000) may be affected in the United States, a number that increases with patient age.[2-4] Others estimate that upwards of 294,000 fatal cases of PE occur in the United States annually, accounting for up to 10% of all hospital deaths.[5,6] In selected patient populations, VTE has been reported to have an associated mortality rate as low as 2%[7] and as high as 30%, which is primarily attributed to PE.[2,3,8]

One significant challenge to health care providers evaluating patients for VTE lies in the variability of signs and symptoms of the disease that are related to the clot burden, location, and the individual patient's cardiopulmonary reserve. Without perfect, cost-effective tests for the diagnosis, providers have come to rely on Bayesian decisionmaking to guide their workup, using pretest probability to interpret diagnostic evaluations and generate posttest probability of disease.[9,10] Doing this allows providers to maximize diagnostic accuracy while minimizing overtesting and patient harm from the risks associated with unnecessary evaluation and treatment.

Efforts to refine this Bayesian approach in emergency medicine have been ongoing. Original studies to determine pretest probability and the accuracy of various screening tests[11-13] have been validated, and the limits of their efficacy are being explored.[14] These structured clinical prediction rules, whether diagnostic (eg, Pulmonary Embolism Rule-out Criteria [PERC], Wells criteria, revised Geneva score [RGS]), or prognostic (eg, Pulmonary Embolism Severity Index [PESI], Hestia criteria), offer an adjunct to gestalt clinical assessment to assist in risk stratification and determination of pretest probability (ie, low, intermediate, high, nonhigh, PE unlikely, PE likely) or predict prognosis. In consideration of the cost of evaluation, the risk of false positives, and the risk of complications related to testing, studies have supported using a predefined posttest probability threshold of less than 2.0% to exclude the diagnosis of VTE.[9,14-18] Last, substantial efforts are being made to advance the treatment of VTE by balancing outcomes, anticoagulation risks to patients, and patient preferences. New non–vitamin K antagonist oral anticoagulants (NOACs) (aka novel oral anticoagulants, direct oral anticoagulants, and target-specific oral anticoagulants) directly bind to specific clotting factors (ie, IIa or Xa) to induce anticoagulation, and have been proposed as safer alternatives to vitamin K antagonists (VKAs) (ie, warfarin), which more broadly reduce circulating clotting factors (ie, II, VI, IX, and X). NOACs are particularly appealing for long-term anticoagulation because of their simple oral dosing regimens with no need for routine laboratory monitoring. Examples of approved NOACs include apixaban (Eliquis), dabigatran (Pradaxa), edoxaban (Savaysa), and rivaroxaban (Xarelto).

The 2011 American College of Emergency Physicians (ACEP) clinical policy on this topic focused on 6 critical questions: pretest probability and clinical assessment, utility