

## VENOUS THROMBOEMBOLISM

Venous thromboembolism (VTE), or clotting within the venous system, is a common and under-recognized cause of significant preventable morbidity and mortality in hospitalized patients. VTE includes deep vein thrombosis (DVT) and pulmonary embolus (PE). The American Heart Association states that first VTE occurs in roughly 100 patients per 100,000 each year. Of these, one-third have pulmonary embolism. Thirty percent of the 200,000 new cases of VTE annually die within three days, and one-fifth die suddenly due to pulmonary embolus. DVT accounts for approximately 8,000 hospital discharges per year, while PE accounts for almost 100,000 discharges. Hospitalists can lead their institutions in the development of screening and prevention protocols for patients at risk for VTE, and in the promotion of early diagnosis and safe approaches to the treatment of VTE. Hospitalists can also develop strategies to operationalize cost-effective programs that will improve patient outcomes and reduce the economic burden of VTE.

### KNOWLEDGE

*Hospitalists should be able to:*

- Describe VTE pathophysiology, including contributing aspects of endothelial damage, stasis, and alteration of the coagulation cascade.
- Describe the epidemiology of VTE, including the effects of demographic, environmental, thrombophilic, and hormonal factors; underlying medical and surgical conditions, and length of stay.
- Explain the clinical presentation of VTE and describe the diagnostic algorithmic approach.
- Describe the indications and limitations of specific diagnostic tests, including plasma D-Dimer testing, Doppler ultrasound, PE-protocol chest CT, CT of the pelvis and lower extremities, V/Q scanning, and MRI.
- Explain when invasive testing, including pulmonary angiography and venography, is indicated and describe the contraindications and potential complications of such testing.
- Describe the role of additional tests in the assessment of disease severity, including echocardiogram, troponin, and BNP.
- Describe VTE prophylaxis regimens for specific hospitalized risk groups, including medical, general surgical, orthopaedic, neurosurgical, obstetric, ICU, and renal insufficiency patients.
- Describe the indications, contraindications and side effects of thrombolytic therapy in the setting of VTE.
- Explain indications, contraindications and mechanisms of action of pharmacologic agents used to treat VTE.
- Explain the role and potential side effects of other therapeutic modalities in the setting of VTE, including different anticoagulation regimens, IVC filters, and embolectomy.
- Describe poor prognostic factors that necessitate early specialty consultation.
- Explain the indications for hospitalization and admission to the intensive care unit.
- Explain goals for hospital discharge, including specific measures of clinical stability for safe care transition.

### SKILLS

*Hospitalists should be able to:*

- Elicit a thorough and relevant history and review the medical record to identify relevant risk factors and symptoms consistent with VTE.
- Perform a complete physical examination to identify clinical features that predict the presence of VTE and significant clot burden, including evidence of pulmonary hypertension, right heart failure, low perfusion state and underlying malignancy.
- Analyze history and physical findings to determine pretest probability for DVT and/or PE.
- Apply pretest probability and interpretation of diagnostic testing to establish the diagnosis or exclusion of VTE or need for additional testing strategies.
- Determine appropriate level of inpatient care required.
- Appraise the need for urgent invasive treatment modalities, including catheter-directed thrombolysis of the venous or pulmonary artery system, or catheter-directed or surgical embolectomy.

- Formulate a treatment plan tailored to the individual patient, including selection of a specific anticoagulation regimen (agent, dosing, target level and duration) and required monitoring and/or IVC filter placement.
- Anticipate and address factors that may complicate the VTE or its management including cardiopulmonary compromise, bleeding and/or anticoagulation failure.
- Facilitate co-management of VTE treatment and prophylaxis when requested by other services.

## ATTITUDES

*Hospitalists should be able to:*

- Communicate with patients and families to explain the natural history and prognosis of VTE.
- Communicate with patients and families to explain goals of care plan, discharge instructions and management after release from hospital.
- Communicate with patients and families to explain tests and procedures, and the use and potential side effects of pharmacologic agents.
- Communicate with patients and families to explain tests and procedures and their indications, and to obtain informed consent.
- Recognize the need for early specialty consultation, which may include interventional radiology, vascular surgery, and hematology.
- Perform VTE risk assessment in all hospitalized patients and initiate indicated prophylactic measures including pharmacologic agents, mechanical devices and/or ambulation, to reduce the likelihood of VTE.
- Educate clinicians and nurses in VTE risk assessment and preventive measures.
- Employ a multidisciplinary approach, which may include nursing, anticoagulation, pharmacy and nutrition services, to the care of patients with VTE that begins at admission and continues through all care transitions.
- Address and manage pain in patients with VTE.
- Collaborate with primary care physicians and emergency physicians in making the admission decision.
- Document treatment plan and provide clear discharge instructions for receiving primary care physician responsible for monitoring anticoagulation.
- Insure adequate resources, including monitoring of anticoagulation, for patients between hospital discharge and arranged outpatient follow-up.
- Recognize when to prescribe extended duration prophylaxis to patients being discharged to rehabilitation hospitals, skilled nursing facilities, or home with immobility.
- Utilize evidence based recommendations when managing hospitalized patients at risk for VTE or with acute VTE.

## SYSTEM ORGANIZATION AND IMPROVEMENT

*To improve efficiency and quality within their organizations, Hospitalists should:*

- Lead, coordinate or participate in multidisciplinary initiatives to implement screening and prevention protocols for hospitalized patients based on national evidence based recommendations.
- Lead, coordinate or participate in multidisciplinary teams to develop early treatment protocols.
- Lead, coordinate or participate in multidisciplinary initiatives to improve inpatient care efficiency, facilitate early discharge, and encourage the outpatient management of VTE.
- Advocate for the establishment and support of resources to facilitate early discharge including patient education, adequate availability of pharmacologic agents, and home health resources.
- Integrate outcomes research, institution-specific laboratory policies, and hospital formulary to create indicated and cost-effective diagnostic and management strategies for patients with VTE.