AACN Practice Alert

Preventing Venous Thromboembolism in Adults

Scope and Impact of the Problem

Venous thromboembolism (VTE) is a major health problem that affects an estimated 900 000 patients in the United States annually and results in an estimated 300 000 deaths.[1] The prevalence is predicted to more than double within the next 35 years.[2] Critically ill patients who receive VTE prophylaxis have a significantly lower risk of death than do those who do not receive VTE prophylaxis.[3,4] In a recent study, the incidence of deep vein thrombosis (DVT) in critically ill patients without prophylaxis was 11%.[5]

Expected Nursing Practice

1. Assess all patients upon admission to the critical care unit for risk factors for VTE and bleeding, and anticipate orders for VTE prophylaxis depending on the risk assessment. [level D]
2. Patients at risk and regimens for VTE prophylaxis include
    a. For acutely ill medical patients who are at increased risk: low-molecular-weight heparin (LMWH) or low-dose unfractionated heparin (LDUH) or fondaparinux [level B]
    b. For acutely ill general surgery patients who are at increased risk: LMWH, LDUH, or mechanical prophylaxis [level B]
    c. For critically ill patients: LMWH or LDUH [level A]
    d. Patients with high risk for bleeding: mechanical prophylaxis including graduated compression stockings (GCSs) and intermittent pneumatic compression devices (IPCDs) [level B]
    e. Mechanical prophylaxis may also be anticipated in conjunction with anticoagulant-based prophylaxis regimens [level D]
3. Review daily—with the physician and during interprofessional rounds—each patient's current VTE risk factors, including clinical status, necessity for a central venous catheter (CVC) or peripherally inserted central catheter (PICC), current status of VTE prophylaxis, risk for bleeding, and response to treatment. [level E]

AACN Levels of Evidence

Level A Meta-analysis of quantitative studies or metasynthesis of qualitative studies with results that consistently support a specific action, intervention, or treatment (including systematic review of randomized controlled trials)

Level B Well-designed, controlled studies with results that consistently support a specific action, intervention, or treatment

Level C Qualitative studies, descriptive or correlational studies, integrative reviews, systematic reviews, or randomized controlled trials with inconsistent results

Level D Peer-reviewed professional and organizational standards with the support of clinical study recommendations

Level E Multiple case reports, theory-based evidence from expert opinions, or peer-reviewed professional organizational standards without clinical studies to support recommendations

Level M Manufacturer's recommendations only

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4. Maximize the patient's mobility whenever possible and take measures to reduce the amount of time the patient is immobile because of the effects of treatment. Mobilizing patients does not eliminate the need for chemical prophylaxis as ambulatory patients may still be an increased risk for VTE. [level D]
5. Ensure that mechanical prophylaxis devices are fitted properly and in use at all times except when being removed for cleaning or inspection of skin. [level D]

Supporting Evidence

Assessing Risk Factors

1. Multiple medical and surgical risk factors leading to VTE formation have been identified.[6] Hospital-associated risk factors for VTE in critically ill patients include immobilization, sedation/neuromuscular blockade, CVCs, surgery, sepsis, mechanical ventilation, vasopressor administration, heart failure, stroke, malignant neoplasms, previous VTE, and renal dialysis.[6] Most critically ill patients have 1 or more major risk factors.[3,4,6,7] Researchers in one study[8] examined the incidence of upper-extremity DVT in medical patients and reported that upper-extremity DVT accounted for 51% of the hospital-associated DVTs and that the use of CVCs was a major risk factor. A meta-analysis indicated that PICCs were associated with higher risk of DVT than CVCs in critically ill patients and patients with cancer.[9]

VTE Prophylaxis

1. VTE is a preventable adverse event, and multiple professional organizations recommend VTE prophylaxis for at-risk patients.[6,7,10-15]
2. A meta-analysis and 2 recent randomized controlled trials (RCTs) compared LDUH with LMWH for preventing VTE in critically care patients. The results demonstrated that both LDUH and LMWH prevent DVT, and the incidence of DVT did not differ significantly between LDUH and LMWH.[16-18] Data from an RCT and the meta-analysis, however, showed that LMWH is superior to LDUH in the prevention of pulmonary embolism.[17,18] In another meta-analysis comparing LDUH and LMWH in acutely ill medical patients, LMWH was superior to LDUH in preventing DVT but no difference was found in the incidence of pulmonary embolism.[19] Researchers in 2 other studies[20,21] compared rivaroxaban and apixaban with LMWH in acutely ill medical patients and concluded that the newer oral anticoagulants offered no benefit over LMWH.
3. Mechanical methods of prophylaxis (GCSs, IPCDs, and venous foot pumps [VFPs]) reduce the risk of VTE.[22-32] Mechanical prophylaxis methods are a desirable option because they do not pose bleeding concerns.[6] A meta-analysis was done to evaluate the effectiveness of GCSs for prevention of DVT in hospitalized medical-surgical patients, and the researchers concluded that GCSs decreased the incidence of DVT, particularly in general and orthopedic surgery patients.[22] Another meta-analysis compared the effectiveness of knee length and thigh length GCSs in hospitalized patients for DVT prevention; those researchers concluded that the evidence was insufficient to determine if one length was superior to another in reducing the incidence of DVT.[33] A systematic review was done to evaluate the efficacy of IPCDs and VFPs for DVT prevention in adult trauma patients, and the researchers reported that although both IPCDs and VFPs reduced the incidence of DVT, VFPs were more effective.[23] In a prospective cohort study,[26] researchers examined the association of IPCDs and GCSs and VTE prevention in critically ill medical-surgical patients and reported that IPCDs were associated with a significantly lower risk of VTE but GCSs were not. Current guidelines state that to be an effective method of prophylaxis, mechanical methods should be worn at all times.[8,15]
4. Evidence comparing mechanical prophylaxis with pharmacological prophylaxis for VTE prevention in critically ill patients is limited.[24] In an observational study, researchers reported that critically ill patients receiving pharmacological prophylaxis had a lower risk of death than did patients

receiving mechanical prophylaxis.[3] A combination of mechanical prophylaxis and pharmacological prophylaxis is thought to potentiate the overall efficacy of VTE prevention. In a meta-analysis done to evaluate VTE prophylaxis in trauma patients, researchers reported that patients who received both had a lower risk of DVT.[34] Results of another meta-analysis done to examine VTE prevention in hospitalized patients also indicated that pharmacological prophylaxis combined with IPC was more effective than IPC alone.[25] Results of recent RCTs in critically ill patients also suggest that combination therapy is superior to either pharmacological or mechanical prophylaxis alone.[24,29]

Interprofessional Assessment

1. Written guidelines,[35] continuing education,[36] daily rounds checklists,[37] and electronic alerts[38] for VTE prophylaxis increase compliance with prophylaxis measures.[39]

Increasing Mobility

1. Immobility is a strong risk factor for VTE in hospitalized medical patients,[1,6] surgical patients,[10] and critically ill patients.[5,6] Patients should be provided education on the risks of VTE and encouraged to ambulate or walk around as early as possible and as often as possible.[10,13] IPCDs may pose a trip or fall hazard. Patients should be instructed to call for assistance before ambulating to facilitate removal of the IPCDs.

Proper Use of Mechanical Prophylaxis

1. Adherence and appropriate application and management are ongoing concerns with mechanical methods of prophylaxis, as effectiveness depends on consistent and proper use. A meta-analysis indicated that 25% of surgical patients do not adhere to mechanical methods of prophylaxis.[32] Reasons reported for nonadherence include discomfort, disruption of sleep, noise, and failure of the nursing staff to implement the therapy properly.[32] Researchers in another observational study[40] reported that IPCDs were improperly applied 33% to 66% of the time.

Implementation/Organizational Support for Practice

1. Ensure that your practice related to VTE prevention is consistent and reflects current evidence.
2. Participate in your unit's organized process for developing and communicating patients' goals (which include VTE prophylaxis) to members of the interprofessional team.
3. Engage in competency assessment in the use of mechanical prophylaxis devices.
4. Review orders of patients discharged from the intensive care unit to ensure that transfer orders include a plan for VTE prophylaxis.
5. Participate in quality improvement initiatives involving an interprofessional team as necessary.

Need More Information or Help?

1. Contact a clinical practice specialist for additional information: go to www.aacn.org then select Practice Resource Network.
2. Antithrombotic Therapy for VTE Disease: CHEST Guideline and Expert Panel Report. *Chest.* 2016; 149(2):315-352. http://journal.publications.chestnet.org/article.aspx?preview=true&articleid=2479255. Accessed July 15, 2016.

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None reported.

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