



## DEEP VEIN THROMBOSIS PREVENTION

### Expected Practice:

- Assess all patients upon admission to the ICU for risk factors of deep vein thrombosis (DVT) and anticipate orders for DVT prophylaxis based on risk assessment. Clinical eligibility and regimens for DVT prophylaxis include:
  - Moderate-risk patients including medically ill and postoperative patients—on low dose unfractionated heparin or low-molecular-weight heparin (LMWH)
  - Higher risk patients including major trauma or orthopedic surgery—LMWH
  - Patients with high risk for bleeding—on mechanical prophylaxis including graduated compression stockings and/or intermittent pneumatic compression devices
  - Mechanical prophylaxis may also be anticipated in conjunction with anti-coagulant based prophylaxis regimens.
- Review daily with the physician and during multidisciplinary rounds each patient's current DVT risk factors including clinical status, necessity for central venous catheter (CVC), current status of DVT prophylaxis, risk for bleeding, and response to treatment.
- Maximize patient mobility whenever possible and take measures to reduce the amount of time the patient is immobile because of the effects of treatment (eg, pain, sedation, neuromuscular blockade, mechanical ventilation).
- Ensure that mechanical prophylaxis devices are fitted properly and in use at all times except when being removed for cleaning and/or inspection of skin.

### Supporting Evidence:

- Multiple medical and surgical risk factors leading to DVT formation have been identified.<sup>1</sup> Iatrogenic risk factors for DVT include immobilization, sedation/neuromuscular blockade, CVCs, surgery, sepsis, mechanical ventilation, vasopressor administration, heart failure, stroke, malignancy, previous DVT, and renal dialysis; a vast majority of patients in critical care units have 1 or more major risk factors.<sup>1-4</sup> In 5 prospective studies, the rate of DVT in patients in critical care not receiving prophylaxis ranged from 13% to 31%.<sup>5-8</sup> Because signs and symptoms of DVT are frequently silent and can lead to fatal pulmonary embolism, AHRQ (Agency for Healthcare Research and Quality) and ACCP (American College of Chest Physicians) recommend DVT prophylaxis for at-risk patients.<sup>1,9-17</sup>
- Randomized trials indicate that both low dose unfractionated heparin and LMWH are efficacious in preventing DVT in moderate-risk critical care patients.<sup>5-8, 18</sup> For patients at higher risk, such as those who have major trauma or have had orthopedic surgery, LMWH has been shown to provide superior protection over low dose unfractionated heparin.<sup>1</sup> Direct thrombin inhibitors can be used in place of low molecular weight heparin or unfractionated heparin for patients with documented or suspected heparin induced thrombocytopenia.<sup>1, 19,20</sup> Numerous studies suggest that aspirin alone is not an efficacious means of DVT prophylaxis for any patient group.<sup>21-25</sup>
- Although examined less rigorously than anticoagulant based methods, mechanical methods of prophylaxis (including graduated compression stockings, intermittent compression devices, and venous foot pumps) have been shown to reduce the risk of DVT.<sup>26-36</sup> One study involving non-lower extremity trauma patients compared the efficacy of intermittent pneumatic compression devices and venous foot pumps. DVT rates among the venous foot pump group were 3 times greater when compared with the rates of the intermittent pneumatic compression group. The researchers concluded that intermittent pneumatic compression devices provided superior prophylaxis in this patient population.<sup>34</sup>
- In general, mechanical prophylaxis is less efficacious when compared to anticoagulation based therapy.<sup>31-33, 35,36</sup> Reduction in risk of death or pulmonary embolism has not been attributed to mechanical methods of prophylaxis.<sup>1</sup> In 1 study involving below-the-knee graded stockings, 98% of commercially available stockings failed to produce an ideal pressure gradient and 54% were found to produce a dangerous reverse pressure gradient.<sup>37</sup> Mechanical prophylaxis methods are a desirable option because they do not pose bleeding concerns.<sup>1</sup> A combination of mechanical prophylaxis and chemoprophylaxis is thought to potentiate overall efficacy but this combination has not been tested in the critical care setting.<sup>38</sup>

- Written policies for DVT prophylaxis in conjunction with either preprinted or computerized ICU admission orders have been shown to increase compliance with prophylaxis measures.<sup>39</sup> One study found that implementation of a daily goals form, which included DVT prophylaxis in the ICU, resulted in a significant improvement in the percentage of residents and nurses who understood the patient's daily goals for care and decreased ICU length of stay by 1.1 days.<sup>40</sup>
- The presence of a CVC is an independent risk factor for upper extremity DVT in the general population.<sup>41</sup>
- Several studies involving a variety of patient populations with diagnostically confirmed DVT have identified immobility either as a comorbidity or independent risk factor.<sup>42-44</sup>
- Improperly fitted graduated compression stockings producing a reversed pressure gradient were associated with a statistically significantly higher incidence of DVT compared with stockings that produced a proper gradient.<sup>35</sup> Studies evaluating compliance with intermittent pneumatic compression devices demonstrated rates of non-compliance ranging from 22% to 81% in at-risk patients.<sup>37,45-46</sup>

### What You Should Do:

- Ensure that your unit has a written policy for DVT prophylaxis that is updated regularly to reflect emerging evidentiary findings in addition to preprinted or computerized ICU admission orders.
- Ensure that your unit has an organized process for developing and communicating patient goals (which include DVT prophylaxis) to members of the multidisciplinary team.
- Establish a process to educate and routinely evaluate all staff in the use of mechanical prophylaxis devices.
- Review orders of patients discharged from the ICU to ensure that transfer orders include a plan for DVT prophylaxis.
- Monitor your unit's compliance with DVT prophylaxis policies and rates of DVT and pulmonary embolism. Initiate quality improvement initiatives involving a multidisciplinary team as necessary.

### Need More Information or Help?

- Talk with a clinical practice specialist for additional information / assistance at [www.aacn.org](http://www.aacn.org) then select PRN.

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