13
CHAPTER

VENOUS THROMBOEMBOLISM TREATMENT

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INTRODUCTION

Venous thromboembolism (VTE) is comprised of deep vein thrombosis (DVT) and pulmonary embolism (PE) and affects between 350,000–600,000 patients each year. In addition, it has been estimated that up to 100,000 patients directly or indirectly die of this disease process annually.[1] Optimal treatment of VTE is critical to prevent death and future recurrence as well as minimize the risk of complications such as post-thrombotic syndrome (PTS) and chronic thromboembolic pulmonary hypertension (CTEPH).

VENOUS THROMBOEMBOLISM OVERVIEW

DVT, in the lower extremity, typically begins in a calf vein and can propagate proximally to the popliteal vein and higher. Lower extremity DVT is 10 times more common than upper extremity DVT. In the upper extremity, DVT typically has an iatrogenic cause such as internal cardiac defibrillators, pacemakers, or in-dwelling central venous catheters (e.g., peripherally inserted central catheter [PICC] line). For DVT of the upper extremity, the risk increases with the diameter of inserted catheters and number of lumens used.

PE occurs when a DVT embolizes to the lungs (see **Figure 13-1**). Patients with signs and symptoms of shock, elevated cardiac biomarkers, and signs of right ventricular (RV) dysfunction are classified as having massive PE. Massive PE accounts for 5–10% of all PE cases and indicates extensive thrombus affecting over half of the pulmonary vascular tree. Classic symptoms include syncope, hypotension, dyspnea, and cyanosis. Patients with massive PE often present in shock and can die. Patients who have cardiac manifestations (e.g., RV dysfunction, release of cardiac enzymes) but who are hemodynamically stable are classified as having submassive PE, which represents 20–25% of all PE cases. The remaining 70–75% of patients with PE are classified as having nonmassive PE and have a good prognosis for recovery.

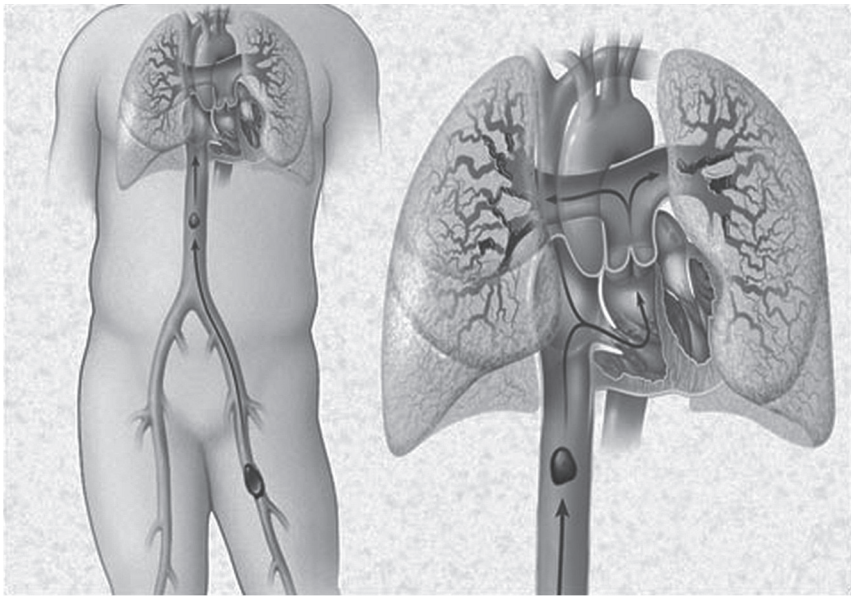

FIGURE 13-1. **Pathophysiology of DVT and PE**

Pulmonary emboli usually originate in the deep veins of the leg. The thrombus typically originates around the venous valves and other areas of stasis. Thrombi that extend above the knee or originate above the knee are at a higher risk of embolization. Pulmonary emboli travel through the venous system, into the right side of the heart, to the lungs.

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Common Areas for Venous Thrombosis[2]

- Lower extremity DVT.
- Lower extremity superficial vein thrombosis.
- Upper extremity DVT (UEDVT) represents approximately 10% of all DVT cases.

See **Tables 13-1** and **13-2** for veins found in the upper and lower extremities.

See **Figure 13-2** of lower extremity venous anatomy.