



# Deep Vein Thrombosis in the Patient With Cancer

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## Case Study

Ms. L, age 76, was diagnosed in January 1998 with locally advanced (III-B) breast cancer that was estrogen/progesterone receptor negative and positive for the HER2/*neu* oncogene. After undergoing a left mastectomy, she received adjuvant chemotherapy with doxorubicin and cyclophosphamide. In 1999, disease recurrence on the chest wall was treated with paclitaxel and trastuzumab, followed by palliative radiation therapy to the chest wall. A left partial acromioplasty was performed in February 2000 to manage extension of the disease from the chest wall. The patient then remained stable until this morning when she awoke with chills and a fever of 102° F. She reported that she had experienced progressive shortness of breath over the past week, which increased dramatically over the past two days to the point where she is dyspneic at rest. She has no cough and says that she stays in bed or on the sofa all day.

Physical examination reveals an awake, alert, anxious, slightly confused patient short of breath at rest. Her vital signs are: temperature = 101.6° F; pulse = 120/minute and regular; respiratory rate = 30/minute; and blood pressure = 190/95 mm/Hg. Her oxygen saturation is 86% on room air and 92% on two liters of oxygen per nasal cannula. She has decreased breath sounds at the right base. Her abdomen is soft and nontender with normoactive bowel sounds. Pitting edema (grade 2 out of 4) is evident bilaterally in both ankles and to the knee on the right. The right leg also is pink and warm to the touch. She has grade 2 (out of 4) pulses in both upper and lower extremities. No cyanosis or clubbing of the fingers or toes exists. Ms. L's current medications include levothyroxine sodium, dexamethasone, clorazepate dipotassium, and ranitidine

hydrochloride. The results of the diagnostic studies follow.

- White blood count 2,600/mm<sup>3</sup>
  - Hemoglobin 7.5 g/dL
  - Platelets 117,000/mm<sup>3</sup>
  - Blood urea nitrogen 10 mg/dL
  - Creatinine 0.5 mg/dL
  - Prothrombin time 10 seconds
  - International normalized ratio (INR) 0.97 (normal value 0)
  - Activated partial thromboplastin time 41.9 seconds
  - D-dimer assay > 1,000 ng/ml (normal range 0.00–500.00)
  - Venous doppler (also called a duplex scan): Positive for bilateral deep vein thrombosis (DVT)
  - Ventilation/perfusion lung scan: Indeterminate
  - Chest x-ray: Consolidation at the right apex
- Cultures of blood, urine, and sputum are pending. A gram stain reveals rare gram-negative rods. A diagnosis of bilateral DVT is made, and therapy is initiated.

Thromboembolic disease includes superficial and DVT, pulmonary emboli, thrombosis of venous access devices, and arterial thrombosis and embolism. This disease affects 15% of all patients with cancer and is the second leading cause of death in hospitalized patients with cancer (Haire, 2000; Letai & Kuter, 1999). If the cancer is diagnosed at the same time or within one year of the thromboembolic event, it tends to be at a more advanced stage and the prognosis is considered poor (Sorensen, Mellemkjaer, Olsen, & Baron, 2000).

1. Lower extremity DVT is the most common manifestation of thromboembolic disease. Which of the following is a persistent risk factor for development of lower extremity DVT in Ms. L?
  - A. Prior surgery
  - B. Immobility

- C. Prior chemotherapy treatment
  - D. Her underlying tumor
2. Based on knowledge of the treatment of choice in the initial management of acute DVT, the nurse prepares to teach Ms. L about which of the following treatments?
    - A. Fibrinolytics
    - B. Unfractionated heparin (UFH)
    - C. Low molecular weight heparin (LMWH)
    - D. Vena cava interruption
  3. On day six, Ms. L's platelet count fell to 43,000/mm<sup>3</sup>. Which complication of anticoagulation administration should the nurse suspect?
    - A. Thrombotic thrombocytopenic purpura
    - B. Heparin-induced thrombocytopenia with thrombosis (HITT)
    - C. Heparin allergy
    - D. Heparin rebound

## Discussion

**Question 1: The correct response is choice D.** Inherited or acquired abnormalities of the hematopoietic system and cancer are considered to be persistent risk factors for the development of thromboembolic disease (Alatri, Carnovali, & Prandoni, 2000). For this reason, treatment recommendations for patients with cancer include continuing DVT treatment until no evidence of the disease exists and not limiting treatment to 6–24 weeks for a first DVT as is recommended for patients with nonmalignant disease (Bauer, 2000).

Cancer and its treatment can affect all three arms of Virchow's triad, which include

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