Chemotherapy-Induced Cardiomyopathy

Case Study

Mrs. H is 67 years old, obese, and hypertensive and has been diagnosed with infiltrating ductal carcinoma of the right breast. She had a modified radical mastectomy, and pathology revealed a poorly differentiated 2.8 cm tumor that was estrogen- and progesterone-receptor negative and HER2 positive. Two axillary lymph nodes were positive for malignant cells. A baseline blood pool multiparametered acquisition scan (MUGA) obtained prior to commencing chemotherapy with doxorubicin and cyclophosphamide demonstrated a left ventricular ejection fraction (LVEF) of 67%. After completion of four cycles of chemotherapy, Mrs. H had a short, disease-free interval but subsequently developed metastatic disease. She will begin a course of paclitaxel (Taxol®, Bristol-Myers Squibb, Princeton, NJ) and trastuzumab (Herceptin®, Genentech, Inc., South San Francisco, CA). You are concerned about her risk for developing cardiomyopathy.

Clinical Problem Solving

Responding to this clinical challenge are Julia Smith, RN, MSN, APRN, AOCN®, former faculty member of the Yale University School of Nursing in the Adult Advanced Practice Nurse Program, Oncology Specialty Track, in New Haven, CT, and Jessica Shank Covello, RN, MSN, APRN, a lecturer at the Yale University School of Nursing in the Adult Advanced Practice Nurse Program, Acute Care Track, and an adult nurse practitioner at the Connecticut Heart Group in New Haven.

What are the prevention and surveillance strategies?

Cardioprotective strategies and surveillance protocols should be developed for patients undergoing treatment with trastuzumab. Although cardiotoxic effects of cancer treatment occur infrequently, early detection of trastuzumab toxicity requires cardiac monitoring that is similar to that of anthracycline-treated patients. Unfortunately, no proven strategies are available and the approaches used in clinical trials are varied. Concurrent administration of trastuzumab and an anthracycline is not recommended because the highest rates of cardiac dysfunction are found with combination therapy (McKeage & Perry, 2002; Seidman et al., 2002). The use of liposome-encapsulated doxorubicin has been proposed as a means to minimize trastuzumab toxicity, but reduction in rates of cardiotoxicity have not been demonstrated.

In contrast to anthracyclines, trastuzumab toxicity does not appear to be dose related. For patients beginning trastuzumab therapy, a baseline assessment of cardiac function by physical examination and LVEF with MUGA is warranted. However, MUGA does not identify early evidence of cardiac dysfunction. Echocardiography is being compared to MUGA to determine whether it may be more sensitive (Seidman et al., 2002). Nuclear medicine scintigraphy and endomyocardial biopsy can identify early damage but are neither feasible nor economical. Clinical trials...

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