

Breast Cancer: Review Questions

A. Ruggeri, MD

Lajos Pusztai, MD, PhD

QUESTIONS

Choose the single best answer for each question.

- 1. A 45-year-old woman sees her primary care physician (PCP) because of a 1-cm palpable mass in her left breast. Mammography confirms the presence of a suspicious density in the upper outer quadrant, and core needle biopsy shows ductal carcinoma in situ. Which of the following management approaches is optimal for this patient?**
 - A) Perform lumpectomy only
 - B) Perform lumpectomy and administer tamoxifen for 5 years
 - C) Perform lumpectomy, followed by radiation therapy, and consider administration of tamoxifen for 5 years
 - D) Perform lumpectomy, followed by radiation therapy and chemotherapy, and consider administration of tamoxifen for 5 years
 - E) Perform mammography every 6 months
- 2. A 52-year-old woman notices a mass in her left breast during a breast self-examination. Mammography shows a spiculated lesion corresponding to the palpable mass, and diagnostic core needle biopsy reveals infiltrating ductal carcinoma (IDC). Results of staging work-up, including bone scan, chest radiography, and computed tomography of the abdomen are negative for metastatic disease. She undergoes lumpectomy with axillary lymph node dissection. Pathology results show a 3.5-cm, poorly differentiated, estrogen- and progesterone-receptor-positive IDC. Resection margins are clear; all 12 lymph nodes are negative for metastatic cancer. Which of the following should be included in further treatment of this patient?**
 - A) Close follow-up with mammography, chest radiography, complete blood count, and tumor marker analysis every 6 months
 - B) Administration of tamoxifen alone
 - C) Administration of tamoxifen and radiation therapy
 - D) Administration of tamoxifen and anthracycline-based chemotherapy
 - E) Administration of tamoxifen, anthracycline-based chemotherapy, and radiation therapy
- 3. A 58-year-old woman with a history of invasive breast cancer is currently taking tamoxifen 20 mg daily as adjuvant hormonal therapy. Which of the following is a potential adverse effect of her treatment?**
 - A) Acute leukemia
 - B) Congestive heart failure
 - C) Coronary artery disease
 - D) Deep venous thrombosis
 - E) Hand and foot erythema and pain
- 4. A 66-year-old woman with breast cancer that has metastasized to the bone visits her PCP. Her oncologist has recommended hormonal therapy with an aromatase inhibitor (eg, letrozole, anastrozole, exemestane) and intravenous infusions of pamidronate 90 mg every 3 weeks. Which of the following benefits can she expect from her bisphosphonate therapy?**
 - A) Potentiation of the anticancer activity of letrozole
 - B) Prolongation of her life
 - C) Reduced risk for bony complications from her cancer
 - D) Shrinkage of her cancer
- 5. A 28-year-old woman with breast cancer has a strong history of sarcoma and leukemia cancers in relatives on the maternal side of her family. Which of the following is most likely the genetic abnormality carried in her family?**
 - A) *BRCA1*
 - B) *BRCA2*
 - C) Cowden *MMAC/PTEN*
 - D) *HNPCC*
 - E) *TP53*

(turn page for answers)

Dr. Ruggeri is a Clinical Specialist in Medical Oncology, and Dr. Pusztai is an Assistant Professor of Medicine, Department of Breast Medical Oncology, The University of Texas M.D. Anderson Cancer Center, Houston, TX.

EXPLANATIONS OF ANSWERS

- 1. (C) Perform lumpectomy, followed by radiation therapy, and consider administration of tamoxifen for 5 years.** Ductal carcinoma in situ (DCIS) is considered a premalignant lesion that may progress to invasive breast cancer over the course of several years. It is necessary to remove DCIS with clear surgical margins. Approximately half of the local recurrences are invasive cancer, whereas the remaining ones are DCIS. If lumpectomy is performed, postoperative radiation also is necessary to further reduce risk for local recurrence in most women. Tamoxifen therapy following lumpectomy and radiation therapy further reduces the risk of invasive or noninvasive recurrence by as much as 50%, compared with no tamoxifen therapy. However, the absolute benefit from this hormonal treatment is small. In the National Surgical Adjuvant Breast Project (NSABP) protocol B-24 study, a large randomized trial of 1804 women with DCIS, the cumulative incidence of invasive breast cancer recurrence at 5 years was 4.1% in the tamoxifen-treated group, compared with 7.2% in the placebo group. The overall survival was not different between the 2 groups.¹
- 2. (E) Administration of tamoxifen, anthracycline-based chemotherapy, and radiation therapy.** Radiation therapy must be performed in conjunction with breast-conserving surgery (eg, lumpectomy) to reduce local and regional recurrences, unless there are contraindications for radiation therapy. The NSABP protocol B-06 study has shown that postoperative radiation therapy reduces the risk for locoregional recurrence from 35% to 10% in patients who undergo lumpectomy and axillary node dissection.² Systemic adjuvant therapy also is indicated for most invasive breast cancers greater than 1 cm in size. Adjuvant hormonal therapy with 5 years of tamoxifen therapy reduces the odds of recurrence of breast cancer by as much as 50%,³ and chemotherapy reduces the risk by as much as 30%.⁴ The benefit from these 2 systemic treatment modalities is additive. The most optimal therapy for the case patient should include all 3 treatment modalities.
- 3. (D) Deep venous thrombosis.** Treatment with tamoxifen leads to an increased risk for thromboembolic events, including stroke, pulmonary embolism, and deep venous thrombosis, as well as endometrial cancer because of its partial estrogenic activity.³ Heart failure is associated with trastuzumab and anthracy-

cline (eg, doxorubicin) treatment. Acute leukemia and myelodysplastic syndrome is associated with alkylating agents (cyclophosphamide) and type II topoisomerase inhibitors (including anthracyclines). Radiation of the left chest wall also increases the risk of coronary artery disease. Hand and foot erythema with or without pain is a frequent acute adverse effect of capecitabine (5-fluorouracil) therapy.

- 4. (C) Reduced risk for bony complications from her cancer.** The bisphosphonate pamidronate (or zoledronate) is indicated for patients with lytic bone metastasis from breast cancer (or myeloma) to delay the development of skeletal related adverse events, including fractures and radiation of pain or vertebral collapse.⁵ Bisphosphonates have not yet been shown to prolong the life of patients with cancer. Objective tumor response to chemotherapy or hormonal therapy (ie, shrinkage of a cancer) is not improved by administration of pamidronate.
- 5. (E) TP53. BRCA1 and BRCA2** are associated with breast and ovarian tumors. *HNPCC* gene alterations are associated with colorectal cancer. Cowden disease is associated with breast cancer but is not associated with sarcomas or leukemias. Li-Fraumeni syndrome is caused by mutations in the gene for tumor protein p53 and is associated with leukemias, lymphomas, sarcomas, and breast cancer.⁶

REFERENCES

1. Fisher B, Dignam J, Wolmark N, et al. Tamoxifen in treatment of intraductal breast cancer: National Surgical Adjuvant Breast and Bowel Project B-24 randomised controlled trial. *Lancet* 1999;353:1993–2000.
2. Fisher B, Anderson S, Redmond CK, et al. Reanalysis and results after 12 years of follow-up in a randomized clinical trial comparing total mastectomy with lumpectomy with or without irradiation in the treatment of breast cancer. *N Engl J Med* 1995;333:1456–61.
3. Tamoxifen for early breast cancer: an overview of the randomised trials. Early Breast Cancer Trialists' Collaborative Group. *Lancet* 1998;351:1451–67.
4. Polychemotherapy for early breast cancer: an overview of the randomised trials. Early Breast Cancer Trialists' Collaborative Group. *Lancet* 1998;352:930–42.
5. Theriault RL, Lipton A, Hortobagyi GN, et al. Pamidronate reduces skeletal morbidity in women with advanced breast cancer and lytic bone lesions: a randomized, placebo-controlled trial. Protocol 18 Aredia Breast Cancer Study Group. *J Clin Oncol* 1999;17:846–54.
6. Lindblom A. Familial breast cancer and genes involved in breast carcinogenesis. *Breast Cancer Res Treat* 1995;34:171–83.