

Neoadjuvant Therapy versus Adjuvant Therapy

I. INTRODUCTION

The following concerns study design in oncology clinical trials on solid tumors, as well as treatment of patients with solid tumors outside of the trial setting. Neoadjuvant therapy, also called induction therapy, refers to chemotherapy or radiation that is administered *before* surgical removal of tumors. Adjuvant therapy refers to chemotherapy or radiation that is administered *after* surgical removal of tumors.

Neoadjuvant therapy (1) and adjuvant therapy are less often issues for non-solid tumors, that is, for the hematological malignancies. (The hematological malignancies include the leukemias and myelodysplastic syndromes.) When the term “adjuvant” occurs in articles on the hematological malignancies, it is almost always the case that it refers to the following unfortunate adverse event. This adverse event is that where previous adjuvant therapy for a solid tumor has the consequence of causing leukemia or myelodysplastic syndrome. This effect is documented in the cited references (2,3,4,5,6,7,8).

Chemotherapy and radiation therapy can take various forms. These forms include single-agent therapy, combination therapy, and sequential treatment (9). Sequential chemotherapy allows each of two different drugs to be administered separately at

¹ In a search in *Journal of Clinical Oncology* (2000 to 2011), 1612 articles contained the term “neoadjuvant.” But of these, zero articles contained the term, in the title/abstract, “acute lymphoblastic,” “acute myeloid,” “chronic lymphocytic,” or “chronic lymphoblastic.” (Search conducted March 22, 2011.)

² Flaig TW, Tangen CM, Hussain MH, et al. Randomization reveals unexpected acute leukemias in Southwest Oncology Group prostate cancer trial. *J Clin Oncol.* 2008;26:1532–1536.

³ Le Deley MC, Suzan F, Cutuli B, et al. Anthracyclines, mitoxantrone, radiotherapy, and granulocyte colony-stimulating factor: risk factors for leukemia and myelodysplastic syndrome after breast cancer. *J Clin Oncol.* 2007;25:292–300.

⁴ Beaumont M, Sanz M, Carli PM, et al. Therapy-related acute promyelocytic leukemia. *J Clin Oncol.* 2003;21:2123–2137.

⁵ Praga C, Bergh J, Bliss J, et al. Risk of acute myeloid leukemia and myelodysplastic syndrome in trials of adjuvant epirubicin for early breast cancer: correlation with doses of epirubicin and cyclophosphamide. *J Clin Oncol.* 2005;23:4179–4191.

⁶ Crump M, Tu D, Shepherd L, et al. Risk of acute leukemia following epirubicin-based adjuvant chemotherapy: a report from the National Cancer Institute of Canada Clinical Trials Group. *J Clin Oncol.* 2003;21:3066–3071.

⁷ Chaplain G, Milan C, Sgro C, Carli PM, Bonithon-Kopp C. Increased risk of acute leukemia after adjuvant chemotherapy for breast cancer: a population-based study. *J Clin Oncol.* 2000;18:2836–2842.

⁸ Patt DA, Duan Z, Fang S, Hortobagyi GN, Giordano SH. Acute myeloid leukemia after adjuvant breast cancer therapy in older women: understanding risk. *J Clin Oncol.* 2007;25:3871–3876.

⁹ Buzdar AU. Preoperative chemotherapy treatment of breast cancer – a review. *Cancer.* 2007;110:2394–2407.