

# Cardiovascular Toxicity Associated With Cancer Treatment

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Cardiotoxicity is a well-described and potentially lethal side effect of certain chemotherapeutic agents. Cardiotoxicity is a broad term used to depict conditions ranging from benign forms of arrhythmias to potentially fatal conditions, such as myocardial ischemia or infarction and heart failure. Anthracyclines (daunorubicin, doxorubicin, and epirubicin), mitomycin, and monoclonal antibodies such as trastuzumab have been associated with cardiotoxicities, but other chemotherapeutic agents, such as fluorouracil, cyclophosphamide, interferons, and interleukin-2 and other targeted agents, also can cause this side effect. Although several theories exist about the process that leads to cardiotoxicity from some chemotherapeutic agents, the exact mechanism of action is unknown. Oncology nurses should know the agents associated with cardiotoxicity, including newer targeted therapy drugs. Knowledge of the potential mechanism of action, as well as the possible reversibility of cardiotoxicity with specific agents, is important.

**S**pecific chemotherapy treatments have long been associated with cardiovascular toxicity in patients who receive the agents and oncology nurses are familiar with many of them (Yeh et al., 2004). Additional risk factors can place patients at an increased threat for toxicity, including the cumulative effects of multiple chemotherapeutic agents that increase toxicity risk as well as existing medical conditions that can predispose a patient to cardiovascular damage. Cancer occurs more frequently in older adults and, because cardiac disease is more prevalent in this population, cardiotoxicity associated with cancer therapies are an increased concern (Chanan-Khan, Srinivasan, & Czuczman, 2004). In addition, many patients now have a prolonged survival or life expectancy after cancer therapy and clinicians should view cardiovascular toxicity as a long-term side effect (Meinardi et al., 2000). Serious long-term cardiotoxic effects, such as congestive heart failure (CHF), have been noted with several specific types of cancer after therapy, including breast and testicular. According to Pinder, Duan, Goodwin, Hortobagyi, and Giordano (2007), women aged 66–70 years who received anthracyclines in the adjuvant setting, presented with significantly higher incidences of CHF over 10 years of follow-up. Therefore, decisions regarding initial adjuvant therapies should take into account potential long-term cardiotoxic effects of the treatment (Partridge, Burstein, & Winer, 2001).

Patients present in many different ways with cardiovascular effects associated with the various agents used in cancer treatment. Some of the effects include myocardial infarction, myocarditis or pericarditis, cardiomyopathy, arrhythmias or changes in cardiac conduction, hypertension, and changes in electrocardiographic readings (Chanan-Khan et al., 2004).

## At a Glance

- ◆ Although cardiotoxicity is a well-known side effect of specific traditional chemotherapy agents, some newer targeted therapy agents can produce cardiotoxic effects as well.
- ◆ Laboratory tests, such as electrolytes, blood counts, liver, thyroid, and B-type natriuretic peptide assay, are used to determine heart failure in patients on specific chemotherapy treatments.
- ◆ Oncology nurses should be aware of the various risks for heart failure in patients with cancer and assess and monitor for early signs and symptoms of toxicity.

Changes can be acute or chronic and may appear years after therapy is completed (Chanan-Khan et al.).

Oncology nurses should increase their awareness of the cardiac toxicities that are associated with standard chemotherapeutic

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