The Phenomenon of Chemo Brain

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During and following chemotherapy, some patients experience difficulties with memory, attention, and other aspects of cognitive function. This constellation of deficits commonly is referred to as chemo brain. Although the phenomenon is not understood completely, it is assuming greater significance as cancer survival improves. Return to prediagnosis levels of domestic, employment, and academic activity is expected in most survivors. Advances in basic, imaging, and clinical sciences are beginning to unravel pathophysiologic mechanisms and develop neuroprotective strategies. Pharmacologic options are borrowed from diverse diseases, including attention-deficit/hyperactivity disorder and neurodegenerative diseases. Conventional therapies soon may find new applications; for example, recent preclinical data suggest that erythropoietin may have some neuroprotective abilities, which may positively affect patients experiencing chemo brain. A collaborative model is bringing together international specialists interested in unraveling the mysteries of the phenomenon and developing management strategies to attenuate its effects. This article will review the clinical features of chemo brain as well as a working hypothesis regarding pathophysiology. The potential and emerging interventions that can be used by oncology nurses to assist patients and their families to cope with this enigmatic dysfunction will be discussed.

As newer and more aggressive cancer therapies improve survival, issues relating to quality of life are becoming more prominent. One adverse effect of cancer treatment often not discussed between patient and provider is chemo brain, a constellation of cognitive deficits experienced by some individuals during and following chemotherapy. The purpose of this article is to define and review what is known about chemo brain and to offer suggestions to patients and professionals for managing this poorly understood phenomenon. The discussion that follows excludes disorders of thinking documented in the pediatric oncology population and the cognitive changes experienced by individuals with central nervous system (CNS) involvement and their treatments.

What Is Chemo Brain?

This cognitive deficit is referred to by a variety of terms (see Figure 1), but the most frequently used is chemo brain. It presents as weakened cognitive abilities, speed of information processing or reaction time, and organizational skills. Specific elements of thinking or cognitive function that can be affected negatively include language ability, memory, concentration, and attention. Executive function (which refers to hindsight, foresight, and judgment) also can be impacted. The clinical features of chemo brain, alone or in combination, can become a serious detriment to multitasking, create stress, and weaken performance when patients are challenged by high-level cognitive demands, including acquiring new skills (Ahles et al., 2002; Coyne & Leslie, 2004; Glaspy, 2002; Olin, 2001; O'Shaughnessy, 2003; Paraska & Bender, 2003; Parker-Pope, 2004; Saykin, Ahles, & McDonald, 2003).

Cognitive dysfunction has been reported in as many as 50% of women undergoing chemotherapy for breast cancer (Paraska & Bender, 2003). Severity has been described as mild to moderate (Foreman, 2003), with most deficits being subtle (Parker-Pope, 2004). High-functioning individuals may possess a heightened awareness of the deficits (Coyne & Leslie, 2004), leading to greater difficulties coping with this side effect. In a small minority of patients, chemo brain still is perceptible 10 years after treatment (Ahles et al., 2002; O'Shaughnessy, 2003; Saykin et al., 2003; Schagen et al., 2002; van Dam et al., 1998). Although the effect is believed to diminish with time, whether a patient returns to pretreatment levels of function is unknown (Breastcancer.org, 2002; Parker-Pope). Consensus exists that chemo brain has a potentially profound psychological impact on those affected by it.

To date, most studies have been conducted with female patients with breast cancer. Likely, this population has been researched because it represents the largest cancer survivorship group (Ganz et al., 2002). The age of patients during treatment laces them at life milestones where deficits are readily observable and potentially debilitating. Chemo brain also has been described in men and women with hematologic malignancies (Saykin et al., 2003) and in the testicular cancer population (Phillips &

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