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Cognition effects of chemotherapy

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Introduction

Very little scientific literature addresses the effects of chemotherapy on cognitive function. Given the increasing use of adjuvant chemotherapy for breast cancer, it is important to establish whether individual complaints of altered cognition are part of a pattern attributable to chemotherapy, or are subjective, mood-related, and/or sporadic. Perhaps even more important is to determine whether any impairment persists long after the usually described side effects have resolved, particularly for potentially curative regimens after which patients may live for many years with long term sequelae.

Aims

To test the hypothesis that cognition is impaired by standard dose adjuvant chemotherapy regimens given for early breast cancer.

Comments

This study supports the anecdotal reports with which all clinicians are familiar, that chemotherapy can, at least temporarily, impair one's mental aptitude. More research in this area is warranted, especially given the expanding indications for chemotherapy to populations with ever diminishing risk of breast cancer recurrence. Whether cognitive impairment is a justifiable risk in view of the curative potential of adjuvant chemotherapy is a value judgement. However, one cannot properly weigh the relative value until its associated risk is adequately quantified and compared with the absolute expected benefit of the therapy.

Methods

This study compared the cognitive function of three groups: 31 women with early breast cancer undergoing chemotherapy, 40 women with early breast cancer who completed chemotherapy at least one year earlier, and 36 healthy women with no chemotherapy exposure. A validated, highly accurate cognitive assessment tool (High Sensitivity Cognitive Screen [HSCS]), which tests six cognitive domains (memory, language, visual-motor, spatial, attention and concentration, self-regulation and planning) was used. The Profile of Mood States (POMS) questionnaire was used to control for the well known effects on cognition of depression and anxiety, which could account for some of the observed differences among patients receiving chemotherapy for cancer. Age, educational level and menopausal status were also controlled for. The global score and individual domain scores of the HSCS were compared for statistical differences between the three groups.

Results

Significant differences were observed in global score ($P = 0.009$) and in memory ($P = 0.024$) and language ($P = 0.033$) domains for women undergoing chemotherapy compared with healthy volunteers, suggesting that chemotherapy can acutely alter cognitive skills. Compared with the healthy volunteers, women who had completed chemotherapy at least one year prior had significantly different scores for language ($P = 0.047$) and visual-motor skills ($P = 0.024$) domains, suggesting the possibility of long term effects. POMS scores were not significantly different across the three groups, and along with age, menopausal status and education level, did not account for these cognitive differences. Significantly more patients in the ongoing (48%) and prior (50%) chemotherapy groups had scores consistent with moderate or severe cognitive impairment than in the control group (11%).

Discussion

In addition to well recognised side effects of chemotherapy, many patients report symptoms such as blurred vision, and concentration and memory difficulties, which can be difficult to quantify in daily clinical practice. This small study supports the sparse literature and anecdotal reports of negative cognitive effects of adjuvant chemotherapy for breast cancer. Furthermore there is the suggestion that some of these effects may be long lasting. A better global understanding of the effects of chemotherapy requires complimentary longitudinal comparisons of cognitive function among individuals before, during and some time after chemotherapy. More research into this area is clearly warranted, particularly if some cognitive changes are permanent or long lasting. Based on the literature available, it seems that we should be adding 'impaired cognition' to the list of potential side effects that a patient receiving adjuvant chemotherapy might expect.

References

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