Are Hot Flashes Associated with Cognitive Impairments in Breast Cancer Patients?

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INTRODUCTION

Many breast cancer patients also complain of hot flashes. They suffer from hot flashes, which are often asymptomatic after a meal and hot flashes appear when glucose levels decline (Simpkins & Katosh, 1989). Preliminary data from animal models also provide some support for this hypothesis (Katosh & Simpkins, 1990; Simpkins & Katosh, 1990). Indeed, induced hypoglycemia results in a consistent flushing response in rats. A large proportion of women treated for breast cancer suffer from hot flashes. Many of these patients also complain of attention and memory difficulties.

STUDY GOALS

This cross-sectional study aimed to assess the relationship between hot flashes and cognitive impairments in breast cancer patients, who experience an abrupt menopausal transition following the administration of systemic oncological treatments.

METHODS

Participants

Fifty-six women with breast cancer participated in this study. Patients were recruited from a larger longitudinal study or solicited at the radio-oncology department of Hôtel-Dieu de Québec (CHU de Québec).

Inclusion criteria

• Between 30 and 70 years of age
• Having received a first diagnosis of non-metastatic breast cancer
• Having completed in the past four months a treatment protocol combining surgery, chemotherapy and radiotherapy
• Having been receiving hormone therapy for a minimum of five weeks

Exclusion criteria

• A diagnosis of sleep disorder other than insomnia
• Having received neoadjuvant chemotherapy for breast cancer
• Having a score ≤24 on the Mini-Mental State Examination
• Having any medical, neurological or psychological disorder that is known to significantly alter sleep

Procedure and Measures

Participants completed a 24h home-based recording of hot flashes using sternal skin conductance level (SCL) measurement. A hot flash was automatically coded using an increase in SCL of at least 1.2 micro siemens (µmho) within a 30-second period after the criteria (Savard et al., submitted).

Participants were instructed to use an event marker located on the device each time they felt a hot flash was beginning, even during nighttime.

RESULTS

Relationship between objectively-recorded hot flashes and cognitive functioning

<table>
<thead>
<tr>
<th>Hot flash variable</th>
<th>Neuropsychological domains</th>
<th>Subjective assessment of cognitive functioning</th>
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</thead>
<tbody>
<tr>
<td>Objective hot flashes (n = 42)</td>
<td>Spontaneous Memory</td>
<td>Attention and Speed Processing</td>
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<td></td>
<td><strong>True positives</strong></td>
<td><strong>False positives</strong></td>
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*p < .01

Lower executive functioning scores on the neuropsychological assessment were associated with more frequent objectively-assessed nocturnal hot flashes (r = -.37, p < .005).

Relationship between subjective hot flashes and cognitive functioning

<table>
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<td>Subjective hot flashes</td>
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<td></td>
<td><strong>True positives</strong></td>
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*p < .05

Lower executive functioning scores on the neuropsychological assessment were associated with more frequent self-perceived nocturnal hot flashes (r = -.36, p = .019).

Lower attention and speed processing scores were associated with more false positive diurnal hot flashes (r = -.38, p = .021).

CONCLUSION

Breast cancer patients appear to show decreased executive functioning scores following a night characterized by more frequent objective and self-perceived hot flashes.

These relationships appear to be independent of subjective sleep quality. However, objective sleep quality (i.e., polysomnography) should be included as a potential covariate in future analyses.

Participants who showed worse attention and speed processing scores, also reported more subjective diurnal hot flashes following adjuvant treatments among younger patients, may have obscured the results.

All relationships remained significant only among older participants. Other potential covariates, such as induced menopause, may be investigated following adjuvant treatments among younger participants, may have obscured the results.

RESEARCH AND CLINICAL IMPLICATIONS

These preliminary data support the hypothesis of a relationship between hot flashes and cognitive impairments among breast cancer patients.

We found that women with more nocturnal hot flashes tend to have worse cognitive functioning. However, it is still unclear whether increased hot flashes are an indicator of a counter-regulatory mechanism allowing glucose delivery to the brain, as has been previously hypothesized (Dormire, 2003, 2009).

Further studies are clearly needed in order to replicate these findings. In particular, studies measuring the occurrence of hot flashes in addition to glucose levels during a cognitive task would be helpful to better understand the relationship between hot flashes and cognitive functioning.

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Statistical Analyses

Creation of domains: To decrease the number of type I errors, result obtained on neuropsychological tests were transformed into z-scores and averaged to create three cognitive domains: (A) episodic memory, (B) attention/speed processing, and (C) executive functioning.

The relationship between hot flashes and cognitive functioning was examined using Pearson correlation analyses.

The same analyses were performed taking into account age (young vs. old) and subjective sleep quality (Insomnia Severity Index <8 or ≥8).

All relationships remained significant after controlling for subjective sleep quality.

However, when controlling for age, these relationships remained significant only among older participants.