Persistent fatigue and endocrine function in women after radiotherapy for breast cancer

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Declaration

I hereby declare that this thesis is my original work. To the best of my knowledge it contains no previously published material unless otherwise acknowledged or has been accepted for an award or diploma by any other institution of higher learning.

______________________________
Michala Short (Student ID: 306076292)
Abstract

The experience of persistent fatigue after breast cancer treatment is estimated to affect approximately one in four women, but fatigue development and factors associated with cancer-related fatigue are poorly understood. Gaining a better understanding of these issues is important because persistent fatigue after radiation therapy can be a debilitating experience for cancer survivors. The objectives of this study were: (1) to determine fatigue prevalence in women with breast cancer at standardised timepoints after radiation therapy; (2) to investigate the relationships between fatigue, salivary cortisol rhythm and thyroid function; (3) to investigate the amount of radiation dose received by the thyroid gland in different radiation therapy treatment techniques; and (4) to investigate the relationship between irradiation of the thyroid, thyroid function and fatigue.

Participants in this research were women diagnosed with non-metastatic breast cancer and all were referred for adjuvant radiation therapy treatment. One cohort of participants (n = 48) was assessed prior to the start of radiation therapy and then six months after treatment, and a second cohort (n = 15) was assessed at six months and then at 12 months after treatment. Behavioural assessments included questionnaires that measured the level of multidimensional fatigue (MFSI–SF), the degree of fatigue and depression symptoms (SPHERE–12), impact that fatigue had on participants’ functioning (FIS) and aspects of quality of life (EORTC QLQ–C30). Biological assessments included a three day measurement of salivary cortisol rhythm and an assessment of thyroid function (TSH, free T4 and free T3). Radiation doses to the thyroid gland were determined from participants’ treatment plans.
Six months after completing adjuvant radiation therapy, women receiving treatment for breast cancer experienced significant improvements in emotional fatigue, role functioning and social functioning. High fatigue levels were prevalent in 29% of women at six months and 33% of women at 12 months after treatment, but newly developed fatigue that was not present before treatment was only found in 5% of participants. There were no significant changes in cortisol rhythm over time or between fatigued and non-fatigued participants; however, significant positive correlations were found between fatigue and morning cortisol. Regarding thyroid function, significant decreases in free T4 hormone levels were seen from six months to 12 months after radiation therapy with larger decreases in free T4 levels being related to higher fatigue. Radiation doses to the thyroid gland were significantly higher in participants who received treatment to the regional lymphatics with a supraclavicular fossa radiation field compared to participants who received localised treatment to the breast or chest wall only. In the former, changes in thyroid function were observed, as were relationships between mean radiation dose to the thyroid and thyroid function.
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<td>#</td>
<td>Radiation treatment fraction</td>
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<tr>
<td>3D CRT</td>
<td>3-Dimensional Conformal Radiation Therapy</td>
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<td>ACR</td>
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