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Coexistence of an imbalance of cytokines, chemokines and growth factors serum levels and symptoms of fatigue and pain in long-term breast cancer survivors.

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Abstract

Background: Fatigue, pain and depression are common problems among long-term cancer survivors (BCS) which in some patients may persist for many years after healing and the completion of treatment. Several studies have reported that increased serum levels of chemokines and growth factors are particularly significantly correlated with the coexistence of these disorders in cancer survivors. The aim of this study was to assess whether the altered imbalance of pro-inflammatory cytokines, growth factors and chemokine serum levels are associated to presence of fatigue and pain in long-term breast cancer survivors. **Methods:** Ninety-three BCS were enrolled in this study and blood samples taken from each. Serum levels of 25 analytes including cytokines, growth factors and chemokines were tested by enzyme immunoassay using the flexible Bio-Plex System. Participants also completed a questionnaire measuring demographic, clinical and behavioral variables. **Results:** Non-parametric discriminant analysis showed that fatigued BCS had significantly higher serum levels of FGF and lower IL-4 and IL-8 compared to the non-fatigued group, while BCS with pain had an increase in eotaxin serum levels and lower IL-4 and IL-7 compared to the group without pain. Univariate analysis showed a statistically significant difference in both mental and physical qol, with levels lower in the subgroup who presented pain than in those without: $p = 0.0003$ and $p < 0.0001$ respectively. A lower value of Rantes ($p = 0.0131$) in breast cancer survivors with pain compared to the group without pain, and a higher median value of TNF- α ($p = 0.054$) in the pain group than in those without pain was observed. The level of depression was higher than the score of 50 on the Zung scale in fatigued survivors compared to non-fatigued survivors ($p = 0.0006$). **Conclusions:** Our results suggest that an altered balance of chemokines, cytokines and growth factors serum levels may be associated to presence of symptoms such as fatigue and pain in breast cancer survivors at an average of 5 years after diagnosis.