

THE IMPORTANCE OF RADIOTHERAPY AFTER NEOADJUVANT CHEMOTHERAPY IN BREAST CANCER

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1. INTRODUCTION AND PURPOSE

The increasing use of neoadjuvant chemotherapy (NACT) raises doubts about the utility of radiotherapy (RT) in breast cancer (BC) patients who present a pathologic complete response (pCR) after NACT.

The aim is to investigate whether the alterations in the serum levels of energy balance-associated metabolites after RT are related to obtaining a pCR in patients treated with NACT.

2. METHODS

37 BC patients NACT → surgery → RT (normofractionated or hypofractionated).
Control group: 44 healthy women.



We analyzed: concentrations of metabolites involved in glycolysis, citric acid cycle and amino acid metabolism (GC-EI-QTOF-MS).

3. RESULTS

Patients receiving NACT had significant alterations pre-RT in the serum levels of energy balance-related metabolites:



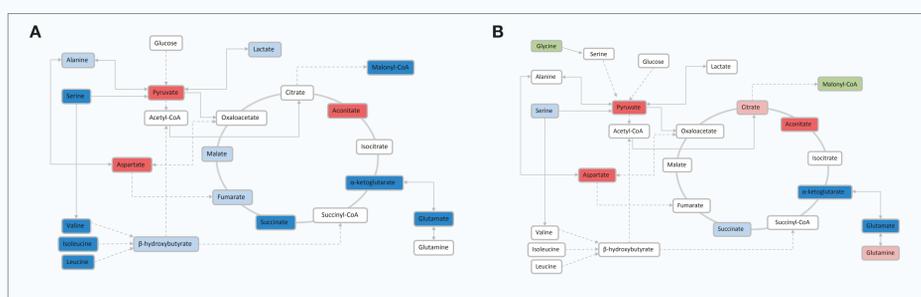
piruvate
aspartate
aconitate
citrate



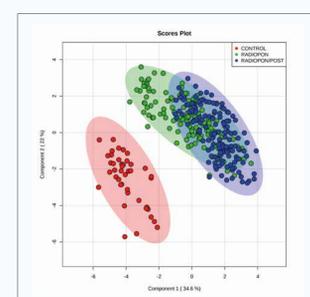
lactate
alanine
valine
leucine

isoleucine
proline
malonyl CoA
glycine

succinate
serine
ketoglutarate
glutamate



Alterations in the glycolytic pathway, citric acid cycle, and amino acid pathways in BC patients compared to control women before (A) and after RT (B). Increased variables are shown in red, and decreased variables in blue. The intensity of the color estimates the magnitude of change. Metabolites that presented the greatest differences between the pCR patients and those that had a partial response are re-marked in green.



Principal component analysis (PCA) scores plot of serum samples from control women (green) and breast cancer patients before (red) and after radiation therapy (blue).

RT corrected these alterations and interestingly, this improvement was significantly superior in patients with a pCR than in those with a partial response.

Metabolites that presented the greatest differences were glycine and malonyl coenzyme A.

4. CONCLUSIONS

- 1- RT after NACT and surgery corrected most of the alterations in energy metabolism in BC patients.
- 2- According to results, RT should not be avoided after NACT in any case.
- 3- The present study suggests that the measurement of serum glycine and/or malonyl coenzyme A post-RT have a high sensitivity and specificity to discriminate between pCR and partial response. Therefore, these analyses may have prognostic value.
- 4- Studies in wider series of patients would be necessary to ascertain this hypothesis.

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