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Micro ribonucleic acid-21 expression and its association with resistance to neoadjuvant chemotherapy in breast cancer: preliminary results

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Objective: To evaluate the expression of micro ribonucleic acid (miR)-21 in the plasma of breast cancer patients and investigate its potential association with resistance to neoadjuvant chemotherapy. **Methods:** All breast cancer patients with an indication of neoadjuvant chemotherapy and submitted to surgical treatment at the Breast Unit of Hospital de Clinicas de Porto Alegre, Rio Grande do Sul, Brazil, between 2023 and 2024 were selected. Chemotherapy resistance was determined through clinical outcomes (e.g., pathological complete response *vs.* residual disease). Patients were grouped based on their pathological response to chemotherapy: complete response, partial response, or no response. The miR-21 was isolated from patients' plasma collected before chemotherapy. The expression of miR-21 was quantified by quantitative reverse transcription polymerase chain reaction (qRT-PCR). Assessment of the association between miR-21 expression and chemotherapy response was performed with the Student's t-test or analysis of variance (ANOVA). Tumors were classified into high- and low-expressing tumors, based on the median miR-21 expression values. Statistical analysis was performed using IBM Statistical Package for Social Sciences (SPSS), version 18. **Results:** Patients with elevated plasma miR-21 levels were significantly more likely to belong to the no-response group, accounting for 70% of the non-responders. In contrast, lower miR-21 levels were associated with a 2.6 times higher probability of partial response ($p<0.001$). **Conclusion:** Our preliminary results suggest that miR-21 expression in plasma could serve as a potential biomarker for predicting resistance to neoadjuvant chemotherapy in early breast cancer patients. Further studies are needed to validate these findings and explore the role of miR-21 in chemotherapy resistance.

Keywords: neoadjuvant chemotherapy; breast cancer.