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Body Composition Modulates Acute Chemokine Responses to Combined Exercise Before Cancer Treatment in Women with Breast Cancer

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Background: Acute exercise can transiently modulate immune and inflammatory pathways relevant to tumor progression, yet the magnitude and direction of these effects may depend on host phenotype. Purpose: To determine whether a single session of combined exercise (CT) modifies circulating chemokine concentrations in women with breast cancer before treatment, and whether these responses are influenced by body composition, strength, and aerobic capacity. Methods: Thirteen women recently diagnosed with breast cancer, prior to therapy initiation, performed one CT session comprising five resistance exercises (8–12 RM) followed by high-intensity interval cycling (3–5 × 2 min at Δ50% with 2 min active recovery). DXA, 1RM testing, and a graded cardiopulmonary exercise test (CPET) with gas analysis were used to assess body composition, strength, and aerobic capacity, respectively. Venous blood was collected before and immediately after CT for quantification of dual-function (CCL17/TARC, CXCL12/SDF-1, CXCL16) and pro-inflammatory (CCL19/MIP-3β, CCL21/6Ckine, CXCL6/GCP-2, CXCL11/ITAC) chemokines. Data were analyzed using paired tests, linear mixed models (LMMs) including covariates (body fat, lean mass, 1RM, VO_2peak), and regression models of Δ (post – pre) concentrations, all FDR-corrected. Results: Group means showed minimal overall chemokine changes ($p>0.05$), but large interindividual variability. CCL21 displayed a trend toward reduction ($p=0.045$, FDR=0.318). LMMs identified significant time × covariate effects: CCL21 decreased proportionally to lean mass ($\beta= -29.48$, $p= 0.027$, FDR=0.107), while CXCL16 increased with higher body fat ($\beta=36.35$, $p=0.043$, FDR=0.171). Regression confirmed inverse ΔCCL21–lean mass ($R^2=0.35$, $p=0.044$) and positive ΔCCL19–body fat ($R^2 = 0.33$, $p = 0.041$) relationships. Conclusion: Although mean chemokine concentrations remained stable, body composition modulated the acute inflammatory signature. Greater lean mass and lower adiposity were associated with attenuated pro-inflammatory chemokine responses, suggesting muscle mass may confer early anti-inflammatory resilience in women with breast cancer.

Keywords

exercise oncology, chemokines, breast cancer, inflammation, DXA, lean mass, VO_2peak.

Conflict of Interest & Ethical Approval

yes

Abstract submitters declaration

yes

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