Comparative analysis of the effects of radiotherapy versus radiotherapy after adjuvant chemotherapy on the composition of lymphocyte subpopulations in breast cancer patients.

Breast cancer is the most common cancer in women worldwide and surgery, radiotherapy (RT) and chemotherapy (ChT) are frequently used to treat this cancer. Adjuvant RT has been shown to cause long-term changes in lymphocyte counts in the peripheral blood. Herein, the time course of changes in lymphocyte subpopulations upon RT was studied in patients with and without adjuvant ChT in order to explore its potential clinical impact. Total lymphocyte counts and the composition of lymphocyte subpopulations before RT (t0), after 30Gy (t1), at the end of RT (t2), and 6 weeks (t3), 6 months (t4), and 1 year (t5) after RT were studied by flow cytometry. Absolute lymphocyte counts were significantly lower in all breast cancer patients (n=40) before and also 1 year after RT compared to healthy controls. The percentage of CD3(+)/CD4(+) helper T cells and FoxP3(+) regulatory T cells increased significantly in patients without adjuvant ChT. Different NK cell subpopulations dropped during RT in patients with and without ChT, but recovered to initial levels 6 months after RT (t4). During RT (t0-t2) the percentage of CD19(+) B cells significantly dropped in patients without ChT, but gradually increased in patients with adjuvant ChT. Both
different lymphocyte subpopulations respond differently to RT with and without adjuvant ChT. CD4(+) T cells increase during RT, whereas NK cells and B cells decrease in patients without ChT, but recover within 6 months after RT. Treg cells gradually increase in patients without ChT from t0 to t5, but not in patients with adjuvant ChT.