

Effect of adjuvant therapy on body mass composition and bone density in women undergoing breast cancer surgery

Summary

Breast cancer belongs to one of the most common types of cancer in women in Poland and worldwide. Spectacular advances in medicine have greatly improved the prognosis of these patients, but women often struggle with the side effects caused by the disease itself and treatment. Adjuvant therapies such as chemotherapy, radio and hormone therapy are associated with side effects, including changes in body composition and bone density. Therefore diagnostics in this area is of key importance.

The aim of this study was to evaluate the changes in bone mineralization and body composition in women undergoing surgery for breast cancer who received adjuvant therapy, and to present the possibility of using DXA X-ray absorptiometry in monitoring the effect of treatment of patients with breast cancer.

The study included 60 women aged 49–75 years subjected to breast cancer surgery who received adjuvant therapy.

The subjects were divided into two 30-person groups due to the adjuvant therapy regimen. Group A (N=30) consisted of patients who were treated with chemotherapy followed by radiotherapy combined with the simultaneous use of hormonal drugs. Group B (N=30) were women treated with radiotherapy combined with simultaneous hormonal treatment. The chemotherapy regimen was based on Adriamycin and Cyclophosphamide (AC) in 4 courses. As a result of radiotherapy, the patients received a dose of about 56 Gray (Gy). Hormone therapy included Tamoxifen and Letrozole (Clarzole) classified as aromatase inhibitors.

Densitometry tests were performed with a Lunar iDXA (GE Healthcare) with enCORE software (LU43619PL) using the technique of double-beam X-ray absorptiometry with image reconstruction, according to the manufacturer's standard scanning and positioning protocols.

Each tested woman had three measurements: the whole body, the lumbar spine, and the proximal femoral epiphyses. The densitometry test was performed twice – after the diagnosis of the patient (before the surgery) and about 6 months from the start of adjuvant treatment. Based on the obtained results, it was found:

1. Comparing the treatment effect in both groups, statistically significantly greater decrease in BMD values for the right femoral neck were found in group A compared to group B.
2. As a result of the treatment, statistically significant differences were found in changes in the values of T and Z indices between the groups in the proximal epiphysis and the right femoral neck (T-score) and in the right femoral neck (Z-score). During the treatment, greater decrease of the index values were observed in group A compared to group B.
3. The differences in changes in body composition values after treatment are greater in group A compared to group B, but not statistically significant.
4. Comparing the changes in the treatment results in the healthy sides, statistical significance was not observed between groups A and B.
5. Statistically significantly greater decrease in soft tissue lean mass (LM) during treatment was found in the sides with pathology in group A compared to group B.
6. The weight and volume of visceral adipose tissue (VAT) were statistically significantly higher after treatment in group A compared to group B.
7. The obtained results show that adjuvant therapy in women with breast cancer has a negative effect on bone density and body weight composition. A greater difference in the value of parameters was observed in women receiving combined chemo-, radio- and hormone therapy (group A).
8. The obtained results provide a strong basis for the conclusion that DXA tests should be routinely performed in all patients treated for breast cancer with any type of adjuvant therapy.