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Dietary status and nutritional status and the risk of breast cancer

Abstract

Introduction. Breast cancer is the first in the structure of the incidence of neoplastic diseases in women, with the number of affected individuals becoming higher every year. The risk of breast cancer is influenced not only by genetic factors, but also by the lifestyle. Proper dietary habits, a high level of physical activity and normal body weight not only reduce the risk of developing a primary neoplastic lesion, but also of a recurrence. In 2007 the World Cancer Research Fund (WCRF) and American Institute for Cancer Research (AICR) published their recommendations concerning lifestyle in the prophylaxis of neoplasms. In 2018 the recommendations have been updated. One of the main risk factors for breast cancer is obesity, including sarcopenic obesity (SO), which is characterized as the coexistence of sarcopenia and obesity. It is associated with many adverse health consequences, also in oncological patients. Unfortunately, SO diagnostics causes many methodological difficulties.

Objective. The main aim of the study was evaluation of diet and nutritional status and identification of nutritional factors which may influence the risk of tumor recurrence in women with prior breast cancer.

Other study objectives were to assess whether the adherence to WCRF/AICR recommendations influenced the risk of developing breast cancer in women and evaluation of the prevalence of SO in postmenopausal women with a history of breast cancer depending on adopted methodology.

Materials and methods. The study involved 108 women aged 50 years and older with history of breast cancer who were divided into two categories: women who completed cancer treatment with no recurrence for minimum 5 years (group I, n=82) and women with diagnosed breast cancer recurrence (group II, n=26). A control group constituted of subjects with no breast cancer diagnosis (n=74). Diet was evaluated by means of an original questionnaire. The adherence of lifestyle to 8 WCRF/AICR recommendations was assessed by a point method. The score obtained in the study and control groups was compared, both in all participants and separately in those who declared no changes in dietary habits after being diagnosed with breast

cancer. In every subject anthropometric measurement were taken and the analysis of adipose tissue and muscle mass content was performed with bioelectrical impedance method (BioScan 920-2, Maltron). Additionally, the measurement of hand grip strength was performed (SAEHAN dynamometer). The identification of patients with SO involved the use of the following indices: BMI, FM, FMI and MMI, SMI, FFMI with the cut-off points as proposed by Milewska, Tichet and Siemaszko. Hand grip strength was assessed with the use of new EWGSOP2 criteria with the cut-off value for sarcopenia being 16 kg. The results were analyzed with *Maltron BioScan* 920 software v. 1.1.135 and Statistica 10PL.

Results. Average BMI and hip circumference values were higher in the group II than in the group I. In both study groups the percentage of high WHR values was significantly higher than in the control group. Women with history of cancer consumed significantly less vegetable and fruit and more dairy products, meat and cold cuts than women in the control group. Group I responders more often declared implementation and maintenance of changes in their diet after diagnosis of cancer than women from group II. Subjects with cancer history consumed more alcohol and more often used supplements than females in the control group.

The adherence of lifestyle to WCRF/AICR recommendations was significantly lower in the group of women with a history of cancer compared to the control group. It was reported both in the study group as a whole (5.5 ± 1.34 vs 6.4 ± 1.48 points) and in those who declared no changes in dietary habits after being diagnosed with breast cancer (5.3 ± 1.24 vs 6.6 ± 1.38 points). The differences in the lifestyles of the participants with breast cancer and those in the control group were associated predominantly with the adherence to recommendations concerning appropriate physical activity, avoiding the consumption of sweetened drinks and limiting the consumption of processed and red meat.

In group II sarcopenia occurred significantly more commonly compared both to group I and the control group (for the skeletal muscle index (SMI) <=29.20%: 13 (52%) in group II vs 16 (20.5%) in group I, p=0.004 and 3 (4.1%) in group III, p<0.001; for SMI <=26.60%: 10 (40%) in group II vs 9 (11.5%) in group I, p=0.003 and 3 (4.1%) in group III, p<0.001; for SMI <=33.87%: 17 (68%) in group II vs 21 (26.9%) in group I, p<0.001 and 5 (6.8%) in group III, p<0.001). Depending on the assessment criteria, SO was diagnosed in 0-11.5% of cases in group I, 0-40% of cases in group II and 0-4.1% in the control group. Intergroup differences were not statistically significant, irrespective of the adopted pair of diagnostic criteria. The

highest detectability of SO was observed when SMI was combined with each of the diagnostic criteria for obesity used.

Conclusions. Avoiding overweight and obesity along with following the principles of a healthy diet seems to reduce the risk of both breast cancer incidence and its recurrence.

The results of the study confirmed the benefits of complying with WCRF/AICR recommendations in the prevention of breast cancer.

Sarcopenia occurred in women with the recurrence of the tumor more frequently than in women in remission or in women without the history of breast cancer. However, no statistically significant difference was observed concerning the prevalence of SO, regardless of adopted diagnostic criteria.