Systemic Treatment of Breast Cancer Depending on BMI using L-Carnitine

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Aim

The aim of this retrospective study the effect of body mass index on the efficiency of treatment of breast cancer, improve treatment outcomes for breast cancer by individualization of treatment measures taking into account the characteristics of the metabolism of the patient.

Keywords: body mass index, breast cancer, obesity, overall survival

Background

The incidence of breast cancer in the world in general and in Ukraine in particular is growing. In 2015, in Ukraine the incidence reached 70.0 per 100 thousand female populations.

According to the Ministry of Health in Ukraine 26% of the female population for 2015 was overweight or obese. Obesity - a chronic metabolic character, which is the result of the interaction of the endogenous factors, environmental conditions and lifestyle. Endogenous factors could be considered a violation of the genetic and hormonal balance. The external conditions include irregular rhythm nutrition, use of substandard products. By disorders include sedentary lifestyle lifestyles.

Obesity is the first risk factor for metabolic syndrome, diabetes type II, cardiovascular disease and some forms of cancer, including breast cancer.

Since overweight is a risk factor for breast cancer, there is reason to believe that among patients with breast cancer the percentage of obese women is higher than in the population. The risk of breast cancer in postmenopausal women by 30% more than in premenopausal, women with obesity - 50%. Furthermore it was proven that obesity is associated with poor prognosis in patients with breast cancer, regardless of menopausal status. [1]

The leading role in achieving long-term results of treatment with systemic methods, such as chemotherapy or hormone therapy. The purpose of systemic therapy is the eradication of micro metastases in the case of radical surgical treatment or reduction of tumor load in case of treatment of locally advanced or metastatic cancer. The calculation of the dose of chemotherapy conducted mainly in the area of the body. [2] Thus to avoid complications associated with overdose of chemotherapy, the standard practice is to calculate the dose of 2.0 m2 patients whose body area more than this. Preparations hormonal action used in standard dosage for an adult without constitutional features. Along with this recent literature there is information that women are overweight effectiveness of systemic treatments may be lower than expected. Other data refute this information. [3]

In view of the above, the study on the impact of body mass index on the effectiveness of systemic treatment for breast cancer is an actual scientific problem and promising area of research.

Overexpression of Her-2/neu in ER-positive breast cancer cells can cause Tamoxifen to behave as an agonist and stimulate cell growth. Implicit in this mechanism for resistance is cross-talk activation between the ER and the epidermal growth factor receptor (EGFR/Her-2/neu) pathways [3]. Treatment with various signal transduction inhibitors has been used in combination with endocrine therapy to overcome resistance, such as Gefitinib, which targets the internal tyrosine kinase domain of EGFR, and Trastuzumab, which blocks the external domain of Her-2/neu [4].

Recently, complementary and alternative medicine (CAM) is widely accepted among patients with breast cancer, which may provide several beneficial effects including reduction of therapy-associated toxicity, improvement of cancer-related symptoms, fostering of the immune system, and even direct anticancer effects [5]. Carnitine is a trimethylated amino acid, naturally synthesized in the liver, brain and kidney from protein-bound lysine and methionine. Several factors such as sex hormones and glucagon may impact on Carnitine distribution and level in tissues [6]. L-Carnitine plays an important role in cell energy metabolism through mediating the transport of long chain fatty acids across the inner mitochondrial membrane. Carnitine has a modulating effect on the function of acetylcholine excitatory neurotransmitter, glutamate excitatory amino acid, insulin growth factor-1 (IGF-1) and nitric oxide (NO). L-Carnitine may have a dual protective effect by enhancing the energy dynamics of the cell and inhibiting cell membrane hyper excitability [15], which make it an
ideal nutrient for cancer prevention and treatment [7], ex hormones, especially estrogens, have been implemented in the development of breast cancer. Breast cancer risk increases after menopause, where aromatization of androgens to estrogens in adipose tissue is the most important source of estrogen in blood and peripheral tissues [11]. Weight increase and obesity subsequent to menopause have been identified as the most important risk and negative prognostic factors for breast cancer in postmenopausal women. Obesity results in increased circulating levels of insulin and insulin-like growth factor, which by acting as mitogens for epithelial breast cells, stimulate their growth and neoplastic degeneration. Mechanisms may combine to explain the association which links together menopause, the subsequent body weight increase, and hormone-dependent breast cancer [12]. Body mass index of Letrazol-treated breast cancer patients included in the present study was positively correlated with estrogen level (E2) which is consistent. [11], who showed that the increased breast cancer risk seen in postmenopausal women with adiposity might be related to elevated sex hormone level.

Materials and Methods

The study included 754 patients with breast cancer between the ages of 30 and 77 (57.6 ± 1) years of age who were treated according to our clinic, department of oncology and medical radiology.

Dnipropetrovsk medical academy at Municipal Institution "Dnipropetrovsk City Multi-field Clinical Hospital #4", Dnipropetrovsk state medical academy from 2005-2016. All patients were evaluated according to the following data: stage of the disease, age and BMI at the time of diagnosis, the size, histological type and metastases. IHC type, MRI methods, Bioelectrical impedance analysis, Ultrasounds analysis.

Tumor size was evaluated after measuring its maximal diameter and distributed in accordance with the International TNM-classification (7th edition, 2009). The histological type and degree of differentiation of the tumor was evaluated respectively by the National Standards (7th edition, 2009). The histological type and degree of differentiation of the tumor was evaluated respectively by the National Standards (7th edition, 2009).

In conclusion, this retrospective investigation of our patient demonstrates that BMI is an independent prognostic factor for OS in patients with breast cancer. We have supporting evidence that obese BMI represents a poor risk feature for outcome, especially in pre-/premenopausal patients, most of whom received chemotherapy without hormonal therapy. A lifestyle intervention reducing dietary fat intake, with modest influence on body weight, may improve relapse-free survival of breast cancer patients receiving conventional cancer management. Longer, ongoing nonintervention follow-up will address original protocol design plans, which requires 3 years of follow-ups after completion of recruitment. The prominent role of L–Carnitine in the present study belongs to the level of Her-2/neu, Ki67, which were significantly reduced after L-Carnitine supplementation. Thus, L-CAR as ad on therapy to TAM, in addition to its ability to foster the immune system and improve the patients’ fatigue and quality of life, may offer better cancer prognosis, which may be, in part, a prospective trial to overcome Chemotherapy and Letrazol resistance.

References


Citation: