

Dependence between Breast Cancer in Women and Body Mass Index. The Role of L-Carnitine in Prediction and Outcomes of the Disease

Hojouj Mohammad I. M., Chabanova K. N., I. N. Bondarenko, Viktor Zavizion and Hojouj Tamar*

Department of oncology and medical radiology, Volodymyr Vernadskii str., Dnipro, Ukraine

Abstract

The incidence of breast cancer in the world in general and in Ukraine in particular is growing. In 2017, in Ukraine the incidence reached 16 percent of female population. According to the Ministry of Health in Ukraine 26% of the female population for 2017 was overweight or obese. There is a strong biologic basis for an association of obesity with poor breast cancer outcomes. 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 is more by 30% 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.

Keywords: Body mass index • Breast cancer • Obesity • Overall survival • L-carnitine

Introduction

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. 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.

Although obesity is associated with poor outcomes in women with breast cancer, it is not clear whether post diagnosis weight loss (resulting from changes in caloric intake, physical activity, or other interventions) will reverse this effect. We can use Diet and Physical Activity Interventions, or complementary and alternative medicine.

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 [1]. Carnitine is a trim ethylated 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 [2]. 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, which make it an ideal nutrient for cancer prevention and treatment [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.

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.

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. Dnepropetrovsk medical academy at Municipal Institution "Dnepropetrovsk City Multi-field Clinical Hospital 4", Dnepropetrovsk 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 [4-6].

Tumour 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 tumour was evaluated respectively by the National Standards of diagnostics and treatment of malignant neoplasms, reflecting the recommendations of leading international organizations. BMI is calculated by the formula: $I = m \times h^2$, where m =body weight (kg); h =height (m) shown in Table 1. According to these calculations the patients were divided in accordance with the WHO criteria into the following groups: those with a BMI <25 kg/m²-normal or underweight; from 25 kg/m² to 29.9 kg/m²-overweight; >30 kg/m²-obese. The material for the histopathological study was eight factors obtained during surgery. We examined the relative risk of relapse and death with regard to the BMI categories adjusting for known to be predictors of Disease-Free Survival (DFS) and Overall Survival (OS): menopausal status, nodal status tumour size, vessel invasion, Estrogen Receptor (ER) status, progesterone receptor status, tumour grade and treatment regimens ECO [7-9].

*Address for Correspondence: Hojouj Tamar, Department of oncology and medical radiology Volodymyr Vernadskii str., 9, Dnipro, 49044, Ukraine. Email: Hojouj@yahoo.com

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Table 1: Tumour size was evaluation based on the International TNM-classification (7th edition, 2009).

Total Number of Patients	BMI	
	<25 kg/m ²	normal or underweight
754	25 kg/m ² - 29.9 kg/m ²	overweight
	>30 kg/m ²	obese

By analysing archival material to consider the particular response to systemic treatment of breast cancer women with deficiency of body weight, normal, high and overweight. Explore options for determining the individual characteristics of lipid metabolism of patients with breast cancer and their possible use for predicting the effectiveness of treatment. To determine the lipid metabolism will be applied anthropological research methods, bioimpedansnoho measurement, CT [10].

Results

In this retrospective study, among 754 patients with breast cancer, 45% were identified with excess body weight, and 31% - of various obesity degrees. Patients with a BMI <25 kg/m² were significantly more diagnosed with stage 2 breast cancer triple negative. BMI>30 kg/m², 10% more often associated with metastatic RLN, which is an indirect sign of higher metastatic potentials. Patients with normal BMI had significantly longer Overall Survival (OS) and Disease-Free Survival (DFS) than patients with intermediate or obese BMI in pairwise comparisons adjusted for other factors. We found a strong correlation between obesity and lymph node involvement these observations suggest that obesity may potentiate the metastatic spread of breast tumours. Distant metastases were also found more often in obese patients in bone or visceral sites in patients <45 years of age at diagnosis. Patients with normal mass by IHC with triple negative cancer 45% and 20% with BRCA+ and patients with obesity 55% that's with IHC luminal A.B but 2 group receive L carnitine in group with L carnitine by ECOG better and calendar Chemotherapy was as planed and less Adverse Advents than group Patients without support L Carnitine And less haematological complication.

Discussion and Conclusion

Every year, 1.7 million new cases of breast cancer are registered in the world. Approximately 40% of them are in the zone of increased risk of recurrence of breast cancer and death due to obesity. Thus, overcoming these challenges presents great opportunities for improving patient care, reducing recurrences and complications in obese individuals with breast cancer and the impact on the health of the population positively in general. In conclusion, this retrospective investigation 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-menopausal 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, on-going non-intervention follow-up will address original protocol design plans, which requires 3 years of follow-ups after completion of recruitment. Better results of Pathology group patents with support L- carnitine that was fixed by CT scan and By.

References

- Porter Nicole S., Leonard A Jason, Aaron Boulton, Nancy Bothne, et al. "Alternative medical interventions used in the treatment and management of myalgic encephalomyelitis/chronic fatigue syndrome and fibromyalgia." *J Altern Complement Med* 16 (2010): 235-249.
- Kraemer William J, Jeff S Volek, and Courtenay Dunn-Lewis. "L-carnitine supplementation: influence upon physiological function." *Curr Sports Med Rep* 7 (2008): 218-223.
- Schubert Christian, Suzi Hong, Loki Natarajan, Paul J Mills, et al. "The association between fatigue and inflammatory marker levels in cancer patients: a quantitative review." *Brain Behav Immun* 21 (2007): 413-427.
- Khalil Rania M., H El-Bahrawy, Nahla E El-Ashrawy, et al. "l-carnitine decreases Her-2/neu in breast cancer patients treated with tamoxifen." *J Psychiatr Brain Sci* 5 (2013): 91-98.
- El-Ashrawy, Nahla E, and Rania M Khalil. "A review on the role of L-carnitine in the management of tamoxifen side effects in treated women with breast cancer." *Tum Bio* 35 (2014): 2845-2855.
- El-Sheikh, Hadier M, Sahar M El-Haggar, and Tamer A Elbedewy. "Comparative study to evaluate the effect of l-carnitine plus glimepiride versus glimepiride alone on insulin resistance in type 2 diabetic patients." *Diabetes Metab Syndr*: 13 (2019): 167-173.
- Pan An, Qi Sun, Adam M Bernstein, Matthias B Schulze, et al. "Red meat consumption and mortality: results from 2 prospective cohort studies." *Arch Intern Med* 172 (2012): 555-563.
- Rizza Wanda, Nicola Veronese, and Luigi Fontana. "What are the roles of calorie restriction and diet quality in promoting healthy longevity?" *Age resear rev* 13 (2014): 38-45.
- Moon Hyun-Seuk. "Chemopreventive effects of alpha lipoic acid on obesity-related cancers." *Ann Nutr Metab* 68 (2016): 137-144.
- Bozzetti F. "Forcing the vicious circle: sarcopenia increases toxicity, decreases response to chemotherapy and worsens with chemotherapy." *Ann onco* 28 (2017): 2107-2118.

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