VIII. STRESZCZENIE W JĘZYKU ANGIELSKIM

Colorectal cancer is the third most common cancer and the fourth most common cause of death worldwide. The most important environmental factors that increase the risk of developing colorectal cancer include: diet, smoking, alcohol consumption and physical activity. Obesity is also a risk factor for colorectal cancer. Adipose tissue cells – adipocytes, produce leptin. The main factor affecting blood leptin levels in humans is body fat mass. The results of recent years' research show that leptin is also produced by malignant tumor cells. A review of the literature data on the role of leptin in the development of colorectal cancer showed that there is a need for more studies to determine its role in patients with colorectal cancer. Better understanding of the mechanisms by which leptin is associated with colorectal cancer could potentially lead to the development of new methods of diagnosis, assessment of risk factors and treatment of colorectal cancer.

The main aim of the research was to assess the concentration of leptin in the serum and to evaluate the expression of the leptin receptor in colorectal cancer cells. Moreover, the influence of serum leptin level and leptin receptor expression on clinical and pathological parameters such as BMI, obesity, lifestyle, TNM and tumor size were assessed. The study attempts to elucidate the role of leptin as a new biomarker for colorectal cancer.

The study was conducted after obtaining the written consent of patients on biological material (blood and tumor tissue) and clinical data of patients with colorectal cancer treated surgically at the Second Department of General and Gastroenterological Surgery of the University Teaching Hospital in Białystok in 2018-2020, collected as part of the MOBIT project: "Development of a reference model of Personalized Diagnostics of Cancerous Tumors based on the analysis of tumor heterogeneity with the use of genomic biomarkers, transcriptome and metabolome as well as PET / MRI imaging tests as a tool for implementing and monitoring individualized therapy", acronym: MOBIT as part of task 1.

The study covered a total of 61 patients consecutively admitted to the Second Clinic of General and Gastroenterological Surgery of the Medical University Hospital in Białystok in 2018-2020 with a diagnosis of colorectal cancer, with no previous history of cancer, not using hormonal treatment. 1.6 ml of serum, stored at -80 ° C until the tests were performed, and tumor tissue stored in paraffin blocks, were used for the tests. The comparative group for the

serum leptin value consisted of 30 patients without neoplastic diseases, with normal BMI value, not using hormone therapy, and 30 patients without cancer, with obesity I ° BMI> 35, not using hormone therapy. The control for the assessment of the expression of the leptin receptor in the tissue was the samples of the normal mucosa of the large intestine collected from 20 patients with diverticula of the colon stored in paraffin blocks. Clinical and pathological data collected under the MOBIT project were also analyzed.

The International Physical Activity Questionnaire IPAQ was used to assess physical activity.

Serum leptin concentration was tested using the Human Leptin ELISA Kit (ELISA) enzyme immunoassay.

Immunohistochemical methods were used to evaluate the expression of leptin in neoplastic tissues. After surgical resection of the large intestine, tissue samples were fixed in 10% buffered formaldehyde solution, then embedded in paraffin blocks and stained with hematoxylin and eosin. Immunohistochemical studies were performed to evaluate the expression of the leptin receptor in colorectal cancer samples and normal colon mucosa samples. The expression of the leptin receptor in the neoplastic tissue was assessed by two independent pathologists.

The research results were analyzed statistically. The obtained data were presented in the form of tables and figures and subjected to statistical analysis using the Kruskal-Wallis test, the Mann-Whitney test and the Spearman's rank correlation coefficient and the Chi-2 test of independence. The statistically significant results were considered at the level of $p < 0.05$. The statistical package STATISTICA 13 by Statsoft was used to compile the data.

The research was carried out in a group of 61 patients diagnosed with colorectal cancer. Most of the respondents were men 63.9% (39 patients), women constituted 36.1% (22 patients). Patients ranged in age from 43 to 87 years old. The mean age of all subjects was 70.5 ± 10.3 years. The average BMI level in the study group was almost 28. This means that most of the patients were at least overweight. 29.5% (18 patients) of the study group was obese, 34.4% (21 patients) were overweight, and 36.1% (22 patients) had a normal body mass index (BMI). People from the study group were characterized by little physical activity. 29.5% (18 patients) of the study group was not physically active. 57.4% (35 patients) of the respondents had light physical activity.

Based on the research, the following conclusions were drawn:

1. All patients in the study group had positive leptin receptor expression in the neoplastic tissue.

2. Leptin receptor expression was not detected in the normal mucosa of the large intestine in all examined sections of the normal mucosa of the large intestine.

3. Studies have shown a trend towards less frequent occurrence of high leptin receptor expression with increasing TNM degree.

4. In men, in the case of higher leptin receptor expression, there is also a much higher concentration of leptin in the serum

5. There is a statistically significant correlation between age and the concentration of leptin in the serum among men - with age the concentration of leptin in the blood serum decreases.

6. The higher the BMI, the higher the concentration of leptin in the serum.

7. Strong expression of the leptin receptor as well as the occurrence of overweight and obesity are factors contributing to the occurrence of excessively high levels of leptin in the blood serum.

8. In women, the concentration of leptin is on average 2.93 times higher than in men.

9. An increase in BMI by 1 causes an average increase in the concentration of leptin in the serum 1.12 times.

10. In the test group the leptin concentration is 0.728 (ie by 27.2%) lower than in the control group.