Abstract

Aims: The aim of this work was to determine whether a increased resting energy expenditure contributes to the nutritional risk for patients with pancreatic cancer. What the variability of resting energy expenditure is and whether it predicts weight loss. Another aim was to verify that lower protein-energy intake also has an impact on weight loss.

Methods: Data for the diploma thesis were obtained from the project "*Pancreatic Cancer: Metabolic Derangements Associated With Insulin Resistance*", which takes place at the Department of Clinical Physiology of Metabolism at 2nd Department of internal medicine in the University Hospital Královské Vinohrady. The project includes 40 - 50 patients with pancreatic tumor resection per year. Data were collected from the beginning of December 2019 until the end of April 2020. The project is funded by the grant AZV NV19-01-00101. 10 consecutive patients (4 women and 6 men) with pancreatic cancer who had a complete dataset for analysis were selected for the research set for the diploma thesis. The patients underwent anthropometric examination, blood tests were taken, and indirect calorimetry was performed.

Results: The first part of the research was focused on anthropometric parameters, parameters of nutritional status and the presence of cancer cachexia. The second part was devoted to the statistical analysis of hypotheses. Basal energy expenditure was calculated according to the Harris-Benedict equation. When comparing the values of BEE and REE, it was evident that in 90 % (75 % women and 100 % men) of respondents, REE was increased compared to BEE above 110 % of the predictive value, which indicated hypermetabolism. In 10 % of respondents, the REE value was increased only slightly (up to 110 % of the predictive value). It has been shown that patients with pancreatic cancer had an increased resting energy expenditure compared to the predicted value: $T = 5.27; p = 0.00026 (<0.05)$. No significant correlation was demonstrated when evaluating the relationship between increased REE and weight loss: $R = 0.35; p = 0.16$. However, at $n = 24$ and the correlation level $R = 0.35$, the p-value would be p = 0.49 and the result would already be significant. It has not been verified that lower protein-energy intake correlates with weight loss. For the caloric balance, the result was: $R = 0.19; p = 0.30$ and for protein balance the result was: $R = 0.02; p = 0.48$.

Conclusion: Increased resting energy expenditure, anorexia and weight loss are important indicators of cancer cachexia. Patients lose weight due to hypermetabolism and waste of energy due to cancer. Cancer cachexia cannot be reversed by conventional nutritional support, and therefore early detection and intervention is the basis for reducing mortality and improving quality of life. As it has been shown, an increase in caloric intake may not be sufficient to reverse weight loss. It is necessary to monitor all patients with pancreatic cancer and to check the parameters evaluating the nutritional status.

Keywords: pancreatic cancer, indirect calorimetry, resting energy expenditure, cancer cachexia, hypermetabolism