

Determination of Obesity for Cancer Patients and Its Role in Chemotherapy Dose Calculations

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Introduction. Excess body weight is a health problem of epidemic proportions that is not restricted to the developed countries, but affects people worldwide. Moreover, overweight and obesity are now established risk factors for cancer and cancer-related mortality. It is thought that the metabolic changes associated with obesity, particularly abdominal obesity, and changes in adipocyte function underlie this increased risk. The calculation of an accurate dose of chemotherapy for oncologic patients reduces the possible medication errors and the toxicity of the body and so it improves the treatment outcome (survival).

Methods. 202 patients aged 19 to 83 with various tumour localisations underwent anthropometric measurements (height, weight, circumferences, fat-fold thickness, the distance between the hills above the joint), body mass index (BMI) and body surface area (BSA).

Results. 99 men's average weight was 78.5 ± 16.4 kg and 103 women's mean body weight was 70.1 ± 14.6 kg, statistically significantly different ($F = 0.358$, $p = 0.551$), but the independent-sample t-test arithmetic means differed statistically significantly ($t = 3.839$, $p < 0.001$). The oncologic patients in the absolute and relative distribution of groups according to body mass index in relation to patient gender differed statistically significantly ($\chi^2 = 11.510$, $df = 4$, $p = 0.021$). Half of the men were the ideal weight (body mass), but only about 1/3 of women with ideal body weight. Men's average body mass index was 25.41 ± 4.73 kg/m² and women's average body mass index was 26.20 ± 5.90 kg/m². After a variety of formulas calculated, body surface area arithmetic for men differed less than by 1% compared to the calculated area of Mostsellera formula. For women indicated the differences of more than 1%. Distribution of patients in groups, body fat content (%) of the patients' shows that male and female patients were primarily from the group with excessive fat in the body, body fat for men is 25% or more of total body weight, but for women – over 32% of the total body weight. Correlation analysis showed that body fat for men correlates with body surface area, calculated using the Mostsellera formula ($r = 0.663$, $p < 0.001$) and the fat content for women correlates with body surface area, calculated using the Mosteller formula ($r = 0.760$, $p < 0.001$). The male body volume of the mean value was 75.0 ± 17.1 dm³, female body volume of the mean value was 68.6 ± 15.6 dm³. After the independent samples t-test between men and women in body volume arithmetic means differed statistically significantly ($t = 2.437$, $p = 0.016$).

Conclusions. BMI does not feature the percentage of the fat mass of the whole body. Body volume (BV) could be one of the most recent parameters for more accurate calculation of chemotherapy for cancer patients. BV is a new type of measurement for human obesity that has been proposed as an alternative to the BMI.