

## Abstract

*Introduction:* Indirect calorimetry (IC) is a very accurate and non-invasive method which is used in clinical practice to measure the resting metabolic rate. This method is based on the assumption that oxygen consumption, carbon dioxide production and nitrogen metabolite waste are in definite relation to energy consumption. Based on the measurement of resting metabolic rate, a nutritional therapist can individually determine daily energy intake of a respective individual, the optimal amount of specific nutrients and thus prevents excessive or inadequate intake of energy and nutrients.

*Objective:* The main aim of this thesis is to compare for group of overweight patients the results of the measurement of the resting metabolic rate (RMR), values of the resting metabolic rate calculated according to the Harris-Benedict (HB) equation and the actual energy intake calculated from the diet report obtained from the patients. In addition, the body composition of the examined group with a focus on the amount of muscle tissue is also marginally evaluated.

*Methods:* The research sample includes in total 50 persons-36 women and 14 men. These persons are patients of the General Faculty Hospital in Prague. The average age is 46 years for women and 51 years for men. The average BMI for women is  $38,2 \text{ kg/m}^2$  and for men  $35,5 \text{ kg/m}^2$ . All subjects passed measuring by indirect calorimetry method and also the resting metabolic rate was calculated according to the Harris-Benedict equation. Their real energy intake was determined based on the authentic dietary record. The same calculation was evaluated for a group of 25 subjects with normal body weight. Measured and calculated values of RMR as well as energy intake values were subsequently statistically processed and evaluated.

*Results:* There is no statistically significant difference between the RMR values obtained by the Harris-Benedict equation and those measured by the indirect calorimetry method. However, there are significant absolute and relative deviations when evaluating the individual cases. In the women's research set the absolute deviation between HB method and IC method is 1,084 kJ and the relative deviation is 14 %. The absolute deviation between individual values of HB method and IC method ranged from 78 kJ to 4 885 kJ, the relative deviation was within an interval of 1-37 %. In the men's research set the absolute deviation values between HB method and IC method is equal to 1,006 kJ and the relative deviation is 10 %. In the research group of men the absolute deviation between individual values of HB method and IC method varied in the range from 215 kJ to 4 091 kJ, the relative deviation was within an interval of 2-56 %. The energy intake in the research group of women (n=36) is in average about 2 156 kJ lower than the resting metabolic rate measured by indirect calorimetry. In the research group of men (n=14) the energy intake is lower as well than the resting metabolic rate measured by indirect calorimetry, and it is in average about 1,923 kJ.

*Conclusion:* The values of the resting metabolic rate calculated by the Harris-Benedict equation and measured by indirect calorimetry show significant absolute and relative deviations. Indirect calorimetry is considered as the most accurate method for determining the resting metabolic rate of the overweight persons. The basis for setting of the proper diet plan is the knowledge of the patient's existing eating habits including a written authentic dietary record.

**Key words:** indirect calorimetry, resting metabolic rate, energy intake