Relationships between body composition components in women with anorexia nervosa

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INTRODUCTION

Anorexia nervosa (AN) is an eating disorder characterized by weight loss: including fat mass, lean tissue mass, total body minerals, especially minerals of bones [1]. Weight was shown to be of limited use when monitoring nutritional status in patients with anorexia nervosa [2]. Detailed analysis of all components of body mass could be useful for choosing anorectic patient's treatment.

OBJECTIVE

The aim of this study was to assess the relationships between the body composition elements in women with anorexia nervosa.

MATERIALS AND METHODS

This was a case-control study performed in National Osteoporosis Centre in Vilnius, Lithuania. Inclusion criteria were: female, aged 18 years and older, without history of chronic disease except for AN, who agreed to participate in the study. All study subjects were assigned into two groups. Case group were patients with anorexia nervosa, diagnosed in Eating Disorders Center, and healthy women were controls. Body weight was recorded using an electronic calibrated scale to the nearest 0.1 kg. Height was measured with a Harpenden anthropometer to the nearest 0.1 cm. Body mass index (BMI) was calculated as body weight divided by height squared. Body composition: total fat mass, body fat percentage (% BF), fat distribution, lean mass, bone mineral content (BMC), total bone mineral density (BMD), hip BMD, femoral neck BMD, lumbar spine (L_1–L_4) BMD were estimated by dual-energy X-ray absorptiometry (iDXA, GE Lunar). T– test was used for comparing the means of two samples, all data were analyzed by Pearson's correliations, level of significance adopted was p<0.05.

RESULTS

Subjects included 52 women, aged 19 – 33 years. Case group included 17 patients with anorexia nervosa, and 35 healthy women were controls. No significant differences were found in anorectic women vs. controls in average age and height. When compared to controls, women diagnosed with anorexia nervosa presented lower body mass, BMI, body composition components and bone mineral density.

Anthropometrical and body composition characteristics of study participants are shown in Table 1.

Table 1. Anthropometric and body composition characteristics.

Characteristic	AN N=17	Controls N=32	P
Age (yrs)	25.12 ± 4,69	23.49 ± 2.48	NS
Height (m)	1.66 ± 0.05	1.67 ± 0.05	NS
Body mass (kg)	59.9 ± 7.07	46.9 ± 4.28	
BMI (kg/m²)	21.37 ± 2.02	17.10 ± 1.58	
BMD, (g/cm²)	1.0234±0.85	1.1095±0.70	
Lean mass (g)	35708.00±2748.40	39333.66± 3875.75	
Total fat mass (g)	9279.53 ± 3907,22	18074.43 ± 4274.22	
Total fat mass (%)	20.200± 7.43	31.174± 4.2638	
Android fat (%)	17.54 ± 10.61	31.50 ± 9.16	<0,05
Gynoid fat (%)	27.959 ± 10.00	43.30 ± 4.40	
Body mineral content (g)	2089.71 ± 206.50	2408,20 ± 247.315	
Lumbar spine (L_1-L_4) BMD (g/cm²)	1.0226 ± 0.10	1.16720 ± 0.11	
Femoral neck BMD (g/cm²)	0.9032 ± 0.10	1.0358 ± 0.13	

BMI – body mass index. BMD – bone mineral density

Exploring the relationship between body composition components, different associations were observed in AN group patients comparing to healthy controls. In women with AN, positive significant correlation between percentages of gynoid fat and legs fat mass was found. Legs lean mass strongly significantly positively correlated with legs BMC. In anorectic women, total leg mass and lumbar spine BMD correlated significantly positively. Data is provided in Table 2.

Table 2. Associations in body composition components in women with anorexia nervosa.

Characteristic	Legs fat (%)	Legs BMC (g)	Total leg mass (g)
Gynoid fat (%)	r = 0.942*		
Legs lean mass (g)		r = 0.724*	
Lumbar spine BMD (g/cm²)			r = 0.55*

BMD – bone mineral density. BMC – bone mineral content.
*p < 0.05

In controls, more associations were observed compared to AN patients. Gynoid fat positively correlated with lumbar spine BMD (p<0.05). Similar significant associations between gynoid fat and total hip BMD as well as between femoral neck BMD and gynoid fat were found. There was significant correlation between leg lean mass and total hip BMD. Moreover, leg lean mass positively correlated with both total hip BMD and femoral neck BMD (p<0.05), in healthy patients. Data is presented in Table 3.

Table 3. Associations in body composition components in healthy women (control) group.

Characteristic	Gynoid fat (%)	Legs lean mass (g)
Lumbar spine (L_1-L_4) BMD	r = 0.374*	r = 0.373*
Total hip BMD (g/cm²)	r = 0.341*	r = 0.406*
Femoral neck BMD (g/cm²)	r = 0.391*	r = 0.507*
Legs lean mass (g)	r = 0.406*	r = 1*

BMD – bone mineral density. *p < 0.05

CONCLUSIONS

Patients with anorexia nervosa had significantly reduced body mass, including total fat mass, body lean mass, lower body mineral content and bone mineral density in total body, lumbar spine and total hip bone mineral density comparing with healthy controls.

In patients with anorexia nervosa, gynoid fat (%) correlated with legs regional fat (%), and no associations between BMD and gynoid or regional legs fat were found.

REFERENCES

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