소아재활

게시일시 및 장소 : 10 월 19 일(토) 08:30-12:30 Room G(3F)

질의응답 일시 및 장소 : 10 월 19 일(토) 11:00-11:30 Room G(3F)

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The obesity rate and risk of cardiovascular disease of adults with cerebral palsy

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Background
Individuals with cerebral palsy (CP) are prone to lack of physical activity as well as inadequate dietary intake due to dysphagia or gastrointestinal problem at the same time. It was not fully studied whether CP makes subjects more vulnerable to obesity or not. There is a J-shaped relation between the BMI and mortality/morbidity. Regional body fat distribution as well as body fat amount are known to be important for cardiovascular disease (CVD) risk. Therefore we need to investigate the characteristics of body fat amount and its distribution in adults with CP with regard to CVD risk of this population.

Objective
To investigate the characteristics of body fat amount and distribution with regard to CVD risk in adults with CP.

Design
Cross-sectional study.

Setting
University hospitals and communities for persons with disabilities.

Participants
A total of 99 adults with CP (58 men, mean age of 41.8±9.0 years) were included.

Method
The body composition was analyzed using dual-energy x-ray absorptiometry. Body fat mass, body mass index (BMI), fat mass index, and fat mass and ratio in android and gynoid region were analyzed. Resting blood pressure was measured and fasting blood samples were obtained for measurement of plasma glucose, serum triglycerides and cholesterol. The Framingham risk score (FRS) was calculated for estimating the risk of coronary heart disease (CHD).

Results

The mean body weight was 57.3±12.9 kg (59.5±14.4 in men 54.2±9.9 in women) and the mean BMI was 22.5±4.6kg/m² (22.6±5.1 in men and 22.4±3.7 in women). According to BMI criteria, there were 3.3 (3.7 and 2.7) % of underweight, 16.5 (20.4 and 10.8) % of normal weight, 54.9 (48.1 and 64.9) % of overweight and 27.3 (27.8 and 21.6) % of obese subjects (men and women, respectively). The fat mass index (FMI) criteria revealed 7.6 (6.7 and 8.8) % of obesity (men and women, respectively). The rate of obese and overweight based on BMI and FMI criteria were higher than what was reported in general population in South Korea. The mean body fat percent was 27.6±11.6% (23.0±10.3 in men and 33.6±10.4 in women). The mean FRS was 4.4±5.5 (5.2±5.5 in men and 3.1±5.2 in women) and the mean 10-year risk of developing CHD was 2.5±4.0 (3.9±4.5 in men and 0.2±0.5 in women, Table 1). The mean FRS was similar or higher than that of general Korean population. Simple and multiple linear regression analyses were performed to determine the factors independently associated with the FRS. Variables with $p<0.1$ on univariate analyses were used for multivariate analysis. According to the results of the multivariate regression model with stepwise selection, a formula was driven for the FRS as "FRS = -18.79 + 0.42 * Age + 0.54 * Android body fat (%) (R^2=0.741)".

Conclusion

The rate of obese and overweight and FRS was higher in adults with CP than the general Korean population. Percent android body fat was associated with the CVD in adults with CP.

Acknowledgment :This research was supported by the R&D grant of rehabilitation services by Korea National Rehabilitation Center Research Institute, Ministry of Health & Welfare.

Table 1. Clinical characteristics and DXA measurements.

		Total (n=99)	Men (n=58)	Women (n=41)
Demography and anthropometry	Age (years)	41.8±8.9 (22-68)	43.0±9.7 (22-68)	40.1±7.5 (23-55)
	Body weight (kg)	57.3±12.9 (34-120)	59.5±14.4 (34-120)	54.2±9.9 (42-85)
Body fat amount and distribution	Total body fat mass (kg)	16.6±9.0 (1.8-50.5)	15.0±9.5 (1.8-50.5)	18.7±7.8 (3.4-39.3)
	Android fat mass (g)	1575±973 (141-6205)	1562±1073 (141-6205)	1592±838 (227-3947)
	Gynoid fat mass (g)	2979±1430 (340-7062)	2545±1394 (340-6224)	3554±1283 (847-7062)
	Total body fat (%)	27.6±11.6 (4.1-56.1)	23.0±10.3 (4.1-45.4)	33.6±10.4 (8.8-56.1)
	Android body fat (% of total)	9.4±1.8 (5.4-13.4)	10.3±1.5 (6.8-13.4)	8.3±1.4 (5.4-11.6)
	Gynoid body fat (% of total)	18.7±3.0 (12.3-25.9)	17.8±2.7 (12.3-25.9)	19.8±3.0 (13.7-25.8)
	Android/gynoid ratio	0.53±0.17 (0.25-1.0)	0.60±0.16 (0.38-1.0)	0.43±0.14 (0.25-0.79)
Serum and plasma concentration	Glucose (mg/dL)	109.6±40.8 (79-330)	100.9±13.1 (72-124)	106.2±33.0 (72-330)
	Albumin (g/dL)	4.4±0.2 (3.9-4.8)	4.2±0.2 (3.7-4.6)	4.3±0.2 (3.7-4.8)
	Triglycerides (mg/dL)	134.0±86.0 (30-446)	145.4±91.2 (30-446)	116.5±75.1 (41-435)
	Total cholesterol (mg/dL)	174.9±33.3 (100-264)	176.6±34.4 (100-249)	172.3±31.9 (101-264)
	HDL (mg/dL)	49.6±12.0 (28-88)	47.9±10.1 (31-73)	52.2±14.1 (28-88)
	LDL (mg/dL)	99.6±28.1 (45-188)	99.6±29.0 (45-169)	99.6±27.1 (49-188)
Obesity criteria	Body mass index (kg/m²)	22.5±4.6 (14.4-39.2)	22.6±5.1 (14.4-39.2)	22.4±3.7 (16.7-33.3)
	Underweight (<18.5, %)	3.3	3.7	2.7
	Normal (18.5-24.99, %)	16.5	20.4	10.8
	Overweight (25-29.99, %)	54.9	48.1	64.9
	Class I Obesity (30–34.99, %)	18.7	20.4	16.2
	Class II Obesity (35-39.99, %)	4.4	3.7	5.4
	Class III Obesity (≥ 40, %)	2.2	3.7	0
	Fat mas index (kg/m2)	6.6±3.7 (0.7-17.0)	5.6±3.6 (0.7-16.5)	7.9±3.4 (1.5-17.0)
	Fat deficit (<5, %)	34.2	48.9	14.7
	Normal (5-9, %)	46.8	35.6	61.8
	Excess fat (>9-13, %)	10.1	8.9	11.8
	Class I Obesity (>13-17, %)	7.6	6.7	8.8
	Class II-III Obesity (>17, %)	1.3	0	2.9
Risk estimation for CVD	Framingham risk score	4.4±5.5 (-10-15)	5.2±5.5 (-10-15)	3.1±5.2 (-8-14)
	10-year risk of developing CHD	2.5±4.0 (0-20)	3.9±4.5 (0-20)	0.2±0.5 (0-2)

Data are shown as mean± SD or percentage. HDL: high-density lipoprotein; LDL: low-density lipoprotein; CVD: cardiovascular disease; CHD: coronary hear disease.