The relationship between serum neurotensin levels and metabolic parameters and eating behavior in obese children

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Introduction

Neurotensin is a 13 amino acid peptide with central and intestinal effects. There is an anorexigenic effect of the neurotensin released from the central nervous system. It also increases fat absorption from intestines by regulating the release of pancreatic enzymes and bile acid. In the literature, conflicting results regarding serum neurotensin levels in obesity were reported in experimental and adult studies. Obesity mainly results from unhealthy food preference and feeding behavior. Besides, hyperphagia and binge eating disorder (BED) are not rare in obese individuals.

Aim

In this study, we aimed to evaluate the relation of serum neurotensin level with metabolic parameters, hyperphagia, BED and food preference in obese adolescents.

Methods

The study included obese adolescents with a BMI above 95p and healthy controls. Anthropometric measurements and biochemical analyzes [fasting blood glucose, insulin, lipid profile, ALT, insulin resistance index, serum neurotensin, ghrelin and leptin levels] were performed in all cases. Body fat analysis was performed with bioelectric impedance device. In all cases, Dyken's hyperphagia questionnary score, presence of BED and three-day food records were evaluated.

Results

- 65 obese (32 girls, 14.6±1.4 years) and 65 healthy adolescents (32 girls, 14.6±1.5 years) were included in the study.
- In the obese group, leptin and neurotensin levels were significantly higher and ghrelin level was significantly lower than the control group (Table 1).
- BED prevalence was 47.6% (31/65) among obese individuals.
- Hyperphagia score was significantly higher in the obese group.
- Total daily calories, fat, protein and carbohydrate intakes were not different between the obese and control groups.
- Serum neurotensin level was not associated with BED, insulin resistance, hyperphagia or food preference in obese adolescents.

Table 1. Anthropometric and laboratory results of the study groups

	Control Subjects (n=65)	Obese Subjects (n=65)	p
Age (year)	14.6±1.5 (14.9)	14.6±1.4 (14.9)	0.976[a]
Sex /F/M)	32/33	32/33	1.000[c]
BMI (kg/m^2)	20.8±2.1 (20.9)	35.5±4.4 (34.8)	<0.001[a]
BMI SDS	-0.02±0.7 (0.05)	3.1±0.6 (3.0)	<0.001[a]
Waist Circumference (cm)	69.6±5.9 (69)	106.2±10.9 (105)	<0.001[b]
Fat percentage (%)	17.7±7.4 (17.7)	41.3±7.5 (41.8)	<0.001[b]
Fat mass (kg)	10.5±6.2 (10.3)	40.7±11.1 (40.1)	<0.001[b]
SBP (mmHg)	113.1±16.0 (115)	123.3±14.6 (120)	<0.001[b]
DBP (mmHg)	75.9±8.2 (76)	76.5±8.9 (78)	0.815[b]
Fasting Glucose (mg/dl)	87.9±9.5 (89)	88.8±9.1 (88)	0.900a
İnsülin (uIU/mL)	10.1±3.5 (10.1)	22.6±16.4 (18.7)	<0.001b
HOMA-IR	2.2±0.8 (2.1)	5.1±4.4 (3.9)	<0.001b
ALT (IU/L)	15.2±3.7 (15)	27±21 (19)	0.171 b
TG (mg/dL)	87.7±41.9 (75)	123.6±75.3 (109)	<0.001b
TC (mg/dL)	148.7±31.5 (150)	162.8±35.9 (162)	0.021b
LDL-C (mg/dL)	88.5±24.8 (90)	103.7±44.9 (97)	0.049b
HDL-C (mg/dL)	46.4±9.8 (46)	43.1±8.1 (41)	0.027b
Neurotensin (ng/mL)	0.40±0.11 (0.42)	0.61±0.39 (0.50)	0.001
Ghrelin (ng/mL)	8.0±3.3 (7.5)	5.0±2.5 (4.7)	<0.001
Leptin (ng/mL)	4.9±2.2 (4.4)	8.7±4.9 (7.8)	<0.001
Total Calories (kcal/day)	2200±670 (2170)	2361±585 (2334)	0.149 [a]
Daily Fat consume (gr)	36.5±8.7 (36)	37±8.3 (38.3)	0.752 [a]
Daily protein consume (gr)	14.8±4.5 (14)	14.0±3.4 (14)	0.274 [a]
Daily CH consume (gr)	48.6±9.5 (47)	48.9±8.9 (48)	0.884 [a]
Total hyperphagia score	19.7±6.3 (19)	26.3±8.3 (26.5)	<0.001[b]

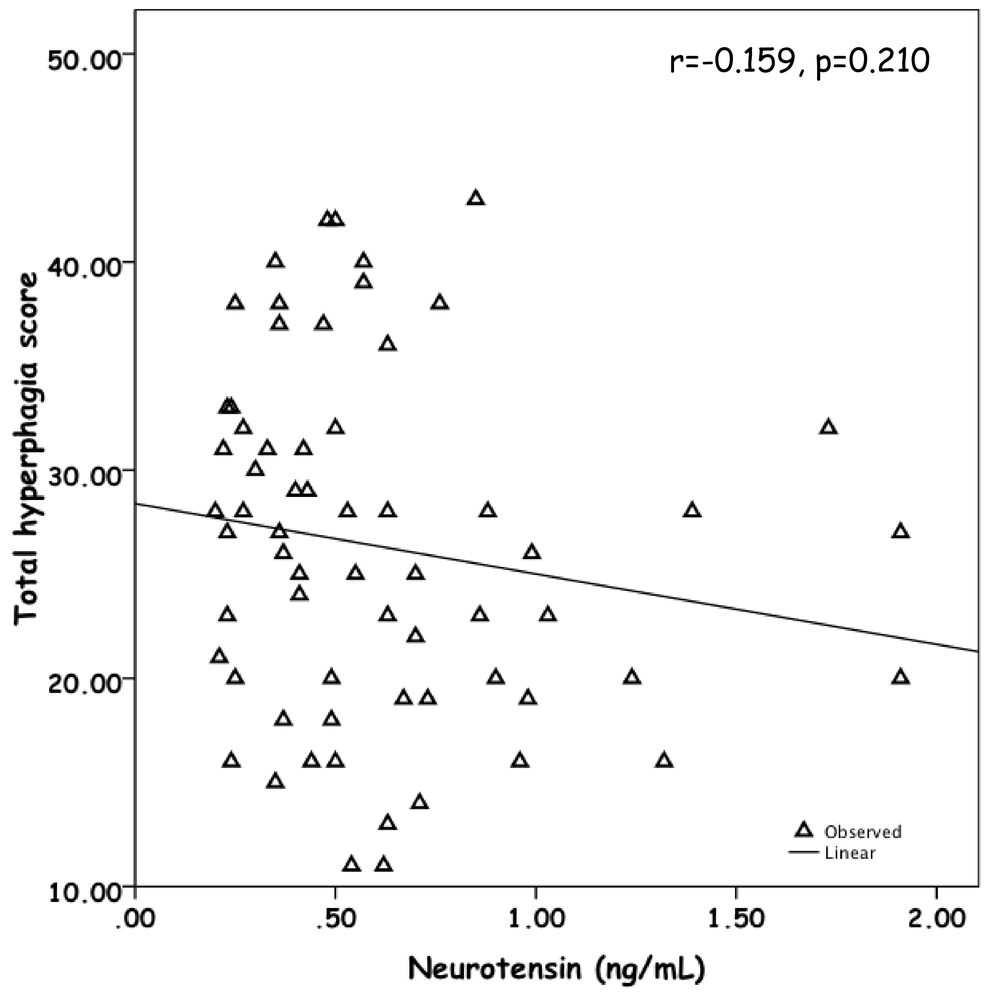

Figure 1. Relation of serum neurotensin and hyperphagia score in obese subjects

Conclusion

- Serum neurotensin level is high in obese adolescents, however it is not associated with eating behavior or food preference.
- Current knowledge linking neurotensin levels with obesity pathophysiology is not sufficient to conclude on a direct cause and effect relationship.