



Effects of Methylphenidate on Growth and Appetite in Attention-Deficit Hyperactivity

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Background:

Attention-deficit hyperactivity disorder (ADHD) is one of the most common psychiatric problems of adolescent and childhood. Methylphenidate is a psychostimulant drug in use of attention-deficit hyperactivity treatment as a first choice modality.

Objective and hypotheses:

The aim of this study is to evaluate the levels of Leptin, Ghrelin and Nesfatin-1 in relation to slowdown in growth and poor appetite.

Methods:

Total of 89 male children at the age of 7-14 years in two groups was conducted in this study; 48 ADHD and 41 age-matched control group without any disorder. Leptin, Ghrelin and Nesfatin-1 levels were measured by ELISA together with anthropometric measurements before and after 3 months of the Methylphenidate treatment. Additionally, IGF-1 and IGFBP-3 levels were evaluated. Results were expressed as mean±standard deviation (Mean±SD), median (min-max), n (number of patients), and percent (%).

Results:

Lack of appetite was observed in 34 of 48 patients together with a significant decrease in weight, weight SDS, body mass index, and body mass index SDS values. Interestingly, the height SDS was in trend of decreasing while statistically insignificant. In addition, serum IGFBP-3 levels were remained unchanged while there was a significant decrease in IGF-1 levels. Most significant data from the study were increased Leptin levels and decreased Ghrelin levels after Methylphenidate therapy, but no change in Nesfatin-1 levels. Interestingly, there was a positive correlation between Leptin and Nesfatin-1 values after the treatment.

Table 1. Basal and Third Month Leptin, Ghrelin and Nesfatin-1 levels of Patients

	Patient (n=48)		p*	Control (n=41)	
	Mean±SD			Mean±SD	
	Basal	Third month		Basal	p**
Ghrelin (ng/ml)	6,1±4,8	3,0±2,3	0,0001	0,6±0,7	0,0001
Nesfatin-1 (ng/ml)	5,3(0,4-27,5)	2,7(0,2-13,0)	0,052	0,4(0,1-4,0)	0,169
Leptin (ng/ml)	0,3±0,5	0,2±0,2	0,0001	0,4±0,7	0,270
	0,1(0,1-3,4)	0,1(0,1-1,6)		0,1(0,1-3,0)	
	5,4±3,2	7,4±3,3		4,2±1,4	
	4,4(1,4-16,5)	6,4(3,2-16,8)		4,2(1,1-9,9)	

*p between of basal and third month **p between of basal and control

Table 2. Comparison of Developed Anorexia and Costant Appetite groups after Methylphenidate treatment

		Developed Anorexia (n=34)		Costant Appetite (n=14)		
		Mean±SD	p*	Mean±SD	p**	p***
Leptin (ng/ml)	Basal	4,4±1,7		7,6±4,6		0,0001
	Third month	7,8±3		6,2±3,7		
	ΔLeptin	3,4±2,8	0,0001	-1,4±3,1	0,019	0,0001
Ghrelin (ng/ml)	Basal	6,6±3,5		4,6±2,1		
	Third month	2,9±2,4		3±2		
	ΔGhrelin	-3,7±6,6	0,002	-1,5±2,1	0,022	0,329
Nesfatin-1 (ng/ml)	Basal	0,29±0,59		0,18±0,13		
	Third month	0,19±0,26		0,16±0,08		
	ΔNesfatin-1	0,09±0,36	0,063	0,01±0,07	0,446	0,832

Δ: Delta Between of basal and third month

p* and p**: between of basal and third month..... p***: Between of Developed Anorexia and Costant Appetite groups

Table 3. ΔIGF-1 ve ΔIGFBP-3 levels of Developed Anorexia and Costant Appetite groups after Methylphenidate treatment

		Developed Anorexia (n=34)		Costant Appetite (n=14)		
		Mean±SD	p*	Mean±SD	p**	p***
IGF-1 (ng/ml)	Basal	185,6±80,6		186±71,6		
	Third month	164,1±72,3		163,2±53,3		
	ΔIGF-1	-21,5±55,6	0,011	-22,7±75,0	0,397	0,548
IGFBP-3 (μg/ml)	Basal	4,14±1,01		4,23±0,83		
	Third month	4,07±0,85		4,3±0,87		
	ΔIGFBP-3	-0,07±0,58	0,561	0,07±0,49	0,551	0,440

Δ: Delta Between of basal and third month

p* and p**: between of basal and third month..... p***: Between of Developed Anorexia and Costant Appetite groups

In conclusion,

Methylphenidate therapy in ADHD patients has an effect on lack of appetite via an increase in Leptin and decrease in Ghrelin levels. Mechanisms underlying the growth and appetite status in ADHD patients in relation to treatment modalities were studied, in first in literature. Future studies could be designed to examine the mechanisms supported by our study.