



Investigation of Pubertal Effect on Thyroid Volume and IGF-1 Changes in Obese Children

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Introduction

Thyroid gland closely interacts with IGF-1 and adipose tissue due to obesity. Thyroid volume and IGF-1 vary depending on severity of BMI.

IGF-1 increases thyroid size via mitogenic effects in thyrocytes and it also mediates effects of growth hormone in tissues. Moreover, it plays a role in energy metabolism by interacting body fat storing.

Puberty is a period in which many changes including thyroid growth, elevated IGF-1 and increased BMI and activation of sex hormones. Sex hormones promote thyroid growth, rise of IGF-1 and increase in body size by triggering the growth factors

The aim of present study is to investigate the effect of puberty on thyroid volume and IGF-1 in pre- and post-pubertal obese children.

Method

This is a cross-sectional study and it was conducted in single-centre in 380 children aged of 6-18 years.

The present study consists of

177 boys (75 pre-pubertal, 102 post-pubertal) and
203 girls (94 pre-pubertal, 109 post-pubertal).

We classified into two prepubertal and pubertal groups.

211 post-pubertal children (120 obese, 91 healthy).
169 pre-pubertal group (102 obese, 67 healthy)

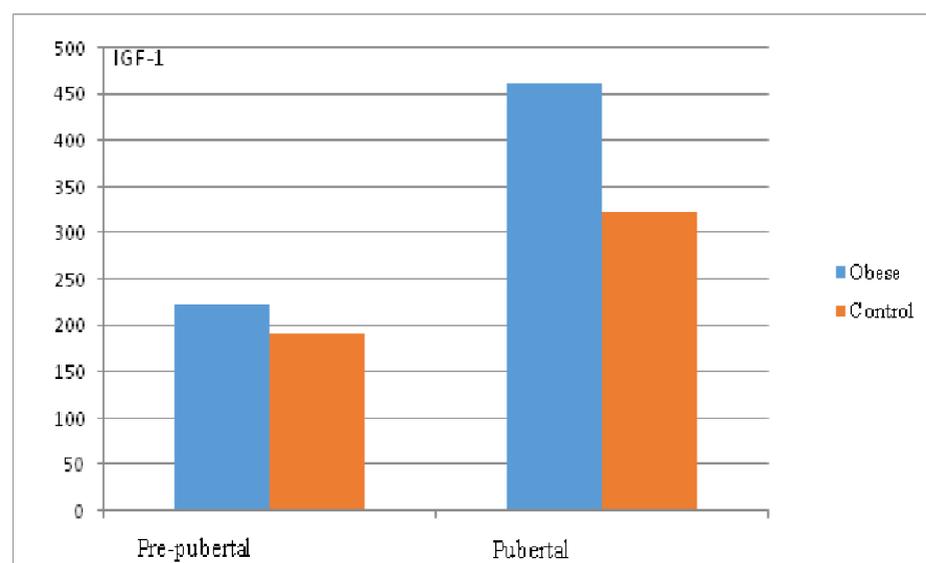
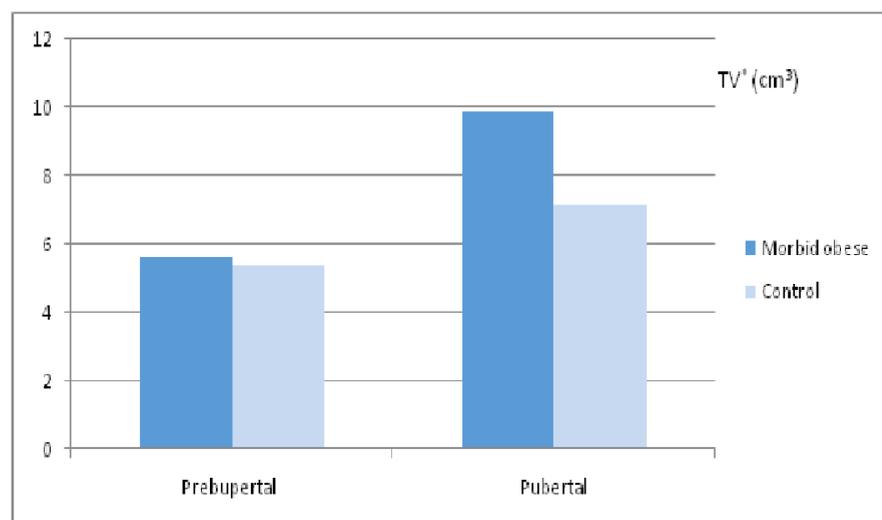
Studied variables	
BMI	Tanner stage
Thyroid volume	Urinary iodine
Thyroid function tests	IGFBP-3
IGF-1	

Results

	Pre-pubertal (n=169)			Post-pubertal (n=211)		
	obese (n=102)	Control (n=67)	p value	obese (n=120)	Control (n=91)	p value
Boys/girls	50/52	27/40	0.854	60/64	45/46	0.253
IGF-1 (ng/ml)	224.61	192.35	0.951	462	324.17	0.023
IGF-1 SDS	0.23	0.19	0.725	1.82	1.34	0.054
IGFBP-3 (ng/dl)	3.31	3.84	0.951	6.54	4.22	0.042
IGFBP-3 SDS	-1.37	-1.1	0.640	-0.89	-1.1	0.076
IGF-1: IGFBP-3*	28.33	25.46	0.693	49.51	32.49	0.031

Thyroid volumes and serum IGF-1 levels according to pubertal stages

Pubertal Status	Tanner Stage (n)	TV			IGF-1		
		Obese	Control	p	Obese	Control	p
Prepubertal (n=169)	1 (169)	5.61	5.36	0.603	224.61	192.35	0.951
Pubertal (n=211)	2 (124)	9.43	7.67	0.008	486.30	347	0.033
	3 (45)	9.91	8.83	0.065	532.48	540	0.924
	4 (23)	10.23	9.74	0.725	548.63	539	0.681
	5 (19)	11.67	11.2	0.801	441.72	463	0.473



Conclusion

The present study demonstrates that thyroid size and serum IGF-1 increase in early pubertal phases of obese children. These results indicate that puberty contributes to increase in thyroid growth and elevate serum IGF-1 level after puberty in obese children.