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Clinical Case Seminar CCS4(1-4)

Growth arrest as unusual presentation of Hashimoto's Thyroiditis in a prepubertal girl

Letteria Morabito[1], Antonietta Spinuzza[1], Francesca Laganà[1], Giorgia Pepe[1], Tommaso Aversa[1], MalgorzataWasniewska[1]

[1]Outpatient Clinic of Pediatric Endocrinology, Department of Human Pathology of Adulthood and Childhood, University of Messina, Messina , Italy

Abstract

We describe a 13 years old girl with severe hypothyroidism due to Hashimoto's Thyroiditis (HT) with an unusual clinical presentation, characterized only by growth arrest in absence of goiter and other clinical signs of overt hypothyroidism, like fatigue, bradycardia or worsening of school performance. The immediate start of Levotiroxine treatment resolved growth arrest and promoted pubertal development. This case confirmed that HT with overt hypothyroidism should be considered in the differential diagnosis of severe short stature in pediatric age.

Key Words: atrophic thyroid, growth arrest, Hashimoto's thyroiditis, renal function impairment

Introducing Member: Filippo De Luca fideluca@unime.it

Corresponding Author: Letteria Morabito, letteria.morabito@gmail.com

Introduction

Hashimoto's thyroiditis (HT), also defined as chronic lymphocytic thyroiditis, is the most common cause of acquired primary hypothyroidism both in adult and pediatric population. It is more common in females and, in childhood, usually occurs in early to mid-puberty (1-2)

Its presentation is characterized by a wide range of signs and symptoms varying from the euthyroid to subclinical and to the overt hypothyroid form, and rarely also hyperthyroid form called hashitoxicosis (3). The most common clinical presentation of HT, above all hypothyroid form, is characterized by goiter, but the disease may also present an insidious onset with deceleration of linear growth and bone maturation, pubertal delay and worsening of scholastic performance (4-6). Adequate Levotiroxine (L-T4) treatment of hypothyroidism usually leads to normalization of auxological picture. We describe the case of a 13-years-old girl who was referred to our Outpatient Clinic of Pediatric Endocrinology for a three years history of growth arrest.

Case report

The patient was born preterm, and also small for gestational age (SGA), at the 33rd gestational week from twin pregnancy with a birth weight of 1100 g (-2.2 SDS) and a length at birth of 33 cm (-3.6 SDS).

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Neonatal screenings for hypothyroidism, phenylketonuria and cystic fibrosis were negative. She presented a satisfactory postnatal catch up growth during the first two years of life, followed by regular growth up to 9 years of age, with next arrest in growth rate (growth velocity 0.1 cm in 3 years).

During the auxological evaluation in our Outpatient Clinic of Pediatric Endocrinology , at the age of 13years, she presented: height deficiency, 3 years delayed bone age (Table 1). Her skin was dry, pale and there was no evidence of goiter. Her clinical pubertal development was B1/P1 according to Tanner stage. Thyroid hormones dosage showed an unexpected condition of severe hypothyroidism secondary to Hashimoto's thyroiditis, characterized by very high TSH levels (236.630 mIU/L, normal range 0.3-4.2 mIU/L), low FT4 concentration (3.2 pmol/L, normal range 9.0- 16.0 pmol/L) and marked positivity of Anti-Thyroperoxidase antibodies (3486 mIU/ml, normal range < 9.0 mIU/L) (Table 1). FSH, LH and Estradiol presented normal prepubertal serum levels (FSH 2.88, LH <0.1, Estradiol <5 pmol/L).Moreover, thescreening for coeliac disease was negative. General biochemical examinations were normal, excepting for increased levels of creatinine (1.3 mg/dl) and urea nitrogen (53 mg/dl).

Ultrasonographic thyroid evaluation revealed a well-sided but small atrophic gland with heterogeneous echotexture and hypoechoic micronodules (pseudonodular aspect).

L-T4 replacement therapy, at the dosage of 75 mcg/day (1.9 mcg/kg/day) was immediately started with subsequent normalization of thyroid and renal function parameters (Table 1). Moreover our patient showed an important catch up growth with regular progression of pubertal development and decrease of Body Mass Index. (Table 1)

Table1. Auxological and biochemical parameters modification at Hashimoto's thyroiditis diagnosis and during the first year of LT4 therapy.

	Diagnosis	**Follow up**		
Chronological age	**13,4**	**13,7**	**13,9**	**14,3**
Height(cm) **Height (SDS)**	132.8 -3.7	133.7 -3.6	136.7 -3.21	139.8 -2.94
Weight (kg) **Weight (SDS)**	39.5 0.57	37.6 0.17	32.3 -1.37	32.7 -1.76
BMI (kg/m2) **BMI (DS)**	21,3 0.15	17,6 -1,19	17,2 -1,39	16,7 -1,81
Creatinine (mg/dl)	1,3	0,9	0,7	0,6
Urea nitrogen (mg/dl)	58	53	42	31
FT4 (pmol/l)	3.2	12.3	13.5	13.4
TSH (□IU/ml)	236.63	0.24	0.4	0.
Pubertal development (B/P)	B1/P1	B2/P2	B3/P2	B4/P2

Normal range values : Creatinine 0.4-0.7 mg/dl (for age),Urea nitrogen 10- 50 mg/dl ,FT4 9.0- 16.0 pmol/L,TSH 0.3- 4.2 mIU/L

Discussion

Severe hypothyroidism, if untreated, might compromise growth and pubertal development and

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could be responsible of serious systemic and organ dysfunction.

We described a case of severe hypothyroidism due to Hashimoto's Thyroiditis with an unusual clinical presentation, characterized only by growth arrest in absence of goiter and other clinical signs of overt hypothyroidism. Thyroid ultrasound revealed typical picture of thyroiditis in condition of glandular atrophy. We weren't able to distinguish if the atrophy was due to the autoimmune process, as reported in literature (7, 8) or if it was due to a congenital thyroid gland hypoplasia, present since the birth, despite the negativity of neonatal screening.

After the start of L-T4 therapy, our patient showed a growth gain of 7 centimeters in the first year of treatment with regular progression of pubertal development and bone maturation.

Thyroid hormones, in fact, influence linear growth with a positive effect on bone maturation and chondrocyte differentiation on growth plate (9), causing the so- called "catch up growth spurt", characterized by an important increase of growth velocity (6). They play also a role in regulation of growth and function of several organs and tissues. This could explain the renal function alterations during hypothyroidism with next normalization of them, in our case, after L-T4 therapy, as was also already described in literature (10-11).

In our patient only the data relating to one year follow-up under L-T4 treatment were available, so we couldn't confirm the reaching the final height within the targeted one. A prolonged and untreated hypothyroidism might be, in fact, associated to an incomplete catch up growth and compromised final adult height (12-13).

A frequent consequence of longstanding severe hypothyroidism could be, in fact, a loss of height potential due to rapid bone age advancement that outpaces linear growth acceleration following initiation of L-T4 therapy, particularly in peripubertal-aged children (12). It was postulated that GnRHa treatment could be considered as one approach to prolong the opportunity for growth, but most of the published reports in this area are retrospective, single case reports and demonstrated absence of real benefits from the addition of such a therapy to L-T4 in children with severe hypothyroidism (14,15). In our case we could not consider this type of treatment because of lack of opportunity to prescription status in Italy for that kind of condition but we were also sure that further delaying puberty in a 13-year-old girl did not seem an acceptable solution. Furthermore, we had also to point out, the presence of perinatal anamnestic data (born preterm and SGA) that might adversely affect her final height in our girl.

In conclusion, we strongly recommend to consider growth failure as a possible unique presentation of acquired autoimmune hypothyroidism, even in absence of goiter and classical symptoms of thyroid hormones deficit.

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