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Case Report

Growth and Development in a incidentally diagnosed Resistance to Thyroid Hormone

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ABSTRACT

Resistance to thyroid hormone is an uncommon condition. We report the clinical and laboratory findings of a case with both resistance to thyroid hormone and, a reduced capacity to produce and respond to thyroid hormone. RTH is a disorder characterized by elevated circulating thyroid hormones, state of non-suppressed pituitary TSH secretion and refractoriness to hormone action in peripheral tissues. Resistance to thyroid hormone might be an important additional diagnosis to consider in cases where thyrotropin remains persistently elevated.

In this article we described an infant with RTH; her situation was diagnosed incidentally at birth with impaired hypothyroidism screening tests.

Introduction:

Thyroid hormone secretion has a suppressive effect on the excretion of thyroid stimulating hormone (TSH), both of them are controlled by a negative feedback loop between the hypothalamus-pituitary and thyroid (1). The syndrome of resistance to thyroid hormone (RTH) in 90% of cases is inherited as an autosomal dominant syndrome of reduced endorgan responsiveness to thyroid hormone, because of mutations in the carboxyl-terminal region of the thyroid hormone receptor-beta (THR-b) gene (2). In most cases there is not a clear correlation between genotype and phenotype. RTH is associated to point mutations in the T3-binding domain of the (THR-b) gene (3). This condition first was identified and described in 1967 by Refetoff and it is estimated that its prevalence might be about 1:40000 (2). RTH key finding is high T4 level with normal or inappropriate raise of TSH serum level with no metabolic consequences (4).

Clinical characteristics have a wide range; from asymptomatic patient whom diagnosed incidentally to debilitating symptoms such as hyperactivity, short stature, mental retardation, tachycardia or speech disorders (3). In female patients an elevated risk of miscarriage during pregnancy might happen (2). Thyroid antibody tests should be performed regularly to detect the development of coexisting autoimmune thyroid disease.

We present a girl with RTH and impaired thyroid function tests.

Case report

An 8 months old infant was referred to our hospital because of impaired thyroid function test which was diagnosed incidentally in thyroid screening tests after birth with nearly normal growth and development.

In past medical history her parents were relatives and healthy, perinatal care was performed as standard protocol for her mother. She was the first child of the family and was born by normal vaginal delivery with good apgar score. Her birth weight was 2500 grams.

Her growth status was measured at the admission as below:

Weight=6800 g ~ 5th percentile curve

Height= 68 cm ~ 25th percentile curve

Head circumference=41.8cm ~ 5th percentile curve

Her physical examinations were normal, and neurologic development was adjusted normally to age.

The results of her thyroid function tests were shown in table 1.

Thyroid gland was evaluated by ultrasound, right lob dimension was 7*8*18 mm and the left

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one was 8*8*18 mm, which had normal size and paranchymal echo.

Discussion

This case report described a thyroid hormone resistance syndrome in an 8 months infant with normal growth and development. Reports about diagnosis of neonatal hyperthyroxinemia detected by neonatal screening are very rare (5). Lafranchi and cols (6) performed the first systematic study of neonatal screening for hyperthyroxinemia.

Thyroid hormone action is regulated by the products of two genes: (TRa) and TRb.RTH is happened because of various mutations in the b-subunit of the THR and the pattern of inheritance is autosomal dominant, such mutations lead to impaired T3 binding, or interference with receptor expression (6). The differential diagnosis in the present case was TSHoma. TSHoma can be discovered using magnetic resonance imaging (MRI) (7).

Most of patients with RTH syndrome adequately compensate for their situation through increased thyroid hormone secretion, have no clinical manifestations and are clinically euthyroid, so they require no specific treatment (8). For patients with clinical features there are some therapeutic options to correct the imbalance of thyroid hormone level and response in both the hypothalamus-pituitary and peripheral tissues. Thyroid hormone analogues Triiodothyroacetic acid and D-thyroxin have also been successfully used to decrease serum TSH and thyroid hormone levels but this is not always lead to clinical improvement (9). On the other hand thyroid hormone replacement in patients with RTH should be monitored carefully because of thyrotoxic cardiac side effects in addition to consideration of TSH level normalization (10).

Conclusion

RTH must be considered in all patients with inappropriate TSH secretion. The clinical manifestation of patients with RTH is heterogeneous.

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Table3. The results of thyroid function test

	Screening after birth	**55 days old**	**3 months**	**8 months**
T4	14.5 micg.dl (10-16)	22.49 micg.dl (6-12)	19.3 micg.dl (7.2 - 14.4)	13.3 micg.dl (7.8 - 16.5)
T3	1.8 (0.52 -1.85)	1.42 nmol.lit (0.92 - 2.37)	-	241ng.dl (80-320)
TSH	4.6 mIU.ml (0.3 – 5.9)	4.34 mIU.ml (1.7 – 9.1)	4.12 mIU.ml (0.5 - 6.7)	4.34
T3 RU	31% (25 - 38)	32.58	35%	32% (25-37)
FTI	4.5 (1.2 – 4.1)	-	-	4 (1.2 – 4.5)
Free T4	-	-	32.5 pmol.lit (10.3 - 23)	-