

Starting treatment in congenital hypothyroidism with normal FT4 levels and thyroid gland in situ detected at neonatal screening

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Background

Recently the diagnosis of congenital hypothyroidism (CH) has increased, in response to the introduction of screening programs, particularly for patients with a eutopic thyroid gland (normally located) and a mild elevation in thyroid-stimulating hormone (TSH). Thyroid hormones play an important role in early neurodevelopment, and thus the early treatment of hypothyroidism is crucial.

Current guidelines recommend initial levothyroxine (LT4) dose of 10-15 µg/kg/die as soon as possible, if diagnosis is confirmed by serum test, even if FT4 concentration is normal and venous TSH concentration is > 20 µUI/ml.



Objective and hypotheses

In our study we evaluated the initial LT4 dose in CH newborn with normal level of FT4 and normal thyroid gland in situ.

Methods

We conducted a retrospective charts review of all CH patients seen at Bambino Gesù Children's Hospital from 2013-present. We included all newborn in whom confirmatory serum test demonstrated TSH > 20 µUI/ml and normal FT4 levels. In all patients thyroid ultrasonography showed a normal gland in situ. We considered exclusion criteria: preterm birth, genetic syndrome and chronic disease.

Results

Tab. 1 Baseline characteristics (n = 24)

	Mean (SD)
Birth	
Sex	10 F/ 14 M
Gestational age	39± 1.13
Birth weight, Kg	3.2± 0.4
Median (range)	
Diagnosis	
TSH at diagnosis, µUI/ml	38.65 (31.1-56.06)
FT4 at diagnosis, ng/dl	1.0 (0.72-1.4)
Mean (SD)	
LT4 treatment	
Age at LT4 initiation, days	29.2 ± 7.9
Initial LT4 dose, µg/kg/day	5.6 ± 1.7

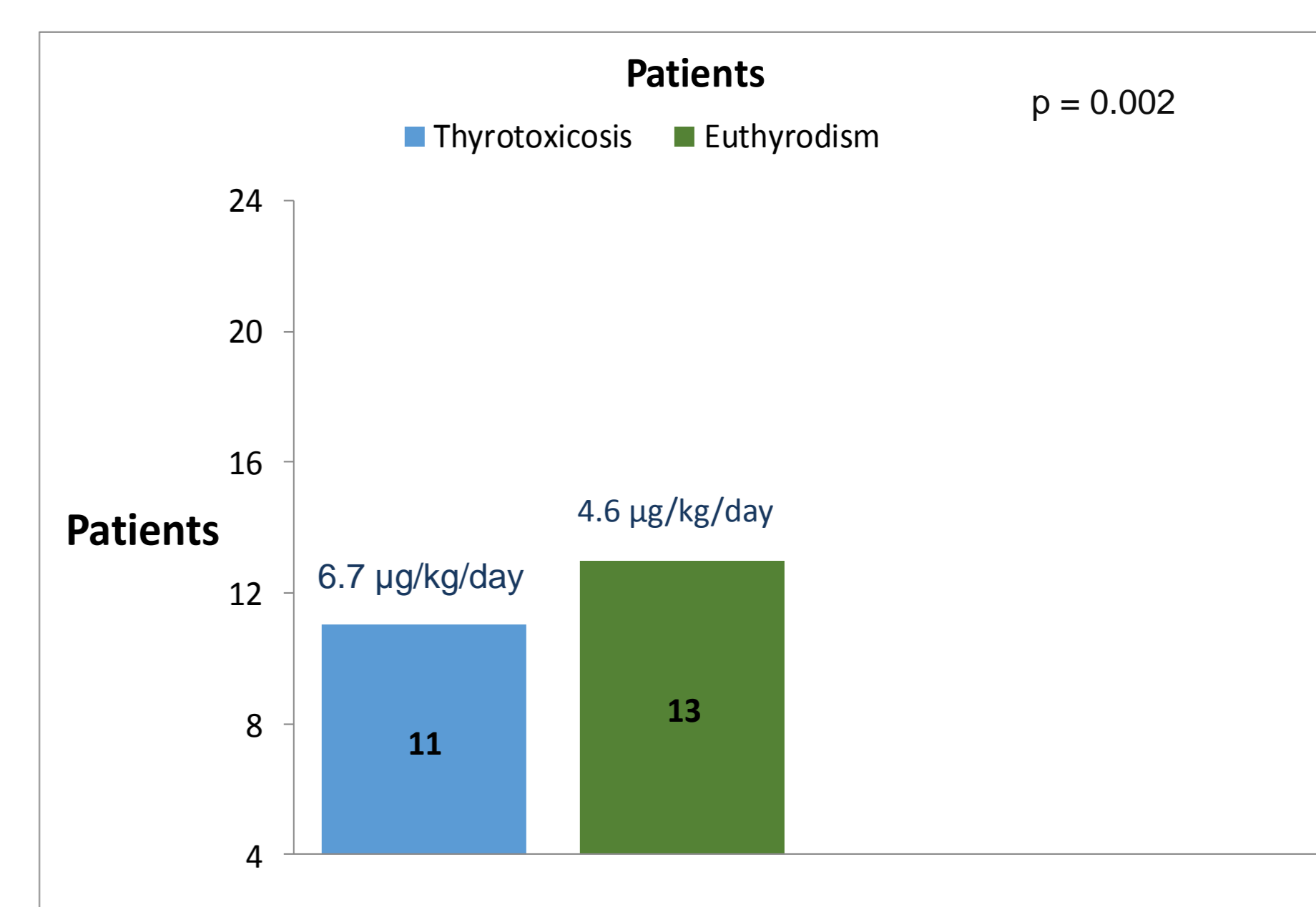
Tab. 2 TSH and FT4 values, after LT4 treatment (n = 24)

	15 days	1 month
TSH, median (µUI/ml)	2.1 (0.8-5.5)	2.4 (0.5-3.7)
FT4, mean (ng/dl)	1.6(± 0.28)	1.58 (± 0.28)

Tab. 3 Number of patients with FT4 > 1.7 ng/dl after 15 days (FT4 normal value 0.8-1.7 ng/dl)

Patients (n= 24)	FT4 after 15 days	LT4 starting dose, mean (SD)
11	FT4> 1.7 ng/dl	6.7 ± 1.5 µg/kg/day
13	0.8 ng/dl<FT4<1.7 ng/dl	4.6 ± 1.1 µg/kg/day

Fig.1 Starting dose and pts with thyrotoxicosis or euthyroidism after 15 days of LT4



Conclusions

After 15 days of LT4 treatment, we obtained normalization of TSH and FT4 values at mean dose of 4.6 µg/kg/day and with this starting dose, none of the patients showed values of FT4 > 1.7 ng/dl. Instead, patients treated with a higher starting dose (mean 6.7 mcg/kg/day) showed thyrotoxicosis after 15 days of treatment. These results indicate that CH mild forms may require lower LT4 starting dose.

Larger prospective studies are needed to validate our findings and to investigate the optimal LT4 dose required in CH mild forms.

References

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