

Hyperthyrotropinemia of the preterm newborn: treat or not to treat?

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Disclosure Statement

The authors have no conflicts of interest to disclose.

Introduction and objectives

Hyperthyrotropinemia with normal FT4 levels and thyroid gland imaging, defined as "subclinical hypothyroidism", is reported in 1/300 preterm newborns. It is still uncertain if this condition requires temporary replacement therapy or it is a simple physiological energy sparing phenomenon. Our study aimed to find which kind of clinical characteristics and pathological condition are commonly associated to subclinical hypothyroidism in the preterm newborn.

Methods

Patients

- 35 preterm newborns (21 males, 14 females)
- gestational age (GA) 32.0 (2.1) weeks
- 13 small for gestational age (SGA)
- TSH neonatal screening in the dried blood spot (DBS) >10 μ U/ml at 1st test, or >5 μ U/ml at 2nd test
- persistent hyperthyrotropinemia during hospitalization

Clinical data collected

- GA, birth weight (BW), length (BL) and head circumference, clinical complications (RDS, jaundice, infections)
- TSH level in DBS and in the serum sample
- time of starting L-thyroxine replacement therapy and its dosage at steady state.

Statistical analysis

Data are reported as median (IQR). Mann-Whitney test and simple regression were applied for statistical analysis. Significance was set at 0.05

References

- La Franchi S. **Screening preterm infant for congenital hypothyroidism: better the second time around.** J Pediatr. 2014 Jun;164(6):1259-61. doi: 10.1016/j.jpeds.2014.02.031. Epub 2014 Mar 20.
- Lee JH, Kim SW, Jeon GW, Sin JB. **Thyroid dysfunction in very low birth weight preterm infants.** Korean J Pediatr. 2015 Jun;58(6):224-9. doi: 10.3345/kjp.2015.58.6.224. Epub 2015 Jun 22.
- Soto-Rivera CL, Fichorova RN, Allred EN, Van Marter LJ, Shah B, Martin CR, Agus MS, Leviton A. **The relationship between TSH and systemic inflammation in extremely preterm newborns.** Endocrine. 2015 Mar;48(2):595-602. doi:10.1007/s12020-014-0329-4. Epub 2014 Jul 6.
- Torkaman M, Ghasemi F, Amirsalari S, Abyazi M, Afsharpaiman S, Kavehmanesh Z, Beiraghdar F, Saburi A. **Thyroid Function Test in Pre-term Neonates During the First Five Weeks of Life.** Int J Prev Med. 2013 Nov;4(11):1271-6.
- Vigone MC, Caiulo S, Di Frenna M, Ghirardello S, Corbetta C, Mosca F, Weber G. **Evolution of thyroid function in preterm infants detected by screening for congenital hypothyroidism.** J Pediatr. 2014 Jun;164(6):1296-302. doi: 10.1016/j.jpeds.2013.12.048. Epub 2014 Feb 8.

Results

	SGA	AGA-LGA	p	RDS+	RDS-	p
n	13	22		23	12	
GA (weeks)	31.57 (1.14)	32.00 (4.86)	ns	31.00 (3.73)	33.21 (3.99)	<.0001
M/F (nr)	8/5	13/9	ns	17/6	4/8	ns
BW SDS	-1.75 (0.35)	-0.38 (0.65)	<.0001	-0.72 (1.73)	-0.57 (0.96)	ns
TSH* (mcU/ml)	6.4 (2.9)	8.7 (23.5)	ns	6.9 (4.9)	10.5 (20.9)	ns
TSH** (mcU/ml)	14.6 (5.1)	22.6 (69.9)	<.05	14.6 (7.9)	24.0 (66.0)	<.05
FT4 (ng/dl)	1.36 (0.59)	1.17 (1.08)	ns	1.32 (0.61)	1.21 (1.21)	ns
Tx/nTx (nr)	10/3	14/8	ns	18/5	6/6	=.056
LThy-Tx(μ g/kg/day)	7.0 (6.2)	7.0 (4.2)	ns	6.6 (4.0)	10.0 (2.0)	<.05

* DBS detection; **detected in serum

TSH levels and time of detection of pathologic values were not correlated to GA, BW, BL and head circumference. SGA showed lower serum TSH. The patients with RDS showed lower TSH levels compared with patients without RDS and required lower L-Thyroxine dosage at steady state (see table). The starting time of replacement treatment was inversely correlated to BW (fig 1) and BL (fig 2), but was not different in SGA compared to appropriate or large for gestational age (AGA-LGA) newborns. The patients who received replacement treatment had significantly higher pretreatment TSH in serum but not in DBS (fig 3).

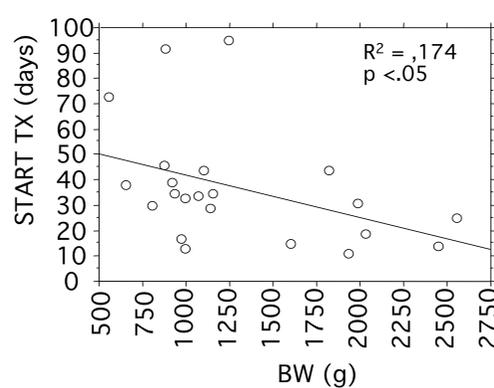


FIG 1

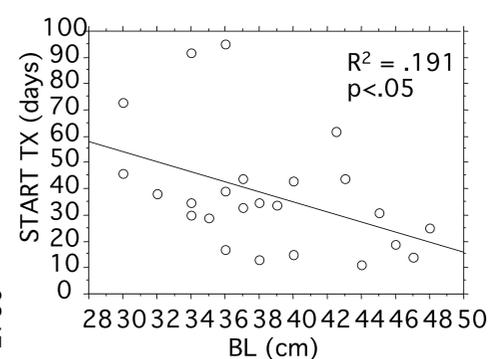


FIG 2

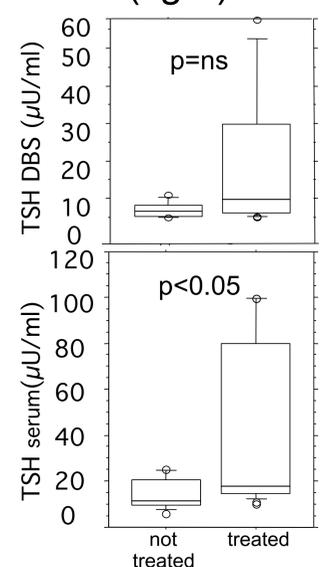


FIG 3

Conclusions

Our results show that RDS and impaired growth in hyperthyrotropinemic preterm newborn are associated with lower TSH levels suggesting that subclinical hypothyroidism could play a protective effect on growth and respiratory function in the preterm newborn, possibly through an energy sparing strategy. In this perspective a substitutive treatment should be started with caution.

