EVALUATION OF THYROID FUNCTION IN PRETERM 24-30 WEEKS OF GESTATION

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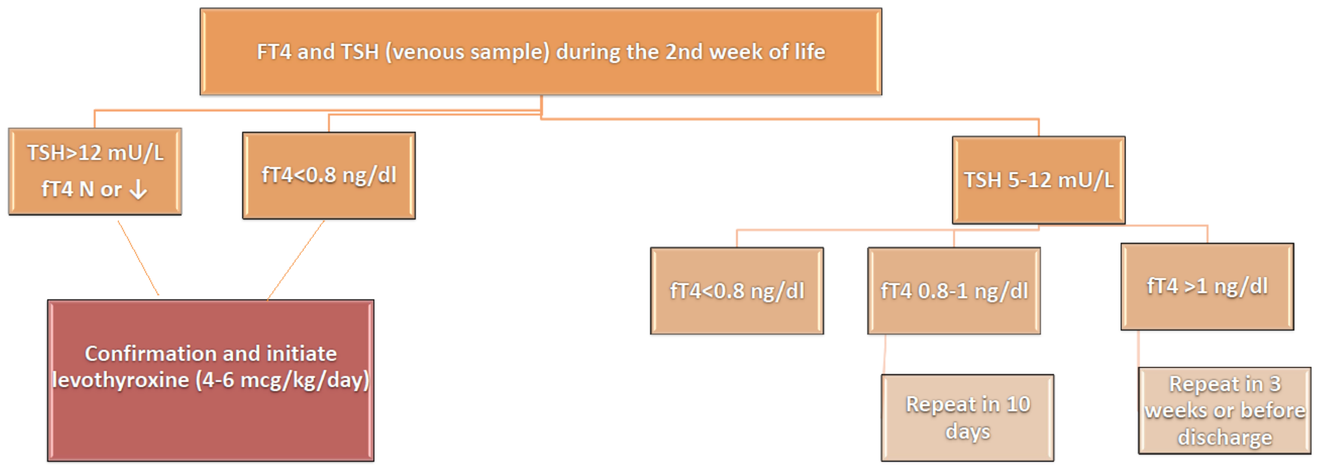
INTRODUCTION: Preterm newborns are at risk of decreased thyroid function due to their immaturity, a higher incidence of mortality and increased susceptibility to iodine. Low levels of thyroid hormones during a critical period for central nervous system development may negatively affect their psychomotor development.
Screening for congenital hypothyroidism with capillary TSH is invalid for preterm babies and would require an specific thyroid function control.

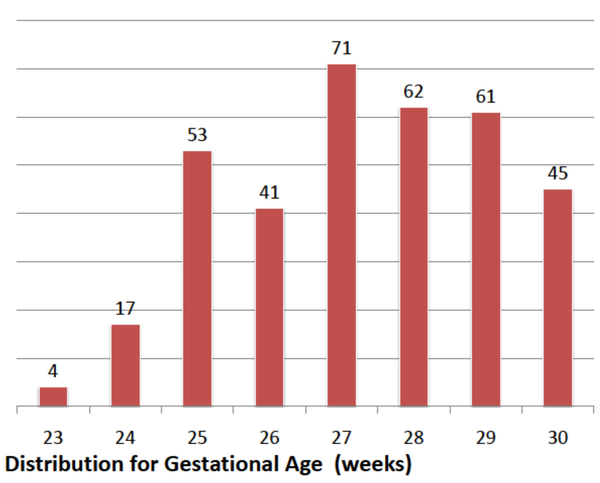
PURPOSE: To assess the protocol applied in our hospital during 2011-2014
To analyse the prevalence of hypothyroxinaemia and hyperthyrotropinemia of prematurity
To review how many premature are treated and their clinical evolution.

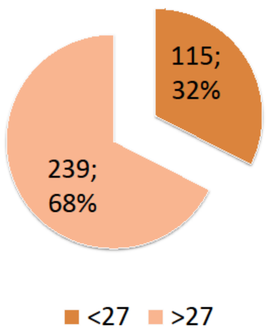
METHODS: Longitudinal descriptive and prospective study of thyroid function in preterm infants admitted to NICU during 2011-2014
Hypothyroxinemia definition: Free T4 (FT4) <0.8 ng/dl



RESULTS

1. Characteristics of the study population N = 354



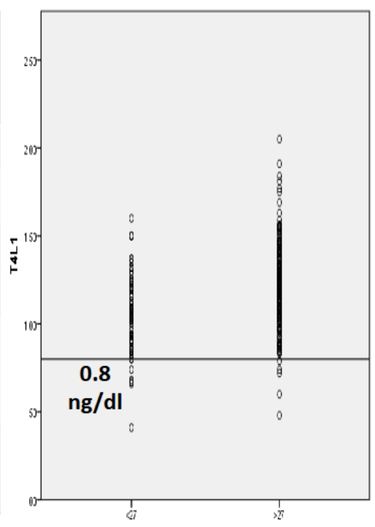


	< 27 WG	>27 WG
N	115 (55% male)	239(55% male)
BIRTH WEIGHT mean (g)	775,59 (+/-153)	1089 (+/-243)
SGA	4 (3%)	23 (9%)
HYPOTHYROXINEMIA at 1st blood test *	5	5
HYPOTHYROXINEMIA at 2nd blood test *	3	2
TREATED	3	9

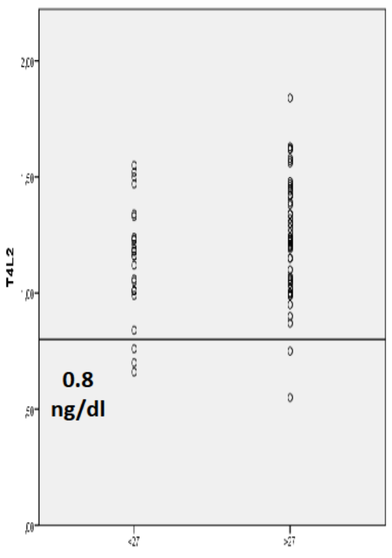
*(FT4 <0.8 ng/dl and normal TSH)

2. Neonates diagnosed of Hypothyroxinemia of prematurity N=15 (3%)

1 st blood test	< 27 WG	>27 WG	
N	115	239	
Days of life	18.7+/-8.9	15.8 +/-6.3	
FT4 mean (ng/dl)	1.05 (r 0.41-1.6)	1.21 (r 0.48-2.05)	P 0.28
Patients with FT4 <0.8 ng/dl	5	5	
TSH mean (mU/L)	4.64 (r 0.9-14.5)	5.10 (r 0.3-46.6)	P 0.15



2 nd Blood Test	< 27 WG	>27 WG	
N	26	62	
Days of life	31.6+/-17	27.3 +/-11	
FT4 mean (ng/dl)	1.14 (r 0.66-1.5)	1.23 (r 0.48-2.05)	P 0.8
Patients with FT4 <0.8 ng/dl	3	2*	
TSH mean (mU/L)	5.2 (r 0.41-25)	6.5 (r 0.09-58)	P 0.2



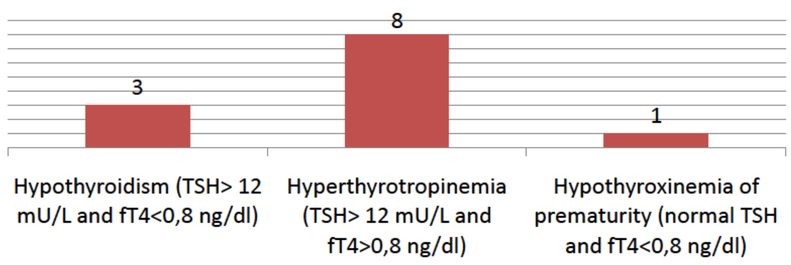
*there's only 1 SGA patient with FT4 <0.8 ng/dl

3. Number of Blood Test Analysis

	Number of blood tests	Days of life	TSH>12 mU/L	TSH>15 mU/L	RT4< 0,8 ng/dl	Repeated blood tests	%	Insufficient sample	%
1 BT	314	16.8 (+/-7.2)	13 (12.4-46)	6	10 (0,41-0,79)	97	27	46	13
2 BT	98	28.7 (+/-13.9)	8 (12.5-58.3)	6	5 (0,66-0,77)	31	8,8	7	2
3 BT	31	40.1 (+/-22.9)	1(17.9)	1	1	14	3,4	5	1,4
4 BT	11	43 (+/-15.1)	1 (19.6)	1	1	9	2.5	0	
5 BT	10	51.2 (+/-9.7)		0	0	4	1,1	0	
6 BT	4	60,7 (+/-20.5)		0	0	1		0	
7 BT	1	98		0	0	1		0	
8 BT	1	118		0	0	0		0	
TOTAL	470					157	33	58	12

4. Neonates treated N=12 (3.7%)

Diagnosis:



4. Evolution of the treated patients N=12 (3.7%)

Hypothyroxinemia

WG sex	BIRTH WEIGHT (g)	Days at 1st BT	TSH 1 mU/L	F T4L 1 ng/dl	Neonatal screening for CH	OBS	CURRENT SITUATION
24 M	720	15	1.27	0.41	60 days of life. Normal	Dopamine	3 years old L-T4 until discharge Normal Thyroid US

Hypothyroidism

WG sexo	BIRTH WEIGHT (g)	Days at 1st BT	TSH 1 mU/L	FT4 1 ng/dl	Days at 2nd BT	TSH 2 mU/L	FT4 ng/dl 2	Neonatal screening for CH	OBS	CURRENT SITUATION
24 M	750	24.4	17	1.4	19	25	0.76	30 days of life. Normal	Surgical PDA 12 days of life	12 months Thyroid US normal Still in treatement L-T4 25 mcg
30 M	1450	25	41	0,48	33	4,4	1.39	13 days of life. Normal	NO	3 Years old Thyroid US normal Lost to follow up
28 F	1220	16	10.37	1.05	33	58,3	0.55	8 days of life. Normal	NO	2 years old Normal Thyroid US Stop L-T4 at 12 months

Hyperthyrotropinemia

WG sex	BIRTH WEIGHT (g)	Days of life when L-T4 is initiated	TSH (mU/L) at start L-T4	FT4L (ng/dl) at start L-T4	Neonatal screening for CH	OBS	CURRENT SITUATIO
24 M	495	60 (5th BT)	13	1.2	40 days. Normal	NO	21 months No thyroid US stop L-T4 at 4 months of life
25 F	630	25 (2nd BT)	15.6	1.18	3 days. Normal	Surgical PDA 20 days of life	7 months No thyroid US Still L-T4
27 M	730	36 (2nd BT)	18	1.6	5 days. Normal.	NO	2 years Thyroid US normal Still L-T4
27 F	600	30 (2nd BT)	32.4	1.23	3 days. Normal	NO	2 years No thyroid US stop L-T4 at 6 months

WG sex	BIRTH WEIGHT (g	Days of life when L-T4 is initiated	TSH (mU/L) at start L-T4	FT4L (ng/dl) at start L-T4	Neonatal screening for CH	OBS	CURRENT SITUATION
28 M	700	33 (4th BT)	19.6	1.02	20 days. Normal	Abdomen surgery. 4 days	17 months Normal Thyroid US Still L-T4 10 mcg/day
28 M	820	21 (2 nd BT)	26.8	1.05	3 days. Normal	NO	3 years Normal Thyroid US Still L-T4 30 mcg/day
30 M	1410	23 (1st BT)	46.6	0.9	3 days. Normal	Dopamine L-T4 intoxication	3 years Normal Thyroid US Still L-T4 12.5 mcg/day
30 M	685	24 (2nd BT)	12.5	1.62	3 days. Normal	NO	14 months No thyroid US Stop L-T4 at 3 months

CONCLUSIONS

- It's mandatory to follow-up thyroid function in preterm infants
- Not all preterm infants present hypothyroxinemia, therefore universal L-T4 supplementation may not be necessary for this population
- The implementation of our protocol does not represent excessive number of additional blood extractions
- No relationship between PEG and hypothyroxinemia was found
- Our protocol is able to detect treatable patients that could go unnoticed (hypothyroxinemia, mild hyperthyrotropinemia, hypothyroidism)

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