

# Comparison of Serum marker as predictive factor in permanent congenital hypothyroidism and transient congenital hypothyroidism

Se Young Kim, Min Sub Kim

Department of Pediatrics, Bundang Jesaeng General Hospital, Daejin medical center, Seongnam, Korea

## Objectives

Neonate who are in condition with congenital hypothyroidism(CH) has great potential to be mental deficit unless he/she would be treated early and appropriately. The NST (neonatal screening test) with TSH(thyroid-stimulating hormone) screening has become standard in many part of the world for 30 years. This strategy has led to improvement of neurologic development of the children with CH by earlier thyroid hormone replacement therapy. However, frequent positive cases has resulted that increasing detection of mild and transient forms of CH. So, the aim of this study was to recognize difference between transient CH (TCH) from permanent CH (PCH) by estimating characteristics, laboratory test and imaging studies might be possible as predictive factors for prognosis.

## Methods

We performed retrospective reviews, using database of pediatric department of Bundang Jesaeng General Hospital, Daejin Medical Center, Korea from Jan. 1998 to Feb. 2016. Age, birth weight, gestational age, symptoms, age at diagnosis and treatment were recorded for each patient. We measured TSH, free thyroxine(FT4), total triiodothyronine(TT3) level at diagnosis and treatment, at one, two and three months after treatment. Treatment dose of start, at one, two and three years were also recorded. Thyroid scan(Tc99m scintigraphy), thyroid ultrasonography reports were described. The size of thyroid were calculated with sum of multiplication wide by height each left and right thyroid. The Statistical Package for the Social Sciences(SPSS) 17 package software was used for the statistical analyses of the data. Student's t test, Mann-Whitney U test were used.

## Results

Among the 282 neonates included in the analysis, 51(26 male, 51%) were diagnosed with congenital hypothyroidism. 27(18 male, 66.7%) were identified as TCH. Serum TSH levels measured at the time of diagnosis were significantly different between two groups that showed TSH levels of PCH group (mean TSH 150.49 IU/mL, median 77.70IU/mL, 25-75% 43.8-185IU/mL) were higher than that of TCH group (mean TSH 30.29IU/mL, median 21.40IU/mL, 25-75% 17.1-29.16IU/mL) ( $p=0.001$ ). FT4, TT3 levels measured at the time of diagnosis also had significant differences between two groups. (FT4: PCH; mean FT4 0.73 ng/dL  $\pm$ SD 0.50, TCH; mean FT4 1.17 ng/dL  $\pm$ SD 0.53,  $p=0.02$ ) (T3: PCH; mean T3 1.36 ng/mL,  $\pm$ SD 0.68, TCH; mean T3 1.90 ng/mL,  $\pm$ SD 0.35,  $p=0.019$ ). There were significant difference between the two groups both in the FT4 level measured at two months later from start of treatment. FT4 in PCH group were higher ( $p=0.034$ ), Treatment doses required between two groups had significant difference in only after 2 years of therapy. Thyroid USG was normal in 53.3% of patients with PCH compared with TCH group that all patients was normal. We found another difference in Tc<sup>99m</sup> scintigraphy reports. The sizes of thyroids in patients of PCH group were bigger than TCH group ( $p<0.033$ ).

Variable	Permanent hypothyroidism	Transient Hypothyroidism	P value
TSH level at diagnosis*	77.70(43.8-185)	21.40(17.10-29.16)	0.001
T3 level at diagnosis	1.35 $\pm$ 0.69	1.90 $\pm$ 0.35	0.019
FT4 level at diagnosis	0.73 $\pm$ 0.51	1.16 $\pm$ 0.53	0.020
Duration of time at birth to start of treatment *	17.00(12.00-22.00)	31.15 $\pm$ 13.78	0.033
FT4 level 1 months later from treatment	1.93 $\pm$ 0.60	1.80 $\pm$ 0.46	0.511
FT4 level 2 months later from treatment	1.93 $\pm$ 0.30	1.65 $\pm$ 0.29	0.034
FT4 level 3 months later from treatment	1.89 $\pm$ 0.39	1.54 $\pm$ 0.43	0.082
Size of thyroid on Thyroid scan	6.10 $\pm$ 2.09	4.31 $\pm$ 1.11	0.033

## Conclusions

According to these data, we may consider initial measurements of Serum TSH, FT4, T3 as predictive factors in categorizing TCH from PCH. Perhaps, the size of thyroid from Tc<sup>99m</sup> scintigraphy could be useful for differentiating TCH from PCH

## References

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