

Neonatal thyroid screening: Relationship between cord blood thyroid stimulating hormone levels and thyroid stimulating hormone in heel prick sample on 4th to 7th day-of-life

Sir,

Neonatal thyroid screening is considered one of the best cost-effective tool to prevent mental retardation in population. Different strategies are suggested for thyroid hormone estimation in the sample obtained at birth using cord blood or later in the neonatal period.^[1-4] The study estimates the correlation between the serially monitored levels of thyroid stimulating hormone in serum obtained from cord blood (TSH-CB) and heel prick (TSH-HP) at 4th to 7th day-of-life.

This cross-sectional observational study was performed between November 2001 and March 2003. Live newborns >28 weeks of gestation at birth were enrolled after taking informed consent from parent. The presented data was from a subset of newborns that were undergoing thyroid screening using cord blood TSH under a separate research project.^[5] A total volume of 5 ml of cord blood was drawn, centrifuged and serum refrigerated. Another sample was collected at the 4th to 7th day-of-life by heel prick on a labeled filter paper (Schleicher and Schuell #903). Estimation of TSH was performed using immunoradiometric assay. The study was approved by the Ethics Committee of the Institute. Difference between the results obtained by 2 strategies was compared using paired *t*-test and the correlation estimated using statistical package for the social sciences version 16 (SPSS Inc, Chicago).

Over the study period, 130 neonates were enrolled. The mean (range) gestational age and birth weight was 38.16 weeks (28-42 weeks) and 2600 g (800-4500 g), respectively. Almost half were males, 15 were delivered

by cesarean section, 14 were preterm, 57 were low birth weight and 24 were small for gestational age.

The comparison between TSH-CB and TSH-HP is given in the Table 1. There was no statistically significant difference observed in mean TSH values. However, in one baby with cord blood TSH 29.4 $\mu\text{U}/\text{ml}$, the TSH-HP was 60.4 $\mu\text{U}/\text{ml}$ and FT4 was in normal range. The TSH-HP increased with increasing TSH-CB with a positive correlation coefficient of 0.87.

A comparison reported from Portugal showed technical superiority of cord blood TSH over heel prick T4 based screening.^[2] Similar results, with lower recall rate associated with primary TSH screening, were also reported from India.^[3] Hardy *et al.* reported better sensitivity of TSH-HP compared with TSH-CB which, in turn, was found to be more sensitive than cord blood FT4 based screening.^[4]

Sample drawn at the 4th to 7th day-of-life is less likely to be affected by the surge in thyroid hormones secondary to the event of birth and the strategy can be applied in the newborns missed during cord blood screening. On the other hand, using cord blood offers advantages of availability in abundance, ethical appropriateness and ensured compliance since it can be collected in all newborns before the discharge in hospital. The observed positive correlation between TSH-CB and TSH-HP appears to be independent of perinatal factors such as birth weight, gestational age and mode of delivery, which are known to interfere with the thyroid status in newborns.^[5] Our observations indicate that same cut-off value for recall can be used for TSH-CB and TSH-HP for screening of congenital hypothyroidism.

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Table 1: Value of TSH among newborns (n=130) as estimated on CB and HP sample on 4th to 7th day-of-life

	TSH-CB	TSH-HP
Mean \pm SD ($\mu\text{U}/\text{ml}$)	8.28 \pm 5.47	8.83 \pm 7.27
Median ($\mu\text{U}/\text{ml}$)	6.6	8
Range ($\mu\text{U}/\text{ml}$)	1.4-29.4	0-60.4
Number of newborns with TSH ($\mu\text{U}/\text{ml}$) between		
1-10	89	90
10.1-20	35	34
20.1-30	6	5
>30	0	1

CB: Cord blood, HP: Heel prick, TSH: Thyroid stimulating hormone, SD: Standard deviation

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