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Research Article

Serum FT4 and TSH Levels in Preterm Babies and the Relationship between these Levels and Respiratory Distress Syndrome

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Abstract

This study aimed to investigate the relationship between serum free thyroxine (FT4) and thyroid-stimulating hormone (TSH) levels in preterm infants and their association with the risk of respiratory distress syndrome (RDS). Preterm babies were enrolled in the study, and blood samples were collected to measure FT4 and TSH levels within the first 24-48 hours of life. The occurrence of RDS was documented based on clinical and radiographic findings. Statistical analysis was performed to evaluate the correlations between FT4, TSH levels, and the development of RDS.

The study was conducted in Al Basel Hospital (Aleppo University Hospital) in the period of February 2010 to February 2011.

Discussion:

The study included preterm newborn during first 24 hours of birth and the samples were withdrawn in the first two hours of birth according to the plan of comparative study of Japan. These samples are blood samples were taken from the umbilical vein or from a peripheral vein and calibrated and FT4 and TSH were compared and linking the results statistically with gestational age, birth weight and sex and monitoring the baby whether will evolve RDS and compare with the results.

The study included 80 preterm aged 22–36-week gestational age. The study excluded the preterm with birth defects, cretinism, disease adenoma of the mother, drug abuse, alcoholic, who received TRH prenatally. 16 of these cases died after sampling and the cause whether related to RDS. The 16 deaths were excluded from the study.

Results:

After sterilization of the sample site, a 3 ml of venous blood was withdrawn.

Statistical analysis of the cases was done using SPSS, and all results were expressed as mean and standard

deviation. Statistical information is expressed as $p<0.05$.

1.FT4 level and gestational age: It was observed that there was a clear increase in the serum level at the exit with increasing gestational age, as the p-value for this study was 0.01, which indicates that it has a statistical value. While the P value is less than 0.01 in the comparative study. The value of FT4 increased from gestational week 25-27 to gestational week 34-36 about four times.

2.TSH level and gestational age: There is also a clear increase in TSH with increasing gestational age. It is very low in premature infants at about 25-27 weeks of age, and it increases about 6 times in premature infants between 34-36 weeks of gestation. In comparison with the Japanese study, we found that preterm infants at about 25 weeks of gestation had the equivalent of 20% of the TSH level of preterm infants between 34-36 weeks. The P value for this study was equal to zero, and the reason for this decrease is the immaturity of the hypothalamic-pituitary-thyroid axis, and this maturation occurs after week 34.

3.The relationship of FT4 with birth weight: There is a relationship between the level of FT4 and birth weight, as we notice that the higher the birth weight, the greater the serum level of FT4. According to the conditions of our study, this is consistent with the Japanese study, where the P value in our study was equal to 0.00. This value indicates that the characteristic changes are not by chance, while in the comparative study P = 0.01.

4.The relationship of TSH with birth weight: There is a relationship between birth weight and the serum level of TSH according to the conditions of our study, as the higher the birth weight, the higher the level of TSH, and this is consistent with the comparative study as well. The P value for our study = 0.00, while the P value for the comparative study = 0.01.

5.The relationship of FT4 and TSH with the sex of the newborn: We note that in our study there is no relationship to gender in the level of thyroid hormone, and this is also consistent with the comparative study. The p-value for our study = 0.7, while in the comparative study it is 0.51. We note that in our study there is no relationship between gender and TSH level, and this is also consistent with the comparative study.

6.The relationship of FT4 and TSH with the type of birth: We note that there is no relationship between the level of FT4 and the type of birth, as in our study P = 1.14, which is consistent with the Japanese comparative study, P = 0.11. We note that in our study there is no relationship or no effect of the type of birth, whether vaginal or cesarean, on the TSH level, where P = 2.836, in contrast to the comparative study, which shows that the TSH level in newborns with a cesarean delivery is higher than in newborns with a vaginal

delivery, P < 0.01.

Gestational age	Number of normal deliveries	Mean FT4	standard deviation
W 22-24	1	0.0600	
W 25-27	3	0.1233	0.2517
W 28-30	7	0.2257	0.13464
W 31-33	14	0.2971	0.18537
W 34-36	27	0.4944	0.21385

Gestational age	Number of normal deliveries	Mean TSH	standard deviation
W 22-24	1	0.3000	
W 25-27	3	0.2000	0.05000
W 28-30	7	0.9857	0.62029
W 31-33	14	0.9700	0.54844
W 34-36	27	3.007	1.78675

Gestational age	Number of cesarean deliveries	Mean FT4	standard deviation
W 22-24	0		
W 25-27	1	0.2000	
W 28-30	8	0.2138	0.08975
W 31-33	6	0.3250	0.18588
W 34-36	13	0.3746	0.39746

Gestational age	Number of cesarean deliveries	Mean TSH	standard deviation
W 22-24	0		
W 25-27	1	1.2000	
W 28-30	8	0.9275	0.38366
W 31-33	6	1.2500	0.75860
W 34-36	13	2.6115	2.48948

The relationship between low levels of TSH-FT4 and the development of RDS:

As we mentioned previously that during the study, 16 preterm infants died 24 hours after birth, and you were not able to know the cause of death. Is it RDS? Another cause. Therefore, these premature infants were deleted from the RDS study, and thus the study was limited to 64 preterm infants who were monitored for 3 days. Obtain the following results:

24 preterm was developed RDS.

40 preterm did not develop RDS. .

It is known that RDS increases in frequency with decreasing gestational age.

But does this disease have a relationship with the serum level of TSH and FT4 in preterm babies?

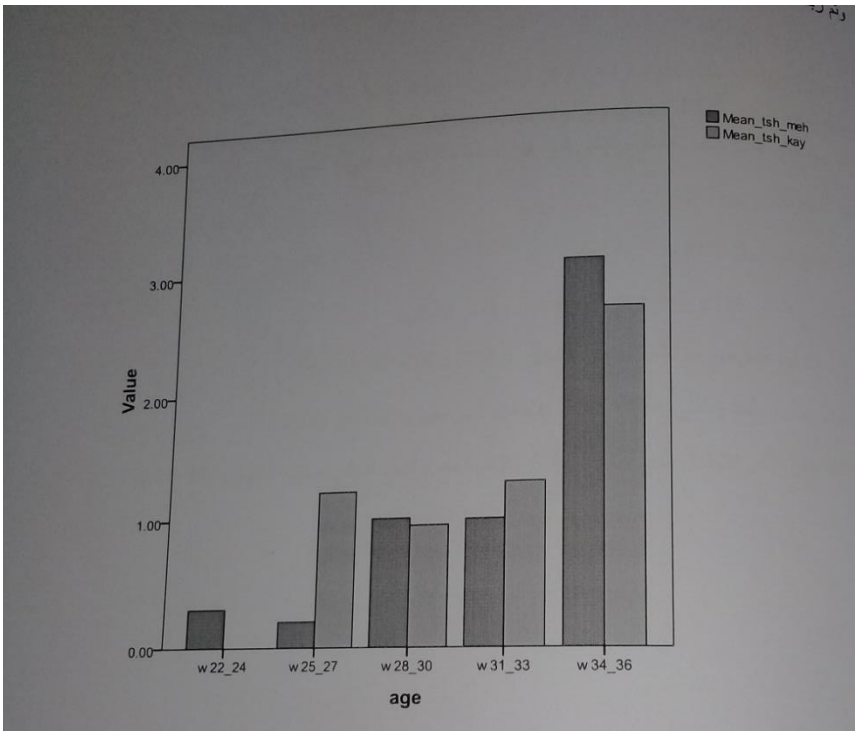
For this purpose, the average FT4 and TSH were taken for the children who later developed RDS, as well as the same for the children who did not later develop RDS, and the results were according to Tables:

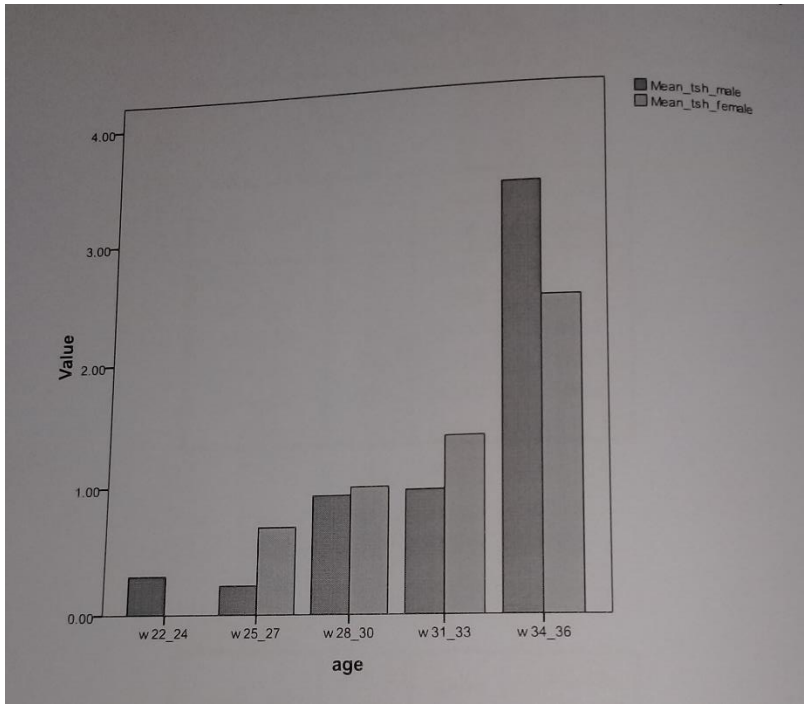
Babies who developed RDS	N	Mean
FT4	24	0.3367
TSH	24	1.9017

Babies who did not develop RDS	N	Mean
FT4	40	0.3829
TSH	40	2.1832

We notice that in our study from Tables above, there is no relationship between the FT4 serum level and the development of RDS. The P value was = 0.09 and therefore has no statistical significance. The comparative study showed that there is no relationship between the low level of FT4 and the development of RDS, as the value was P=0.11

It was also found in our study that there is no relationship between low TSH level and the development of RDS, as the P value was = 0.10.The comparative study showed the same conclusion, where it was P=0.07.





Summery

The objective of Search:

Study the relationship between gestational age and serum levels of FT4 and TSH and does this role in the occurrence of RDS.

The importance of research:

Comes the importance of research from the fact that hormones thyroid synergy with corticosteroids, prolactin and other hormones help in the production of Alsorvktant of alveolitis and mature the lungs during uterine life, and the fact that thyroid hormones can be affected by gestation and birth weight and other factors and therefore the possibility of giving such children TRH for the prevention of the occurrence of RDS.

Recommendations:

1-Trying to give pregnant women who are candidates for early birth in addition to corticosteroids, TRH, because the thyroid hormone plays a role in increasing the synthesis of surfactant in addition to other hormones and thus mature the lungs, and TSH, as some studies have shown, is responsible for the change in temperature after birth, and is responsible for the brown skin color of the newborn. Thus, the newborn is prepared for the environment outside the womb.

2- A distinction must be made between congenital hypothyroidism and a transient physiological state of hypothyroidism in premature infants.

3- Studies have shown that providing T4 to preterm infants less than 30 weeks of gestation does not or does not change developmental outcomes but giving it to preterm infants less than 27 weeks can be beneficial.

4- Future scientific research is necessary to clarify the relationship between thyroid hormone and the development of RDS.

References

1_Nelson text book of pediatrics.

2 Rudolph,s pediatrics.

3 Endocrinology2008.

4_Neonatology2008.

5_Up to date 17.1.

6_ Current pediatrics 2009.

7_Pediatric respiratory 2009.

8_eMedicine pediatrics 2010.

9_Werner and ingbar,s THE THYROID.

10_Functional Endocrinology Diagnosis in children and adolescents.

11_Hypothyroidism Lafranchi 2003.

12 THEyearbook of Endocrinology 200 4.

13 Diseases of the Newborn Schaffer,s2002.

14 The British Association of Perinatal Medicine (BAPM),

15_Collaborative European Multicenter Study Group 1992 Randomized Europ multicenter trial of surfactant replacement therapy for severe neonatal respiratory distress syndrome: single versus multiple doses of curosurf Pediatrics 89:13-20

16_Japan Tokoyama; the preterm and thyroid 2003.