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Review Article

Congenital Hypothyroidism (An Overview to Incidence, Etiology, Risk Factors and Outcomes)

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Abstract

Congenital hypothyroidism is the most common preventable cause of mental retardation in children. Performing an overview can enhance our ability to solve it. We aim to publish an overview of 4 published articles. According to results, the increasing trend in the prevalence of congenital hypothyroidism in IRAN was the same as other developing and developed countries. The prevalence of transient hypothyroidism was higher than permanent one, which was inconsistent with Nelson textbook. Also, Prematurity and postdate were indicated as Risk factors and Growth and development in hypothyroid patients was similar with normal children.

Introduction

Congenital hypothyroidism (CH) with prevalence of 1:3000 – 1:4000, is the most common preventable cause of mental retardation in children [1, 2]. According to unclear clinical presentation at birth, screening is the most suitable method of diagnosis [3]. Although, some clinicians declare no obligation for indicating the etiology of CH as a result of similar treatment for diverse causes, however, it seems that it is an essential factor for diagnosis and treatment [4]. According to previous results, genetic and environmental factors [5] race, ethnicity, sex, and pregnancy outcomes were noted as risk factors [6]. In addition, Chen et al noted strong association between intelligence and CH [7].

As performing an overview about CH may enhance our ability to solve it. We aim to publish an overview of 4 published articles [8-11] in Iran.

Sub Titles

In this article, clinicians answered questions below.

1. What are the causes of high incidence of CH in Iran?
2. What is the etiology of CH?
3. Is there any difference in the method of treatment?
4. What are the risk factors for CH?
5. Are Kind of delivery, neonatal birth weight and gestational age effective factors in the existence of CH?
6. What is the role of iodine in developing CH?
7. What are the outcomes?

The detailed results obtained by four different investigations can be seen below.

In our research performed in Shiraz, congenital hypothyroidism noted in 1:1465 children with a female to male ratio of 1.19:1. Also, prolonged jaundice (73%), large anterior fontanel (56%) and wide posterior fontanel (55%) were the most common clinical findings in these patients. In 53.6% and 46.4% of patients, permanent and transient forms of the disorder were noted, respectively and Higher initial TSH level was noted in Permanent CH (P<0.001).

Dyshormonogenesis (57%) was the most common etiology of permanent CH and thyroid receptor blocking anti body (TRBAb) was found in 6.8% of patients.

Furthermore, clinicians screened 119701 neonates and CH was mentioned in 10.8% of the referral cases in another research in Guilan.

Interestingly, Low Birth Weight (LBW), postdate delivery, Normal Vaginal Delivery and macrosomia were more prevalent in patients with CH.

Also, Iodine was assessed during 2006 -2010 and a total of 138832 neonates were screened in Guilan province. The median urine iodine level in school-aged children was 200-299 µg/L and considering the WHO, UNICEF, ICCIDD criteria, Guilan province can be classified as a none-IDD endemic area. However, health care systems should pay attention to the iodine excess and the risk of iodine induced hyperthyroidism in this population.

Good-enough tests was applied to evaluate the outcomes. Permanent and transient hypothyroidism were noted in 43.2% and 56, 8 %, respectively. In patients with permanent CH, %.68.2 and %.31.2 had dyshormonogenesis and thyroid dysgenesis, respectively. Only family history of thyroid disease mentioned significant statistical difference and all other demographic data and intelligence quotient noted no statistical difference in patients.

Discussion

The incidence of congenital hypothyroidism in Shiraz was 1:1465. However, A cohort study which was conducted during two periods, noted lower incidence of CH during two different periods(1:3010 and 1:1660). Also different incidence rates in Iran were mentioned, while

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1/357 in Isfahan was noted by Hashemipour *et al* [12], and 1/1465 by Karamizadeh *et al was mentioned* in Shiraz [11].

Although Hashemipour *et al* [12] noted diverse screening methods, environmental, genetic and immunologic indices as risk factors, but, Lorey et al mentioned Sex as the most striking factor in CH. They noted 2 :1 (female to male) ratio across all ethnic groups except blacks [13] which was relatively inconsistent with our results (1.19:1 in shiraz and 1:1 in Guilan).

Previous results showed that wherever the prevalence of hypothyroidism was increased, the rate of transient hypothyroidism raised, consequently. Bekhit et al diagnosed Permanent and transient types of CH in 82.3% and 17.7% of patients respectively [14]. However Ghasemi et al noted higher incidence of transient CH (TCH) (79.4%) in comparison with Permanent CH (PCH) [15].

In our study PCH was associated with higher initial TSH level (P<0.001) which was consistent with Bekhit et al. They mentioned higher Initial TSH levels in PCH cases in comparison with transient cases (p<0.004). (14)

Inconsistent with previous results and book reviews [16], our study indicated higher prevalence of dyshormonogenesis than dysgenesia in permanent hypothyroidism. This result was consistent with Previous Iranian investigations [17, 18].

LBW was more prevalent in CH patients which was consistent with previous results [19, 20]. Also, Fagela-Domingo noted NVD as a protective factor for CH which was dissimilar with our findings [21].

Surprisingly Guilan province is a non-IDD endemic area and level of iodine did not relate to CH. Also, McElduff indicated no significant relation between maternal iodine levels and neonatal TSH concentrations [22]. Although previous study showed a strong association between intelligence, early treatment and disease severity in patients with CH, however, results noted no significant relation.

Although, previous investigations demonstrated close relationship between even sub-clinical thyroid dysfunction and increased cardiovascular risk, we didn't assess it unfortunately [23, 24]. Therefore investigators recommend further investigations.

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