Pediatrics & Therapeutics
ISSN: 2161-0665

Çelik and Andıran, Pediatr Therapeut 2011, 1:2
DOI: 10.4172/2161-0665.1000104

Case Report Open Access

A Case with Thyroid Agenesis and Primary Craniosynostosis: An Intriguing Coexistence

Nurullah Çelik[1]* and Nesibe Andıran[2]

[1]M.D, Pediatrician, Division of Endocrinology, Department of Pediatrics, Faculty of Medicine, Fatih University, Ankara, Turkey
[2]M.D, Associate Professor of Pediatrics Division of Endocrinology, Department of Pediatrics, Faculty of Medicine, Fatih University, Ankara, Turkey

Abstract

Congenital hypothyroidism is one of the most important causes of preventable mental retardation, occurring in approximately 1 in 2000 to 4000 newborn infants. With the introduction of a screening program worldwide, it was observed that congenital hypothyroidism was associated with a higher frequency of extra-thyroidal congenital anomalies compared to the normal population. Reported here is a case of a 50-day-old female patient with thyroid agenesis and craniosynostosis.

Keywords: Congenital hypothyroidism; Thyroid agenesis; Craniosynostosis

Introduction

Congenital hypothyroidism (CH) has a worldwide incidence of approximately 1 in 2000-4000 live births [1], with 7.3-24% of affected newborns also having an accompanying congenital malformation (CM) [2,3]. Although craniosynostosis has been reported to occur in children with CH following overtreatment with levothyroxine (LT4), the association of CH with primary craniosynostosis is very uncommon.

Case

A 50-day-old girl with CH was referred to our department for dose adjustment of LT4. She had been diagnosed with CH (pretreatment TSH was > 100) and craniosynostosis in another center after presenting with constipation as a 24-day-old baby. Her parents were second-degree relatives. She was born at term by normal spontaneous vaginal delivery weighing 2700 g. The mother denied having taken any medication during pregnancy. On examination, she weighed 3.6 kg (<3 p) with a height of 50 cm (<3 p) and a head circumference of 36 cm (<3 p). Vital signs were normal. The patient's head was microcephalic in appearance, and her anterior fontanel could not be palpated. Physical examination was otherwise unremarkable. The patient had a blood hemoglobin concentration of 9.3 gr/dL, with white blood cell and platelet counts of 11900 x 10^3 /µL and 152000 x 10^3/ µL, respectively. Serum level of glucose was 91 mg/dl, with a urea concentration of 41 mg/dl and a creatinine level of 0.43 mg/dl. Liver transaminases and serum electrolytes were within normal range (SGOT, 36 U/I; SGPT, 21 U/I; Na, 141 mmol/L; K, 4.33 mmol/L; Cl, 103 mmol/L; Ca, 10.5 mg/dl). The patient was euthyroid on presentation with a serum TSH level of 3.43 uIU/ml (0.5-6.5) and a free thyroxine level of 1.17 ng/dl (0.74-1.52). Pretreatment findings on thyroid ultrasonography and scintigraphy were consistent with thyroid agenesis. Results of a renal ultrasound were normal, and cardiac evaluation by echocardiography was unremarkable. The patient eventually underwent surgery for craniosynostosis at the age of 5 months, and on her last follow-up visit at 22 months of age all aspects of development were normal.

Discussion

CH is one of the most important causes of preventable mental retardation [1]. Following the initiation of a nationwide screening program in January 2007 by the Turkish Ministry of Health, earlier studies from Turkey reported on a CH incidence of 1/2326 to 1/3800 [4]. With the advent of screening programs, a higher frequency of extra-thyroidal congenital anomalies was also observed in association with CH, compared to the general population. Oliveri [5] reported on a frequency of CM among patients with CH four times higher than that of the normal population (8.4% vs. 1-2%), the most commonly encountered being cardiac anomalies. Other observed anomalies include those of the neuromuscular system, genitourinary system, eye, ear and cleft palate [2,3].

Craniosynostosis is a term used to refer to the premature closure of one or more cranial sutures. It may be classified as either simple or multiple depending on the number of sutures affected, as primary (cause is unknown) or secondary (a known cause) based on etiology, and as syndromic or non-syndromic depending on the presence of other findings suggesting multiorgan involvement. The most commonly encountered type is primary, simple non-syndromiccraniosynostosis, with an estimated incidence of 1 in every 2000-2500 live births [6].

Besides the genetic connection, teratogenic factors may be responsible for the development of congenital anomalies involving several organ systems which share the same embryonic origins, particularly during the early stages of embryogenesis. For example, the thymus, thyroid C-cells, parathyroid glands and the heart develop from the same neuronal crest [7,8], all of which may be involved simultaneously.

A newborn with CH is normally expected to have a large anterior fontanel and an open posterior fontanel, whereas primary craniosynostosis is not a typical finding in such patients. Although the occurrence of thyroid agenesis and primary craniosynostosis in our patient may be purely coincidental, an as yet unidentified genetic anomaly may be responsible for both entities. Very few reports may be encountered in the literature on the coexistence of hypothyroidism and craniosynostosis. Tan [9] describe two male siblings with obesity, hypothyroidism, craniosynostosis, cardiac hypertrophy and delayed

***Corresponding author:** NurullahCelik, MD, Kentkoop mah. Yeniumutlar sitesi, E4/16 Batıkent / Ankara Türkiye, Turkey, E-mail: celiknurullah@hotmail.com

Received October 15, 2011; **Accepted** September 17, 2011; **Published** November 11, 2011

Citation: Çelik N, Andıran N (2011) A Case with Thyroid Agenesis and Primary Craniosynostosis: An Intriguing Coexistence. Pediatr Therapeut 1:104. doi:10.4172/2161-0665.1000104

growth, one of whom died after developing fulminant colitis at the age of 5 weeks. The other sibling, who had sagittal and coronal synostosis, survived. The authors postulated that these clinical features were the components of a new syndrome, possibly inherited in an autosomal recessive or X-linked pattern. In another case report published in 2007, Salerno [10] described a 17-year-old male patient with severe growth delay, mental retardation, craniosynostosis, atypical facial appearance, and multiple congenital anomalies, including hypothyroidism. In 2009, Graul-Neumann [11] reported on a 6-month-old boy with pseudohypoparathyroidism, Crouzen-like craniosynostosis, and congenital hypothyroidism who died after developing disseminated intravascular coagulopathy following surgery for craniosynostosis. Unlike any of the previously reported cases, our patient was female and primary craniosynostosis was the only apparent associated anomaly.

Several etiological factors may be implicated in the development of additional congenital anomalies in infants with hypothyroidism. Better understanding of the morphogenesis of the thyroid and other organs, as well as further advances in genetic research may help elucidate the common pathogenesis of such seemingly coincidental congenital anomalies, such as those observed in our patient.

References

1. Rastogi MV, LaFranchi SH (2010) Congenital hypothyroidism. Orphanet J Rare Dis 5:17.
2. Lazarus JH, Hughes IA (1988) Congenital abnormalities and congenital hypothyroidism. Lancet 2:52.
3. Al-Jurayyan NA, Al-Herbish AS, El-Desouki MI, Al-Nuaim AA, Abo-Bakr AM, et al. (1997)Congenital anomalies in infants with congenital hypothyroidism: is it a coincidental or an associated finding? Hum Hered 47:33-37.
4. Cinaz P, Yesilkaya E, Acar D, Bideci A, Camurdan O, et al.(2008) Evaluatıon of neonatal congenıtal hypothyroıdısm screenıng programme. J Ist Faculty Med78-83.
5. Olivieri A, Stazi MA, Mastroiacovo P, Fazzini C, Medda E, et al. (2002) A population-based study on the frequency of additional congenital malformations in infants with congenital hypothyroidism: data from the Italian Registry for Congenital Hypothyroidism (1991-1998). J Clin Endocrinol Metab 87:557-562.
6. Wilkie AO (1997) Craniosynostosis: genes and mechanisms. Hum Mol Genet 6:1647-1656.
7. Franz T (1989) Persistent truncus arteriosus in the Splotch mutant mouse. Anat Embryol (Berl)180:457-464.
8. Dupin E, Calloni G, Real C, Gonçalves-Trentin A, Le Douarin NM (2007) Neural crest progenitors and stem cells. C R Biol 330:521-529.
9. Tan TY, Amor DJ (2007) Obesity, hypothyroidism, craniosynostosis, cardiac hypertrophy, colitis, and developmental delay: a novel syndrome. Am J Med Genet A 143:114-118.
10. Salerno M, Amabile G, Mandato C, Di Maio S, Lecora M, et al. (2003) Growth retardation, developmental delay, distinctive face, multiple endocrine abnormalities, and adenylyl cyclase dysfunction: a new syndrome?. Am J Med Genet A 2120A:389-394.
11. Graul-Neumann LM, Bach A, Albani M, Ringe H, Weimann A, et al. (2009) Boy with pseudohypoparathyroidism type 1a caused by GNAS gene mutation (deltaN377), Crouzon-like craniosynostosis, and severe trauma-induced bleeding. Am J Med Genet A 149A:1487-1493.