

## Case Report



# Delayed Diagnosis of Congenital Hypothyroidism in a 6-month-old Male Infant in Tamale, Ghana

Alhassan Abdul-Mumin<sup>1,2\*</sup>, Kingsley A Bimpong<sup>2</sup>, Emmanuel Ameyaw<sup>3,4</sup>

<sup>1</sup>Department of Paediatrics and Child Health, School of Medicine, University for Development Studies, Tamale, Ghana

<sup>2</sup>Department of Paediatrics and Child Health, Tamale Teaching Hospital, Tamale, Ghana

<sup>3</sup>Department of Child Health, School of Medicine and Dentistry, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

<sup>4</sup>Directorate of Child Health, Komfo Anokye Teaching Hospital, Kumasi, Ghana

### Article info

#### Article History:

Received: 3 Mar. 2021

Accepted: 11 Apr. 2021

e-Published: 16 May 2021

#### Keywords:

- Congenital hypothyroidism
- Delayed diagnosis
- Low resource setting

### Abstract

Congenital hypothyroidism is a common inborn endocrine disorder. The majority of cases are asymptomatic, meaning that its diagnosis may be missed especially in settings where newborn screening is absent. We present a delayed diagnosis case of congenital hypothyroidism and emphasize on the need for high levels of suspicion in order to aid prompt diagnosis and treatment. Our case is a 3 years and 4 months old male, who was first presented at 5 months of age due to poor growth. He passed meconium after the fourth day of life, developed jaundice in the first week of life, and slept a lot in his neonatal period. He had coarse faces, protruding tongue, widened anterior fontanelle and herniation of umbilicus. He was started on oral 50 micrograms of levothyroxine daily. In resource-limited settings where universal newborn screening is absent, healthcare workers should have a high level of suspicion in picking up the early signs of the condition.

### Introduction

Congenital hypothyroidism is the most common inborn endocrine disease.<sup>1,2</sup> It is defined as the deficiency of thyroid hormones at birth.<sup>3,4</sup> There has been an increase in the reported prevalence of congenital hypothyroidism because of the improvements in neonatal medicine and inborn screening programs, as well as the increased sensitivity of testing methods.<sup>3,5</sup>

Deladoëy et al. reported an increase from 1 in 6700 children to 1 in 3500 children in their review regarding the condition, worldwide.<sup>5</sup> In Africa, studies in Nigeria have shown varying incidence between 16.4% and 1.4%.<sup>6,7</sup> However, a lower incidence (0.1%) was reported in South Africa.<sup>8</sup> In Ghana, not much has been done to ascertain the incidence of this disorder, and the country lacks newborn screening program for this disease. However, there has been a case report in a tertiary facility in Ghana in which the neonatal period was also missed.<sup>9</sup>

Congenital hypothyroidism may be primary or secondary. The primary congenital hypothyroidism is due to a defect in the development of the thyroid gland or the production of thyroid hormones; and the secondary congenital hypothyroidism results from a deficiency in the production of thyroid stimulating hormone (TSH). Congenital hypothyroidism may also be classified as transient or permanent; with patients recovering in the

first few months or years of life if transient, but requiring lifelong treatment if permanent.<sup>1,3</sup>

The majority of newborns with congenital hypothyroidism may be asymptomatic at birth, and thus the most certain way of diagnosing these asymptomatic cases is by newborn screening.<sup>2</sup> However, in symptomatic cases, the presentations may include poor feeding, poor growth, hoarse cry, prolonged sleep, constipation, jaundice, and macroglossia.<sup>3</sup>

On physical examination, widening of the fontanelles, large protruding tongue, dry skin, umbilical hernia, and delayed reflexes may be present.<sup>2,9</sup>

We present a brief report of a delayed congenital hypothyroidism diagnosis case and emphasize on the need for high suspicion levels to aid prompt diagnosis in the absence of a newborn screening program in resource-limited countries such as Ghana.

### Case Presentation

Our case is a 3 years and 4 months old male, who was first presented to our pediatric outpatient clinic at 5 months of age due to poor growth. He was delivered in a district hospital via elective caesarean section (C/S) with the mother having two previous C/S deliveries. The birth weight was 3.1 kg. He passed meconium after the fourth day of life and subsequently was able to pass stool at least

\*Corresponding Author: Alhassan Abdul-Mumin; Email: amalhassan@uds.edu.gh

once every day. According to the mother, he developed jaundice in the first week of life which was managed at home by the exposure to early morning sun for two days. The mother also recalled that the baby used to sleep a lot during the neonatal period.

The physical examination at the initial presentation revealed a weight of 6.2 Kg (weight for age 0 SD). He had coarse faces, a protruding tongue (Figure 1), widened anterior fontanelle, and a herniation of the umbilicus. The neurological assessment at presentation level revealed good neck control which was achieved after three months of age, inability to sit with support, general hypotonia in both ventral and vertical suspension maneuvers, and a weak palmar grasp reflex. The examination findings of the other systems were essentially normal.

Based on the initial history and physical examination findings, we made a provisional diagnosis of congenital hypothyroidism. The results of the thyroid function tests requested on 23/10/2017 were as follows:

TSH: 172.832 uIU (0.38-5.33); FT4: <5.1 pmol/L (7.9-18.5); FT3: 1.7 pmol/L (3.5-7.8). Full blood count, blood urea electrolytes, and liver function tests performed at this initial visit were normal.

Anterior neck ultrasonography performed on 23/10/2017, revealed orthotopic thyroid gland of normal size, and no abnormalities were detected.

The patient was confirmed to have primary congenital hypothyroidism based on the results reported above.

He was started on 50 microgram of oral levothyroxine daily and was scheduled for clinical review with repeated



**Figure 1.** Photograph of the patient at 5 months of age with protruding tongue and coarse facies

thyroid function test results after six months. At the first follow-up visit, the patient was able to sit with support but had truncal hypotonicity. The repeated thyroid function test results at this visit were as follows: TSH: 2.186 uIU (0.38-5.33); FT4: 16.6 pmol/L (7.9-18.5); FT3: 6.8 pmol/L (3.5-7.8). As the laboratory parameters returned to normal levels, the treatment was continued with the same dose of levothyroxine, and a plan to review the patient every six months in order to monitor the growth and development; and also to adjust levothyroxine levels when necessary.

The patient did not return for the subsequent reviews despite repeated telephone calls to the family. This was later explained to be due to a family adversary as a result of the loss of the patient's father who was the main bread winner of the family. This tragedy meant an economic down-turn for the family, and therefore, their inability to come for follow-ups and repeated thyroid investigations. The mother admitted that she was able to buy the levothyroxine whenever the stock run out for the duration that they were not able to come for review, but there were irregularities in the administration of the medication.

After two years of interruption without follow-up, the child was seen with the mother at our clinic when he was now three years and four months old. The mother complained that the child had been warm for the past couple of days with occasional coughs prior to presentation. The child was diagnosed with a non-specific upper respiratory tract infection.

His general assessment at this visit showed a weight of 11kg (weight for age < -2 SD), height of 86cm (height for age < -2 SD); weight for height < 0 SD). He was stunted and underweight based on these measurements. The mother reported that he started walking at 3 years of age and she admitted that the patient had significant improvements following the thyroid hormone replacement therapy. The patient also had delayed speech as he could only utter a few discernible words such as 'mama'. Figure 2 shows the patient's image taken on the last visit.

The patient's medication was adjusted appropriately and the family was referred for nutritional counseling, rehabilitation, and speech therapy. They are due for the next review in another three months.

## Discussion

Congenital hypothyroidism is a common endocrine disorder of the newborn,<sup>10</sup> with a reported increase in its incidence because of the advances in the newborn screening programs.<sup>11</sup> However, these newborn screening programs are largely absent in Sub-Saharan Africa.<sup>9,12</sup>

A number of factors may increase a neonate's risk of developing congenital hypothyroidism. These factors include familial history of the disorder, advanced maternal age, and birth in high-risk geographical areas.<sup>13,14</sup> We did not document any risk factors in our case aside from the maternal age which was > 35 years.

Early diagnosis of congenital hypothyroidism and



**Figure 2.** Photograph of the patient at 3 years and 4 months of age

initiation of treatment is essential to prevent long term complications. However, as many patients are asymptomatic at birth, mostly due to the placental transfer of maternal thyroid hormones,<sup>15</sup> universal newborn screening remains the gold standard for early and prompt diagnosis, and the initiation of treatment. This screening was not available in Ghana at the time of this case report.

For the infants who are symptomatic at birth, some of the symptoms may be subtle or a mimic of other presentations in the newborn,<sup>3,9</sup> and thus a high level of suspicion is required to make early diagnosis. Our case, for instance, was born at 42 weeks of gestation, passed meconium after four days of life, developed jaundice in the first week of life, and slept excessively in the neonatal period. These features have all been documented in neonates with congenital hypothyroidism.<sup>3,9</sup> They were missed in our case because, probably, the perinatal healthcare workers did not suspect the condition and also the mother did not report back the delayed passage of meconium and neonatal jaundice to the hospital. At the time we saw the patient, at five months of age, he had developed more overt signs of the disease; including coarse facial profile, large protruding tongue (figure 1), umbilical hernia, and general hypotonia. These could have been prevented if the diagnosis was made earlier and the treatment was initiated promptly.

Delayed treatment initiation of congenital hypothyroidism can lead to severe growth and mental retardation.<sup>3,16</sup> This was observed in our patient as he only developed neck control at the time, he was first assessed at five months of age and also had delayed gross motor activity and speech development at three years of age.

At the first follow-up visit after the initiation of appropriate therapy with levothyroxine, the patient had improved in developmental milestones as he could then sit, albeit with support (11 months); the umbilical hernia

was almost resolved, and the tongue protrusion was gone. The thyroid hormones also reached normal levels and the TSH levels dropped to normal ranges. This was a significant improvement despite the delayed diagnosis and initiation of therapy.

Regular follow-up is as important as the prompt initiation of therapy in order to monitor growth and development and adjust levothyroxine levels. This will ensure that the patient remains euthyroid and the laboratory parameters remain within normal range. Unfortunately, our patient defaulted for almost two years due to disruptions in the family socioeconomic dynamics caused by the death of the father. Although, the thyroid hormones and TSH were within range at the last visit, the patient was underweight and stunted. The growth faltering could have been detected earlier if the patient adhered to the scheduled visits. This non-adherence to follow-up is common with chronic diseases in developing countries.<sup>17</sup> The patient has since been enrolled in both nutritional and speech rehabilitation programs.

### Conclusion

In conclusion, this case highlights the importance of early diagnosis and initiation of therapy to avoid complications in both physical and mental aspects of development associated with congenital hypothyroidism. It also highlights the importance of regular follow-up to ensure optimal care after diagnosis and the initiation of therapy. Universal newborn screening remains the standard for early diagnosis of this condition; but in its absence, high levels of suspicion by perinatal and neonatal care providers is invaluable in picking up the early signs in this critical period.

### Conflict of Interest

The authors declare that they have no conflict of interest

### Ethical Approval

Informed consent was obtained from mother of the child to publish this case.

### Authors' Contributions

AAM conceptualized the study and was involved in data acquisition, drafting the manuscript, and critical revision. KAB was involved in manuscript drafting and critical revision. EA was involved in critical revision of the manuscript.

### Acknowledgements

The authors appreciate the mother of the child for granting an informed consent for the study.

### Funding

Authors received no funding for this study.

### References

1. Grasberger H, Refetoff S. Genetic causes of congenital hypothyroidism due to dyshormonogenesis. *Curr Opin Pediatr.* 2011;23(4):421-8. doi: 10.1097/

- MOP.0b013e32834726a4.
- Dayal D, Prasad R. Congenital hypothyroidism: current perspectives. *Res Rep Endocr Disord*. 2015;5:91-102.
  - Rastogi MV, LaFranchi SH. Congenital hypothyroidism. *Orphanet J Rare Dis*. 2010;5:17. doi: 10.1186/1750-1172-5-17.
  - Bona G, Bellone S, Prodam F, Monzani A. Etiology of congenital hypothyroidism. In: *Thyroid Diseases in Childhood*. Cham: Springer; 2015. p. 27-31.
  - Deladoëy J, Van Vliet G. The changing epidemiology of congenital hypothyroidism: fact or artifact? *Expert Rev Endocrinol Metab*. 2014;9(4):387-95. doi: 10.1586/17446651.2014.9111083.
  - Otokunefor O, Orluwene CG, Wakwe VC. Prevalence of Transient Congenital Hypothyroidism as Seen at the University of Port Harcourt Teaching Hospital, Nigeria. *Asian J Med Health*. 2017;3(3):1-8. doi: 10.9734/ajmah/2017/31934.
  - Das SC, Isichei UP, Otokwula AA, Emokpae MA, Mohammed AZ. Neonatal chemical hypothyroidism in Nigeria. *Ann Trop Paediatr*. 2004;24(3):237-40. doi: 10.1179/027249304225018975.
  - Pretorius PJ, Lebea PJ. Newborn screening for classic galactosaemia and primary congenital hypothyroidism in the Nkangala district of Mpumalanga province, South Africa. *SAJCH*. 2008;2(1):19-22.
  - Ameyaw E. Delay diagnosis in congenital hypothyroidism: case series. *Palgo Journal of Medicine and Medical Science*. 2017;4(2):156-61.
  - Park SM, Chatterjee VK. Genetics of congenital hypothyroidism. *J Med Genet*. 2005;42(5):379-89. doi: 10.1136/jmg.2004.024158.
  - Harris KB, Pass KA. Increase in congenital hypothyroidism in New York State and in the United States. *Mol Genet Metab*. 2007;91(3):268-77. doi: 10.1016/j.ymgme.2007.03.012.
  - Yarhere IE, Jaja T, Briggs D, Iughetti L. Newborn screening in Nigeria: associating the screening of congenital hypothyroidism and sickle cell disease can be a winning choice? *Acta Biomed*. 2019;90(2):316-20. doi: 10.23750/abm.v90i2.8485.
  - Hashemipour M, Samei P, Kelishadi R, Hovsepian S, Hani Tabaei Zavareh N. A systematic review on the risk factors of congenital hypothyroidism. *J Pediatr Rev*. 2019;7(4):199-210. doi: 10.32598/jpr.7.4.199.
  - Kirmizibekmez H, Güven A, Yildiz M, Cebeci AN, Dursun F. Developmental defects of the thyroid gland: relationship with advanced maternal age. *J Clin Res Pediatr Endocrinol*. 2012;4(2):72-5. doi: 10.4274/jcrpe.560.
  - Vulsma T, Gons MH, de Vijlder JJ. Maternal-fetal transfer of thyroxine in congenital hypothyroidism due to a total organification defect or thyroid agenesis. *N Engl J Med*. 1989;321(1):13-6. doi: 10.1056/nejm198907063210103.
  - Segni M. Congenital Hypothyroidism. In: *Endotext* [Internet]. South Dartmouth, MA: MDText.com, Inc; 2000.
  - Sabaté E. Adherence to Long-Term Therapies: Evidence for Action. World Health Organization; 2003.