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Neonatal Thyrotoxicosis: A Case Report

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Summary

Iroha EO. Neonatal Thyrotoxicosis: A Case Report. *Nigerian Journal of Paediatrics 1995; 22: 90.* A case of neonatal thyrotoxicosis in a preterm female infant is described. During the second trimester of pregnancy, the patient's mother had Graves' disease that was controlled with combined carbimazole and propranolol therapy. The infant, with a birthweight of 1.510kg, developed clinical features of thyrotoxicosis at the age of 12 days. With an elevated serum thyroxine (T_3) level of 8.1 mmol/L, the diagnosis was confirmed. The patient was successfully treated over a period of eight weeks with oral propranolol and diazepam as a sedative.

Introduction

NEONATAL thyrotoxicosis is extremely rare and the majority of affected babies are delivered either to mothers with thyrotoxicosis in their current pregnancy, or to mothers who have had a past history of the disease. [1] The first description of neonatal thyrotoxicosis was in 1910 in a preterm infant with exophthalmos born to a mother who had goitre and exophthalmos;[2] since then, 75 cases of the disease had been reported as at 1976.[1] The frequency of neonatal thyrotoxicosis in Nigeria is unknown and this may be partly a reflection of the rarity of the disease and lack of awareness by workers.[3] Because of its rarity and in order to increase an awareness among practitioners to ensure early diagnosis, the present case is reported.

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Case Report

Baby AB (LUTH No 298703) was born prematurely at the Lagos University Teaching Hospital (LUTH) to non-consanguinous parents. The mother was a 27-year old housewife, gravida 4, para 3, and the father was a 50-year old self-employed musician; the siblings and their parents were alive and well. The pregnancy was normal until the second trimester, when the mother was investigated for excessive weight loss, despite a good appetite and adequate food intake, palpitation and heat intolerance. There was no family history of thyroid disease and no medication was taken during pregnancy except the routine antenatal drugs, comprising daraprim and folic acid. Physical examination revealed exophthalmos, goitre and excessive sweating. Investigations showed elevated serum T_3, T_4

and long-acting thyroid stimulator (LATS), thus establishing the diagnosis of hyperthyroidism. Treatment of the mother consisted of a combination of oral carbimazole and propranolol.

There was moderate birth asphyxia in the baby as evident by a one-minute Apgar score of four. Birthweight was 1.510kg, head circumference 29cm and length 42cm, all being appropriate for the gestational age. Physical examination revealed a preterm female infant. She was hyper-active and jittery. The skin was loose, desquamating and meconium-stained, but there were no petechiae or ecchymosis. There was exophthalmos, lid retraction and periorbital oedema (Figure). The thyroid gland was not palpable and there was no bruit over the thyroid area. There were tachypnoea (respiratory rate 100 per minute) and minimal intercostal recession. The lung fields were clear. The praecordium was quiet; the heart rate was 140 per minute and regular. Blood pressure, measured with anaeroid sphygmomanometer, was 80/60mmHg. The infant was nursed in an incubator with 40 percent ambient oxygen and the tachypnoea resolved over the next 24 hours.

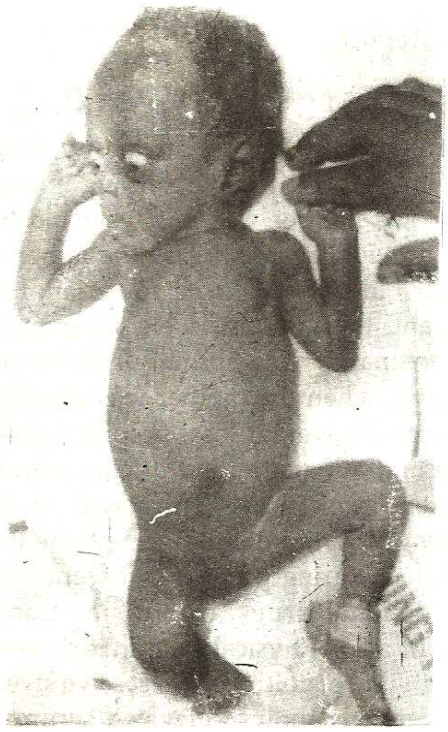

Figure: Photograph of the infant with thyrotoxicosis. Note the alert facies, lid lag and exophthalmos.

Clinical evaluation of the infant up to the age of 11 days was uneventful, but on day 12 of life she developed tachycardia (pulse rate = 200 per minute) and tachypnoea (respiratory rate = 100 per minute). There were restlessness, warm skin and exaggerated tendon reflexes. Serum T_3 was 8.1mmol/L, T_4 278mmol/L and TSH 3.5uu/ml; LATS was not estimated. Chest radiograph revealed normal cardiac shadow and clear lung fields. The above physical features and the elevated serum T_3 were considered to be consistent with the diagnosis of neonatal thyrotoxicosis. Treatment comprised propranolol (2mg/kg/day) and diazepam (0.3mg/kg/day). Satisfactory response, as judged by the drop in cardiac and respiratory rates, occurred within 48 hours. The infant remained well with weight gain of 0.3kg before she was discharged home on day 23 of life. Seen in the outpatient department, at the age of five weeks, the baby was well. The doses of propranolol and diazepam were tappered and finally stopped at the age of eight weeks.

Discussion

The physical features of wasting, marked alertness and hyperactivity, lid lag, exophthalmos and persistent tachycardia were all

consistent with the diagnosis of neonatal thyrotoxicosis in the infant; this was confirmed by the elevated serum T_3 level. Other known features of neonatal thyrotoxicosis include thyroid enlargement and thrombocytopenic purpura.[1] However, neither thyroid nor lymph node enlargement was present in our patient.

The clinical spectrum of thyrotoxicosis is variable, contrary to previously held view. [1 3] Some infants die *in utero*, while others are stillborn or premature as the present case. After birth, the clinical picture differentiates into two distinct types, namely: (1) the more common type with a short self-limiting course, manifesting at birth or soon after birth and lasting four-to-six months; [1 3] (2) the less common type which begins in early infancy and runs a protracted course. [4-6] When the disease occurs in an infant born to a mother with untreated active Graves' disease, the clinical manifestations of hyperthyroidism may become apparent within the first 24 hours of life. But, if the mother had received anti-thyroid therapy, the onset of symptoms in the infant may be delayed for several days or weeks, because of transplacental acquisition of anti-thyroid agents. [1 3] The present patient with onset of symptoms on day 12 of life belonged to the latter category of congenital hyperthyroidism as this was consistent with plasma half-life of anti-thyroid agents, that the mother received antenatally.

The pathogenesis of neonatal thyrotoxicosis has remained elusive because the previously believed causative factor, LATS, is now thought not to be solely responsible, as it does not satisfactorily explain some of the clinical observations namely: that (i) neonatal thyrotoxicosis may occur in infants without detectable LATS and a mother with detectable LATS may give birth to a normal infant and (ii) the course of the disease does not necessarily correspond to the disappearance rates of LATS, if the half-life of LATS is six days as it is difficult to explain in the persistence of signs and symptoms of the disease for months or years. [4 6 7 8]

The familial incidence of thyrotoxicosis has been observed from the earliest description of the disease, thus suggesting familial predisposition to the disease. [1 8] The occurrence of Graves' disease at different age-groups in the same family suggests the possibility of a single underlying defect, with varying times of manifestations and degree of expression.[1] Further evidence for inheritance of Graves' disease is provided by twin studies which showed an increase concordance rate of the disease in monozygotic twins compared with dizygotic twins of the same age. [8]

Systematic study of the disease during the neonatal period has been hampered by its rarity in this age group; this has subsequently affected its management in such a way that the latter has been extrapolated from the principles of management in the older patient. [9 - 11] Various combinations of anti-thyroid drugs and sedation, digitalisation, Lugol's iodine etc have been used. The present patient received treatment consisting of propranolol and diazepam as a sedative. The use of propranolol in neonatal thyrotoxicosis, either as sole therapy, or in combination with other drugs has been controversial; [10 - 11] however, major benefit from propranolol therapy in acute thyrotoxicosis seems to be the reduction in cardiac and respiratory activities. Ideally, patients

under propranolol therapy must have adequate monitoring for bradycardia, hypoglycaemia and other manifestations of beta-blocking effects of the drug.

It must be stressed that, although neonatal thyrotoxicosis is rare, a high index of suspicon in the diagnosis is necessary for early. detection, since the disease is not a benign one. Mortality rate of between 15 and 20 percent has been reported in those not recognised and treated promptly. [1 8] The principal cause of death is due to cardiovascular complications of severe tachycardia with heart failure. As sequelae, including premature craniosynostosis and minimal brain dysfunction, have been described, particularly in cases with persistent or recurrent course, [1 3 4 6] a long-term follow up is mandatory in all infants of thyrotoxic mothers.

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