Regression of Precocious Puberty in a Child with Hypothyroidism After Thyroxine Therapy

M. Bhattacharya
A.K Mitra

The association of hypothyroidism with precocious puberty is uncommon and few cases are reported from India. We report here a case of primary hypothyroidism with precocious puberty, which regressed on hormone replacement.

Case Report

An 8½-year-old girl presented on 11th August, 1989 with truncal obesity and breast development for one and half years and cyclical vaginal bleeding for 3 months. She was quite lean and of normal height till the age of 7 years when suddenly she started gaining weight, became obese and stopped growing. Cyclical vaginal bleeding lasting 3-4 days every 20-30 days had begun 3 months before presentation. There was no history of systemic or CNS disease, febrile illness or medication to the patient. She was delivered at the 8th month of gestation with birth weight of 2.5 kg. There was no history of maternal disease or medication during pregnancy. There was gross delay in developmental milestones.

From the Department of Pediatrics, Institute of Post Graduate Medical Education and Research, Calcutta.

Reprint requests: Dr. Mala Bhattacharya, C/o S.M. Chanda, A 564 Road No. I, H.B. Town Sodepur, West Bengal 743 178.

Received for publication April 5, 1990; Accepted February 11, 1991

Examination revealed a dull looking child with coarse facial features suggestive of hypothroidism; skin was coarse and dry. Height was less than 5th percentile. There had been no shedding of primary teeth. Breast development was SMR II (Tanner's staging). External genitalia was juvenile in appearance with no pubic hair (*Fig. 1*). Hormone profile showed T_3 0.16 ng/ml (norm 1-2 ng/ml), t_4 42 ng/ml (norm 55-115 ng/ml), TSH 11.8 mU/ml (norm 1-4 mU/ml), FSH 8.2 mIU/m (3-22 mIU/ml), and Prolactin 73 ng/ml (3-20 ng/ml). Radiological examination showed the bone age to be seven years. In the wrist joint seven carpal bones and lower radial epiphysis were seen; lower ulnar epiphysis was not present. Ultrasonographic examination showed small sized uterus, ovaries and tubes, with no evidence of cystic enlargement of ovaries.

Replacement therapy with levothyroxine 0.025 mg/day was initiated and the dose increased to 0.05 mg daily, within 15 days. There was only one episode of scanty vaginal bleeding for 3 days in the next cycle. Breast regression started within 15 days of onset of therapy (*Fig. 2*). A spurt in linear growth was noted with a 4 cm increase in height in 4 months of therapy, shedding of temporary teeth started followed by eruption of 4 permanent incisors. Hormone study repeated at the end of December showed T_3 1.3 ng/ml, T_4 48 ng/ml, TSH 5 mU/ml, FSH 6.4 mIU/ml, and prolactin 17 ng/ml.

Discussion

Onset of puberty before the age of eight years is regarded as precocious. Retardation of osseous maturation in a case of precocious puberty is noted only in children with hypothyroidism.

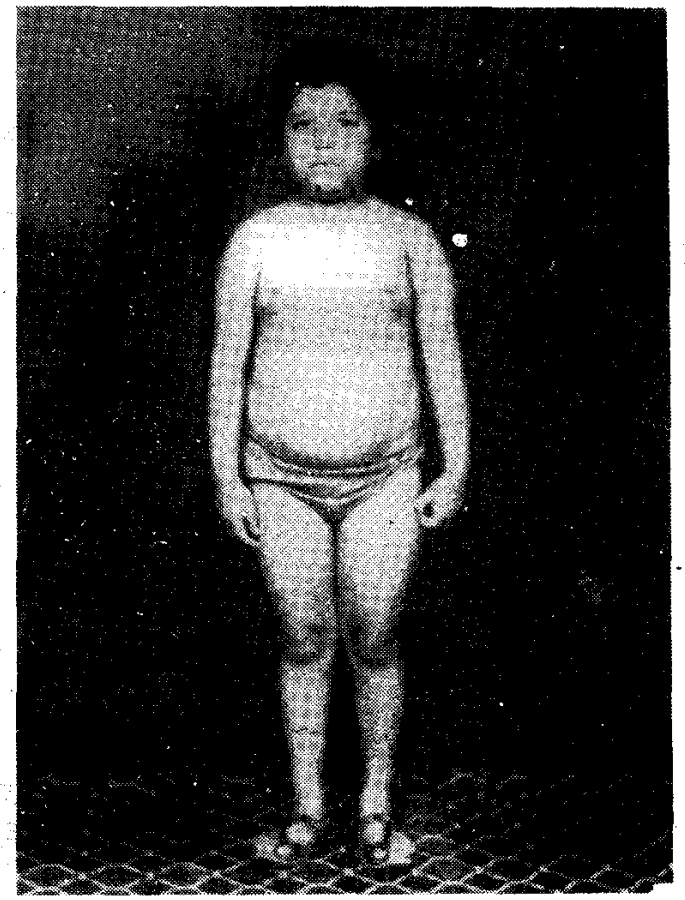

Fig. 1. Infantile appearance of an 8½ years old child before thyroxine therapy. Please note significant breast development.

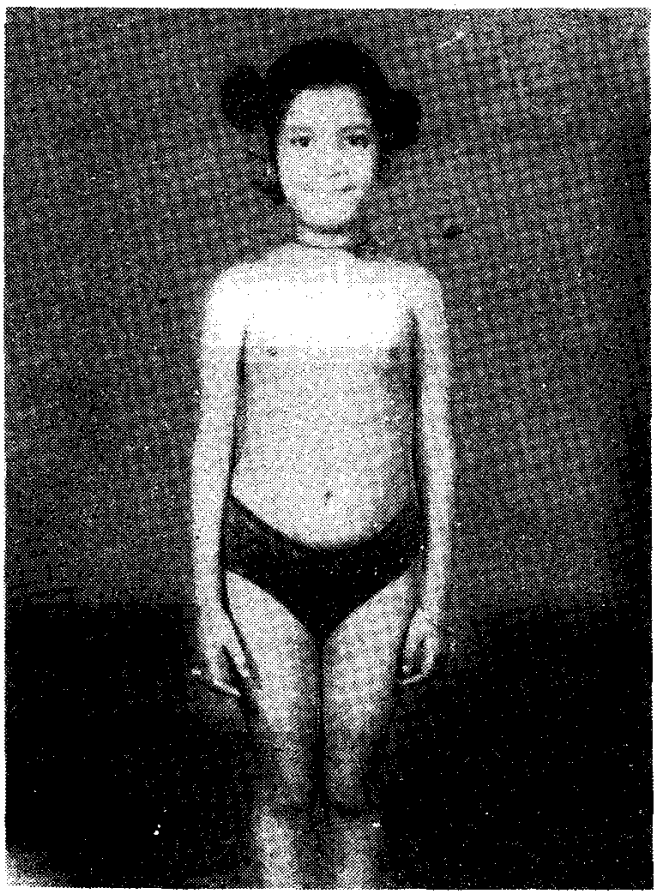

Fig. 2. Appearance of the child after four months of thyroxine therapy. Regression of breast tissue may be noted.

The first case of precocious puberty in primary juvenile hypothyroidism was reported by Kendle in 1905(1). Taking the age of osseous maturation as the point of comparison for precocity of puberty, Barnesetal(2) reported that 31% of primary juvenile hypothyroid patients developed precocious puberty. But if chronological age is considered then precocious puberty in primary juvenile hypothyroidism is uncommon in the world literature. Four cases have been reported so far from India(3-5).

This is an intriguing condition with growth and skeletal retardation unlike all other causes of precocious puberty. Paucity of sexual hair is characteristic. The exact mechanism is not known though many theories have been suggested. Vanwyk and Grumbach(6) postulated an overlap in the function of hypothalamus-pituiary-thyroid loop. Low level of thyroxine stimulate the pituitary to secrete TSH, at the same time stimulating the hypothalamus to secrete TRH. The gonadotrophin release centre and the centre for TRH release are very closely situated in hypothalamus, so that there may be specificity spillover leading to increased release of LHRH which in turn leads to rise in FSH and LH.

Hyperprolactinemia may also be

responsible for an increase in LHRH production and thus secretion of FSH and LH(7). Evers *et al.*(8) while agreeing with the overlap theory, felt that an overlap of glycoprotein synthesis may be the real cause of rise in FSH and LH rather than a non specific hormonal feedback overlap. FSH, LH and TSH are all glycoproteins with a common alpha subunit.

Hyperprolactinemia in primary juvenile hypothyroidism has been attributed to several factors; decreased hypothalamic dopamine leading to uninhibited action of TRH on lactotrophs; lactotroph hyperplasia due to lack of negative feedback by thyroid hormones, leading to increased sensitivity to existing TRH; and perhaps decreased degradation of prolactin. There may be associated galactorrhea.

With institution of thyroxine replacement, most evidence, clinical and hormonal, of precocity regresses completely, and spontaneously puberty has been reported to occur at the normal time and sequence. It is important to think of this condition in the differential diagnosis of precocity as treatment is simple and results gratifying.

REFERENCES

1. Kendle FW. Case of precocious puberty in a female cretin. Br Med J 1905, 1: 246-247.
2. Barnes ND, Hayles AB, Ryan RJ. Sexual maturation in juvenile hypothyroidism. Mayo Clin Proc 1978, 48: 849-856.
3. Vaidya RA, Alorkar SD, Raikar RS, *et al.* Functional pitutary hyperplasia in primary hypothyroidism. Normalization of visual field defect on thyroid replacement in a girl with galactorrhea-Amenorrhea. J Assoc Phys India 1977, 25: 923-928.
4. Chitkara AJ, Singh JP, Khahil A, Mittal SK. Sharma D. Sexual precocity in primary hypothyroidism. Indian Pediatr 1986, 23: 737-740.
5. Rao NS, Sriprakash ML, Dash RJ. Primary juvenile hypothyroidism with precocious puberty galactorrhea and multicyctic ovaries. J Assoc Phys India 1987, 35: 161-162.
6. Vanwyk JJ, Grumbach MM. Syndrome of precocious menstruation and galactorrhea in juvenile hypothyroidism—An example of hormonal overlap in pituitary feedback. J Pediatr 1960, 57: 416-419.
7. Clostein G, Kershnar AK, Kogut MD. Prolactin activity in juvenile hypothyroidism and precocious puberty. Pediatrics 1972, 50: 881-889.
8. Evers JLH, Rolland R. Primary hypothyroidism and ovarian activity evidence for an overlap in the synthesis of pituitary glycoproteins. Br J Obs Gyne 1981, 88: 195-199.

Congenital Adrenal Hyperplasia Due to 11β-Hydroxylase Deficiency

P.S.N Menon
C.V. Harinarayan
M.G. Forest

Congenital adrenal hyperplasia (CAH) due to deficient 21-hydroxylase usually

From the Departments of Pediatrics, Endocrinology and Metabolism, AIIMS, New Delhi, India and Unite de Recherches de Pathologie Hormonale Moleculaire, INSERM U 329, Hospital Debrousse, F-69322 Lyon Cedex 05, France.

Reprint requests: Dr. P.S.N. Menon, Associate Professor, Division of Pediatric Endocrinology, Department of Pediatrics, All India Institute of Medical Sciences, New Delhi 110 029.

Received for publication September 5, 1990; Accepted February 11, 1991