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## Precocious puberty in a 24 month old Nigerian girl: case report

DOI:<http://dx.doi.org/10.4314/njp.v47i4.10>

Accepted: 3rd July 2020

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**Abstract:** Precocious puberty refers to the appearance of signs of puberty at an earlier age than is considered normal. It occurs ten times more commonly in girls than in boys. The overall incidence ranged from 1/5000 to 1/10,000 children. The cause is idiopathic in 90% of cases of female precocious puberty.

We present BA a 24 month old female toddler who presented with one year history of progressive breast development and 6 month history of pubic hair growth. There was associated increasing weight, height and vaginal secretion. There was no similar occurrence in the family. Mother attained menarche at 14 years of age. Essential finding at presentation revealed a toddler who is heavy and tall for age with a weight of 17kg (>95<sup>th</sup> percentile for age and sex), height of 90.5cm (90<sup>th</sup> percentile for age and sex), Occipito-frontal circumference of 49cm (normal). Her sexual maturity rating was Tanner stage 3 for breasts and stage 2 for pubic hair. An assessment of precocious pu-

erty was made. Her investigation result showed an advanced bone age of 5 years; elevated serum gonadotrophins in the pubertal range; and essentially normal cranial CT. Abdomino-pelvic USS showed an enlarged uterus for age, and a dominant right follicle with internal echo measuring 17.1mm X 15.2mm. Parents were counseled on the need for treatment to arrest the progression of precocious puberty but yet to respond because of financial constraint after 2 years of diagnosis.

Female precocious puberty is ten times more common than male precocious puberty. The aetiology is idiopathic in 90% of cases and It is amenable to treatment. Integration of the investigation and treatment of childhood endocrine disorders into the National Health Insurance scheme will be a great panacea to the challenge of prompt management in developing countries.

**Keywords:** Precocious, puberty, 24 months old, female, idiopathic, poverty, Nigeria

### Introduction

Precocious puberty refers to the appearance of physical and hormonal signs of pubertal development at an earlier age than is considered normal or more than 2.5 to 3 standard deviations earlier than the average age or before 8 years in females and 9 years in males.<sup>1</sup> The first clinical sign of puberty in girls is development of breast bud whereas it is testicular enlargement (testicular volume greater or equals to 4mls) in boys. The overall incidence of precocious puberty is estimated to range from 1/5000 to 1/10,000 children and it occurs ten times more in girls than in boys.<sup>1,2</sup> The incidence of precocious puberty in Nigeria is not known as there are few reported cases from this part of the world.<sup>3,4</sup> The cause of precocious puberty in girls is unknown in 90% of cases while 8-10% of girls and 25-75% of boys with precocious pu-

erty may have structural central nervous system abnormality.<sup>5</sup> Aetiologically, precocious puberty is broadly classified into central and peripheral causes. Causes of central (gonadotrophin-dependent) precocious puberty include tumors (hypothalamic hamartoma, optic glioma, chiasma tumor), increased intracranial pressure (from previous CNS damage/ infection) and idiopathic (>90% of cases). The main pathophysiology for central precocious puberty is early activation of the pulsatile gonadotrophin-releasing hormone secretion from the hypothalamus leading to activation of the hypothalamo-pituitary-gonadal axis and consequent development of secondary sexual characteristics in the affected children.<sup>2,5</sup> Peripheral (gonadotrophin-independent) precocious puberty can result from disorders of the gonads (tumors), or the adrenals (tumors or congenital adrenal hyperplasia). Another form of precocious puberty,

gonadotrophin releasing hormone (GnRH) independent precocious puberty, is caused by disorders like McCune-Albright syndrome and autonomous ovarian cysts.

### Case report

BA, a 24 month old female toddler presented at Paediatric endocrine clinic of LAUTECH Teaching Hospital, Osogbo, with 1 year history of bilateral breast growth and 6 month history of pubic hair growth. Growth and development in the first year of life was essentially normal but thereafter she was noticed to be having prominent breasts which increased progressively in size with enlargement of the nipples resembling the breast of an adolescent. There was increasing height, weight and vaginal secretion. There was no history of use of estrogen containing cream, no history suggestive of birth trauma, head injury, or meningitis. Mother attained menarche at 14 years of age. There was no history of blurred vision. Essential findings at presentation revealed a toddler who was heavy and tall for age with a weight of 17kg (>95<sup>th</sup> percentile for age and sex), height of 90.5cm (90<sup>th</sup> percentile for age and sex), Occipito-frontal circumference of 49cm (normal). Her sexual maturity rating was Tanner stage 3 for breasts and stage 2 for pubic hair (Figure 1). An assessment of Isosexual Precocious Puberty was made. Her investigation result showed an advanced bone age of 5 years; elevated serum gonadotrophins in the pubertal range (Leutenizing hormone 1ng/ml [0.9-1.05ng/ml] , Follicle stimulating hormone 3.6 mmol/L [3-22mmol/L], Estradiol 120.4 pg/ml [30-350pg/ml]); and essentially normal cranial computerized tomography. Abdomino-pelvic Ultra Sonography Scan (USS) showed an enlarged uterus for age, a dominant right follicle with internal echo measuring 17.1mm X 15.2mm, but the left ovary was not visualized on transabdominal USS. And a conclusion of Precocious puberty was also made on USS. Skull Xray showed interclinoid ligament calcification of unknown cause; suggestion was made to rule out suprasellar/ hypothalamic lesion.

Her parents were duly counseled on the diagnosis, investigation findings, treatment modality and possible outcome to which they voiced understanding. However, financial constraint to procure intramuscular leuprolide acetate 0.3mg/kg every 28 days (2,400 USD per annum) prevented further treatment and patient has been lost to follow up.

**Fig 1:** Bilateral breast growth in a 24 month old girl with idiopathic Precocious Puberty



### Discussion

The index patient exhibited features of true central precocious puberty evident by compatible clinical features of accelerated growth velocity,<sup>6</sup> progressive growth of both breasts up to Tanner stage 3 at presentation, pubic hair growth and adult body odour. She also had advanced bone age of 5 years, enlarged uterus and elevated serum hormonal profile in the pubertal range. There was no radiological feature of CNS abnormality or intracranial tumor suggestive of hypothalamic hamartoma which is common in her age group and has been reported by previous authors.<sup>2,4</sup> There was also no periodic fluctuations in the size of the breasts as commonly seen in premature thelache. Premature thelache is often diagnosed in female infants (infantile mammoplasia) or a girl up to the age of three years, who has breast enlargement without other signs of puberty and is growing at a normal pre-pubertal growth velocity.

The index patient has a true central precocious puberty of idiopathic etiology which is the most common cause of precocious puberty. The main goal of management is to delay progression of puberty when it occurs in early childhood to prevent adverse psychosocial problems, early menarche and ultimately short stature in adulthood.<sup>7</sup> In most adolescents, pubertal maturation is complete by four years after initiation of puberty.<sup>7</sup> It is pertinent to note that pubic hair growth and adult body odour in early puberty is not related to the activation of the hypothalamo-pituitary-gonadal axis but rather caused by increased secretion of adrenal androgens especially, Dehydroepiandrosterone-sulfate (DHEA-S). This is referred to as adrenarche and it may precede onset of true central puberty by few years.<sup>7,8</sup> It has also been documented in literature that ethnicity has significant impact on human axillary odour production such that body odour produced in early puberty may differ in girls of African descent when compared to girls from Asian or European descent.<sup>9</sup> There is urgent need for awareness campaign and financial support for children with endocrine disorders to enhance early presentation, diagnosis and treatment.

There should be increased advocacy to place all children with endocrine disorders on National Health Insurance Scheme (NHIS) and to ensure that all the needed hormones and endocrine medications are included in the NHIS drug lists; this will take the financial burden off the parents and enhance prompt treatment and good prognosis.<sup>10</sup> The parents of the index patient, after two years of diagnosis, are still looking for money to procure leuprolide to arrest the precocious puberty in a 24 month old girl while the girl continues to grow with attendant avoidable psychological challenges which are too much for the toddler to comprehend or handle. It should however be noted that children aged 5 years and above with idiopathic precocious puberty may not need treatment since previous study has shown that they achieved their genetic height potential and normal adult height without treatment.<sup>7</sup>

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## Conclusion

Female precocious puberty is ten times more common than male precocious puberty. The aetiology is idiopathic in 90% of cases and it is amenable to treatment. The cost of treatment is mostly unbearable in developing countries like Nigeria. Integration of the investigation and treatment of childhood endocrine disorders into the

national health insurance scheme will be a great panacea to the challenge of prompt and effective management in developing countries.

**Conflict of interest:** None

**Funding:** None

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