Bangladesh J Obstet Gynaecol, 2015; Vol. 30(2): 109-112

Case Reports

Precocious Puberty – A Case Report

POLY BEGUM[1], DIPTI RANI SAHA[2], MD. KAMRUL HASSAN[3]

Abstract:

The parents of a 04-year-old girl bring her to a Gynaecologist because of breast development, appearance of pubic hair and periodic per vaginal bleeding. Her medical history is unremarkable. The parents are of average height, and the mother reports first menstruating when she was 11 years old. At physical examination, the girl is 100 cm tall , weighs 17 kg, and has a body-mass index of 17. Her pubertal development is classified as Tanner stage 3 breast development and Tanner stage 2 pubic hair development. She was diagnosed as a case of precocious puberity. Appearance of secondary sexual development before the age of 9 in a male child and before the age of 8 in a female child is called precocious puberty. When the cause of precocious puberty is premature activation of the hypothalamic-pituitary axis, it is called central or complete precocious puberty and she was a case of central precocious puberty. After proper consult she was treated by GnRHa suppressor of pituitary till 11 years of age.

Introduction:

Precocious puberty is reserved for girls who exhibit any secondary sex charactrstics before the age of 8 or menstruate before the age of 10[1].This is due to excessive production of sex steroids which could be due to an activation of hypothalamic-pituitary-gonadal axis activation (GnRH dependent PP) also called as Central Precocious Puberty (CPP) or due to a nonhypothalamic mediated increase in sex steroid production (GnRH-independent PP). Out of these two types, GnRH dependent precocious puberty is the commoner one and accounts for more than 90% of girls and about 50% of boys presenting with precocious puberty [2].

The onset of puberty is marked by breast development and menstruation in girls. Tanner stage 3 breast development means appearance of the breast bud marks the onset of pubertal development.[3] The most common mechanism of progressive precocious puberty is the early activation of pulsatile gonadotrophin releasing hormone secretion which results in maturation of hypothalmo-pituitary ovarian axis which activates maturation of hormone responsive tissue such as breast, bones, pubic hair and endometrium. These girls have normal ovulation, menstruation and reproductive capacity.[4]Isolated sexual precocity of unknown etiology carries no increased risk of mortality, however, distinguishing between children with idiopathic CPP and rare patient with a CNS, adrenal or ovarian tumor is important because the latter group may be at risk for tumor related complication. Children with precocious puberty may be stressed because of physical and hormonal changes; they are too young to understand.[5] Going through puberty early can also be difficult for a child emotionally and socially. For example, girls with precocious puberty may be confused or embarrassed about physical changes such as getting their periods or having enlarged breasts well before any of their peers[5]. In case with progressive precocious puberty, they may present with adverse psycosocial outcomes, early menarche and short stature, because of early epiphyseal fusion[6].

Here we present a case of a female child of precocious puberty.

Case Report:

A female child of 04 years old was brought by her parents to the Obstetrics and Gynaecology out patient

1. Assistant Professor, Department of Obstetrics & Gynecology, Diabetic Association Medical College, Faridpur.
2. Professor& Head, Department of Obstetrics & Gynecology, Diabetic Association Medical College, Faridpur.
3. Lecturer, Department of Microbiology, Faridpur Medical College, Faridpur.

department of Diabetic Association Medical College Hospital having bilateral enlargement of breast, presence of pubic hair for one year and history of periodic bleeding per vagina for three months. According to the statement of patient's mother her child was alright one year back. Her milestones of development were normal. But she noticed that breast was enlarging gradually and there is growth of pubic hair. Her mother also noticed that the girl was suffering from per vaginal bleeding which evolved into monthly regular cycles of three to four days. She had no history of birth injury, head injury, encephalitis, headache or seizure.

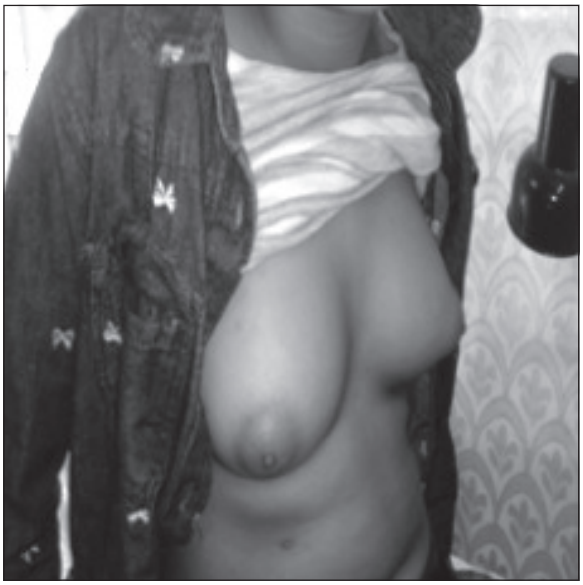

Fig.-1: *Patient of precocious puberty.*

General physical examination of the patient was within normal limit. Her height was 100 cm, her weight 17 kg and skin pigmentation absent. But examination of breast revealed that her both the breast was enlarged and firm in consistency. Nipple and areola were developed. No discharge was present. Axillary and pubic hair was long, curved and dark. On per abdominal examination no palpable lump was present.

She had normal hematological and biochemical profiles, however, the hormonal analysis revealed pubertal response of gonadotropins with luteinizing hormone (LH) of 2.30 ml/ mL (N < 0.6 mIU / mL), follicle-stimulating hormone (FSH) of 4.98 mIU / mL (N < 0.6 mIU / mL), and estradiol (E2) of 9.6 pg / mL (N < 5 pg / mL), with normal thyroid functions. X ray of the left wrist revealed bone age was greater than chronological age. USG showed ovaries were prominent (right ovary- 2.8 x 1.0 cm and left ovary- 1.9 x 1.0 cm) and follicles were present in each ovarian parenchyma , uterus was measuring about 4.7 x 1.3 cm (L x AP). Tumor markers such as carcinoembryonic antigen (CEA), CA 18.7, alphafetoprotein, and human chorionic gonadotropin (HCG) were negative. MRI of brain, shows changes due to hypothalamic hamartoma. After getting all investigations we came to conclusion this girl suffered from precocious puberty, which is central secondary to hypothalmic hamartoma. After counselling with patient's guardian we start our treatment. We prescribed GnRH agonist, Inj. Decapeptyl 3.75 mg every 4 weeks. The drug is to be continued for 11 years of her age. After giving treatment, follow up was done after one month, she developed menstruation, pubic and axillary hair was increased But after two year follow-up, with subsidence in size of the

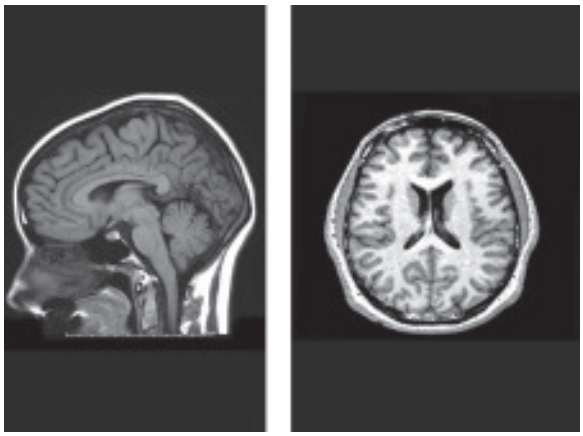

Fig.-2: *Midsagittal and coronal MRI of Brain showing hypothalamic hamartoma.*

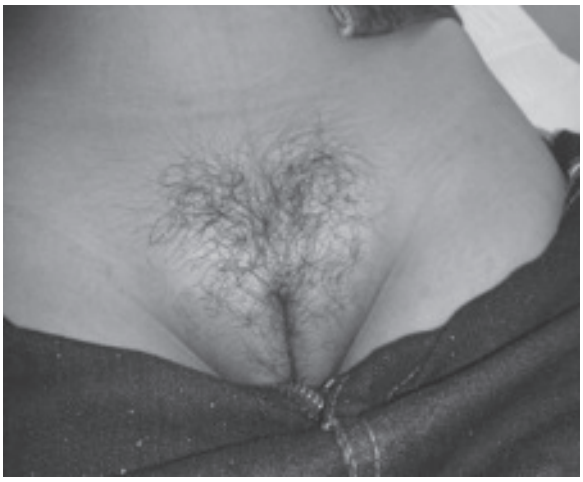

Fig.-3: *Genitalia of 04 yrs. child (Photographs taken with permission of her Parent).*

hypothalamic hamartoma, secondary sexual characters, reversed and monthly menstrual cycles regressed.

Discussion:

Precocious puberty is an unusually early onset of puberty, statistically defined as -2.5 to 3.0 SDs below the average age of onset of puberty in healthy children[6]. It is a relatively rare condition. The Gonadotrophin dependent type (GDPP) also known as central precocious puberty is the most common subtype and is characterized by an early maturation of the hypothalamic-pituitary-gonadal axis. This is much more common in girls than boys. Here the pattern and timing of pubertal events progresses in the normal sequence.[6]Eighty to ninety percent of GDPP will have no identifiable cause (idiopathic GDPP) and this condition will have a striking female predominance[7,8]. The other important causes include CNS tumors, trauma, infections, primary hypothyroidism, hydrocephalus, cysts etc[7].

Hypothalamic hamartoma is a relatively rare congenital malformation usually associated with central precocious puberty and gelastic seizures. This tumor is composed of redundant brain tissue with a haphazard assembly of neurons, nerve fibers, and neuroglial cells in inappropriate distributions and proportions[8].The association of hypothalamic hamartoma with precocious puberty has long been recognized. In fact hypothalamic hamartoma is one of the most common cerebral lesions associated with precocious puberty[9].

Children with precocious puberty due to hypothalamic hamartomas usually present before four years of age[10].Although the mechanism for precocious puberty is not known, the prevailing view is that hypothalamic hamartomas contain ectopic Luteinizing Hormone Releasing Hormone (LHRH) neurosecretory neurons which are unrestrained by the normal negative feedback mechanisms and produce secretory bursts of LHRH[11].

Our patient had a normal pattern of pubertal growth, a quicker skeletal maturity, and an elevated level of Luteinizing hormone (LH). All these findings are characteristic of GDPP or central precocious puberty[12].MRI is the primary imaging modality for detection of Hypothalamic hamartomas allowing better tissue characterization and greater anatomic details[12].The imaging features most commonly consist of a hypothalamic mass isointense to grey matter on T1W sequence, and increased signal intensity on T2W and FLAIR (fluid attenuated inversion Recovery) sequence[8].The MRI of our patient revealed all of these features.

Medical treatment with long-acting GnRH agonists is the first choice of treatment in patients with CPP due to Hypothalamic hamartoma[13].In particular, depot preparations ensure an adult height within the genetic height potential with normal body proportions, bone density and reproductive function[14].Surgical resection of the hypothalamic hamartoma is indicated only in cases of progressive neurological deficit, hydrocephalus, and progressive enlargement of the mass and intractable seizures[15].

Conclusion:

Thorough history taking and careful examination is required to determine the possible causes of precocious puberty, however, it is often vague. Additional evaluation should include hormonal assays and bone age assessment (E2, LH, and TSH). If a randomly measured level of LH is in the pubertal range, an MRI brain should be obtained. A pelvic ultrasound scan is required to rule out an ovarian tumour or cyst, mainly if the E2 level is elevated. A GnRH or GnRH-agonist stimulation test is the gold standard for diagnosing CPP, and is recommended to assess the activation of the gonadotropic axis, for predicting the progression of puberty. In case of progressive CPP, treatment with a depot GnRH agonist is suggested and is generally continued for 11 years, even though the best duration of therapy is undecided.

References:

1. Eugster ex et al. Tamoxifen treatment for precocious puberty. J Pediatr. 2013; 143: 60 – 6.
2. Lee PA, Houk CP. Puberty and Its Disorders. In: Lifshitz F, editor. Pediatric Endocrinology. New York: Informa Healthcare; 2012.p. 273–303.
3. Caral Jeen et al. Precocious puberty. N Eng J Med. 2010; 358: 2366 - 77.
4. Lahlon et al. Pharmacokinetics and pharmacodynamics at GnRH agonist J Peditar Endocrino Metabolism . 2010; 137:723 – 37.
5. http://kidshealth.org/parent/medical/sexual/precocious.html, Steven Dowshen, MD.01-08-2008.

6. Klein KO. Precocious puberty: Who has it? Who should be treated? J Clin Endocrinol Metab 2012;84:411-4.

7. Sun, SS, Schubert, CM, Chumlea, WC, et al. National estimates of the timing of sexual maturation and racial differences among US children. *Pediatrics* 2002;110:911.

8. Chemaitilly, W, Trivin, C, Adan, L, et al. Central precocious puberty: clinical and laboratory features. *Clin Endocrinol* 2011;54:289.

9. Shaheen F, Hakim A, Wani M, Asmi R. Hypothalamic hamartoma presenting with gelastic seizures and precocious puberty: report of a case. *Eastern Journal of Medicine* 2010;15:67-70.

10. Hahn FJ, Leibrock LG, Huseman CA, Makos MM. The MR appearance of hypothalamic hamartoma. *Neuroradiology* 1998;30:65-68.

11. Cassio A, Cacciari E, Zucchini S, Balsamo A, Diegoli M, Orsini F. Central precocious puberty: clinical and imaging aspects. *J Pediatr Endocr Metab* 2010;13:703–708

12. Rousso IH, Kourti MR, Panpandrecu DR, Tragiannidis AR, Athanasiadou FR. Central precocious puberty due to hypothalamic hamartoma in a 7 month-old infant girl. *Eur J Pediatr* 2008;167:583–585.

13. Karnaze MG, Sartor K, Winthrop JD, Gado MH, Hodges FJ. 3rd. Suprasellar lesions: evaluation with MR imaging. *Radiology* 2002;161:77-82.

14. Feuillan PP, Jones JV, Barnes K, Oerter-Klein K, Cutler GB. Reproductive axis after discontinuation of gonadotropin releasing hormone analogue treatment of girls with precocious puberty: long term follow-up comparing girls with hypothalamic hamartoma to those with idiopathic precocious puberty. *J Clin Endocr Metab* 1999;84:44– 49.

15. Heger S, Partsch CJ, Sippell WG. Long-term outcome after depot gonadotropin-releasing hormone agonist treatment of central precocious puberty: final height, body proportions, body composition, bone mineral density, and reproductive function. *J Clin Endocr Metab* 2008;84:4583–4590.