Global Journals LaTeX JournalKaleidoscope™
Artificial Intelligence formulated this projection for compatibility purposes from the original article published at Global Journals. However, this technology is currently in beta. *Therefore, kindly ignore odd layouts, missed formulae, text, tables, or figures.*

Peripheral Precocious Puberty Causes, Diagnosis and Management

Nasir AM. AL. Jurayyan[1]

[1] King Khalid University Hospital

Received: 15 December 2016 Accepted: 31 December 2016 Published: 15 January 2017

Abstract

Background: Precocious puberty (PP) is a common pediatric endocrine problem. It is a complex and a multifactorial. Design and settings:A retrospective hospital based study was conducted at King Khalid University Hospital (KKUH), Riyadh Saudi Arabia, during the period January 1990 and December 2016. Materials and Methods: During the period under review, all patients with the diagnosis of peripheral precocious puberty were reviewed for age, sex, clinical characteristics, hormonal and radiological investigations. Results: During the period under review; 19 patients were evaluated for PPP. Elevated levels of estradiol or testosterone levels with suppressed gonadotropin levels on GnRH stimulation test. Various etiological causes were noted, with congenital adrenal hyperplasia (8 patients) and hypo-thyroidism (5 patients) being the commonest. Adrenal tumors in 3 patients, ovarian pathology in two and McCune-Albright Syndrome was the diagnosis in one. Conclusion: Peripheral precocious puberty wasn?t that rare in our series. Variety of causes with congenital adrenal hyperplasia and hypothyroidism were the commonest.

Index terms— diagnosis, etiology, management, peripheral, precocious, puberty.

1 I. Introduction

recocious puberty (pp) is a common problem seen in pediatric endocrinology practice. It is a complex and can be classified into, central precocious puberty, gonadotropin dependent or true PP which results from early maturation of hypothalammopituitary-gonadal (HPG) axis, and peripheral (pseudo) precocious puberty which is also known as gonadotropin independent puberty, is the result of autonomous peripheral secretion of excess sex hormones independent of the HPG axis. (1)(2)(3)(4)(5) The aim of this article was to discuss peripheral precious puberty and its diagnosis and management.

2 II. Materials and Methods

All patients diagnosed to have peripheral (pseudo) precocious puberty at the pediatric endocrine series of the King Khalid University Hospital (KKUH), Riyadh, Saudi Arabia in the period January 1990 and December 2016, were retrospectively reviewed. Data included age, sex, clinical demographic data, hormonal and radiological investigations. The diagnosis was based on history, clinical examination, hormonal and radiological findings. Gonadotropin releasing hormone (GnRH) stimulation testing is considered as the gold standard for diagnosis (6)(7)(8). Radiological investigations (Pelvic Ultra Sonography), computed tomography (CT), and magnetic resonance imaging (MRI) were performed when indicated.

3 III. Results

During the period under review a total of 19 patients were diagnosed to have peripheral (pseudo) precocious puberty.

Fifteen girls and 4 boys. Their mean age was 3.5 (range; 0.5-7 years). Laboratory investigations revealed elevated Oestradiol level, mean: 110 ng/ ml (normal; up to 35) and testosterone mean: 2.1 nanomol/ L (normal; 0.1-0.4) with suppressed gonadotropin levels on GnRH stimulation test. The etiological diagnosis showed variety of causes (Table **??**.

Congenital adrenal hyperplasia and chronic hypothyroidism were the commonest found in eight and five patients respectively.

Tumors of the adrenal may cause virilization or feminization depending on weather androgens or estrogens are secreted, one estrogen secreting adenoma presented with feminization in a boy and two were due to adrenal carcinoma (figure).

Ovarian cyst and granulosa cell tumor were present in one paticient each. The classic triad of polyostotic fibrous dysplasia, Café/ au/ lait macules of the skin and precocious puberty indicates McCune-Albright syndrome, found in one girl.

4 IV. Discussion

Precocious puberty is defined as development of secondary sex characteristics before the age of eight years in girls and nine years in boys. Two types of precocious puberty are recognized; central (true) precocious puberty (CPP) and peripheral (pseudo) precocious puberty (PPP). CPP is caused by early activation of the hypothalamic-pituitary axes (HPA), with gonadotropin-releasing hormone (GnRh). Stimulated gonadotropin secretion causing gonads maturation. In PPP, serum sex steroids are elevated independent of gonadotropin secretion, and because gonadotropin levels are low the gonads do not undergo maturation. Precocious puberty may be isosexual (involving secondary sex characteristics that are gender matched) or heterosexual (involving sex characteristics of the opposite gender). CPP is always isosexual, whereas PPP may be isosexual or heterosexual.

In Saudi Arabia where the prevalence of consanguinity increased (9,10), congenital adrenal hyperplasia commonly causes virilization without testicular enlargement in boys, and girls will not have breast enlargement, unless secondary central precocious occurred. Approximately 40% of our patients in this series were due to congenital adrenal hyperplasia (21-? -hydroxylaze or 11? hydroxylase deficiency which is a common occurrence in Saudi Arabia and easily diagnosed. The treatment includes glucocorticoids, usually hydrocortisone 12-15 mg/m2/day (11,12). Severe chronic hypothyroidism rarely results in precocious puberty, and unlike other causes, is associated with skeletal and growth delay. The pathophysiology is uncertain, but it may be due to the intrinsic FSH activity if very high TSH levels. The signs of puberty is usually reversible with thyroxine therapy (13,14). Tumors of adrenal glands, ovary, or testes mat cause varilization or feminization depending on whether androgen or estrogen are secreted. These rare neoplasia require surgery or chemotherapy both. Also, Human Chorionic gonadotropin (hCG) secreting tumors can cause precocious puberty in boys by stimulating leydig cells to secrete testosterone. Unlike boys, girls with HCG secreting tumors generally do not develop precocious puberty. Both LH and FSH stimulation are necessary for ovarian activation. Raped varilization suggests the possibility of an endocrine secreting tumor. in adrenal tumors, both testosterone and Dehydroepiandrosterone are usually markedly elevated. A raised serum HCG suggests an hCG secreting tumors. ?? fetoprotein and carcinoembryonic antigen (CEA) are potentially useful markers of non germinomatous germ cell tumors. Ultrasonography helps in delineating the different causes (15)(16)(17) ovarian cysts occur in 2.5% if pre pubertal girls. Imaging studies (ultrasound help in differentiating benign/ malignant legions. Cysts having few internal echoes suggestive of hemorrhages with separation/ calcification is most benign and requires observation with follow up ultrasound in 1 to 2 months. Surgery may be required for large ovarian cyst (>20 ml) because the risk of adnexal torsion. Aromatase inhibiters are used in the management of persistent cyst. Recurrent or persistent ovarian cyst with a solid component in imaging suggest ovarian tumors. Juvenile granulosa cell tumors was the most common ovarian neoplasia to present with precocious puberty (17)(18)(19)(20)(21)(22). The McCune-Albright Syndrome causes precocious puberty, primarily in girls. The classic disorder comprises the triad of polyestotic fibrous dysplasia, café -au -Lait pigmentation, and gonadotropin independent precocious puberty. The disorder results from an activating somatic mutation in Gs, the protein that transduces the signal of many 7 -transmembrane domain receptors, including gonadotropin receptors. Testolactone and other anti-estrogen like Fudrozole and Tamoxifen are effective in treating girls with McCune-Albright syndrome. Unfortunately, escaping from the effects of treatment may occur after one to three years. After years of exposure to estrogen, many of these girls enter central precocious puberty and require treatment with LHRH analogue (23)(24)(25)(26).

5 V. Acknowledgement

Table **??**: Etiology of peripheral, gonadotropin-independent, (pseudo) precocious puberty in 19 patients

6 Diagnosis

Male Female

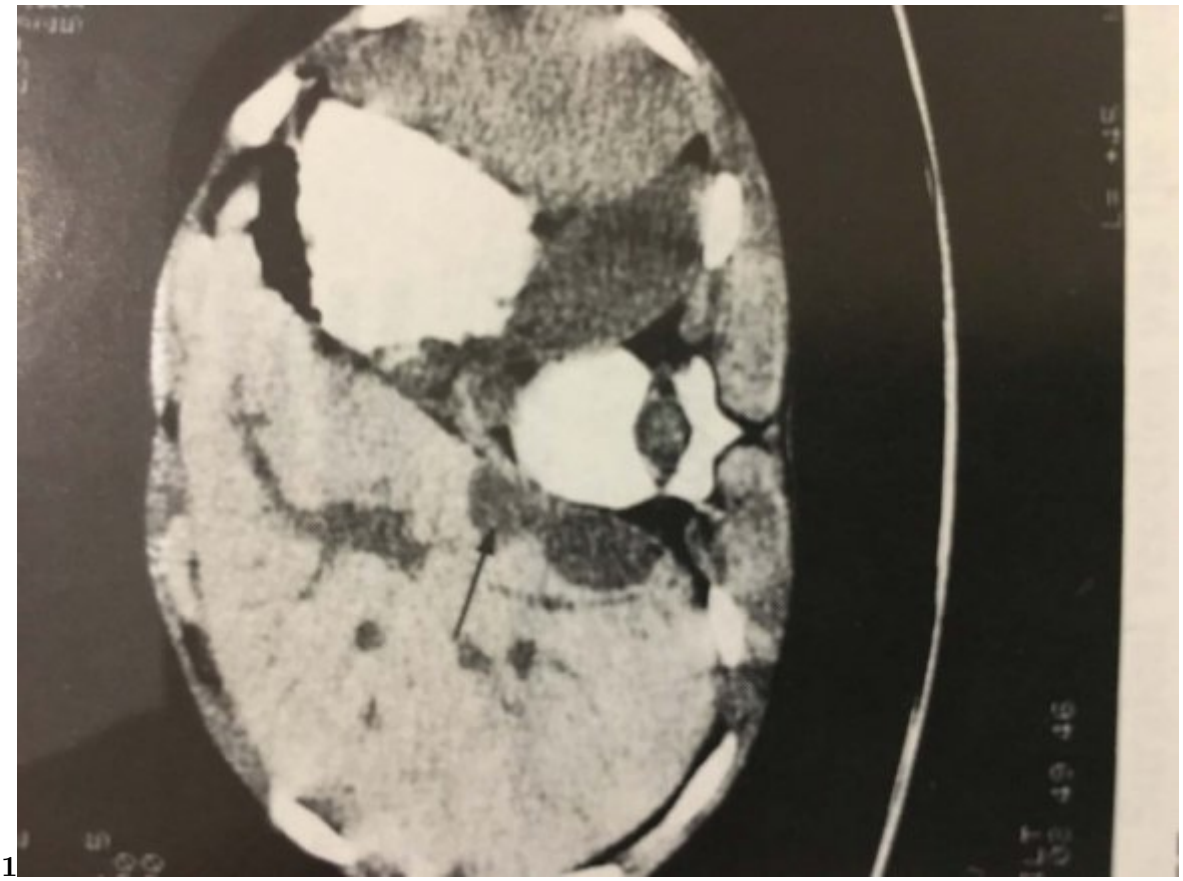

Figure 1: Figure 1 :

The authors would like to thank Mr Mooath N Al-Jurayyan for his help in preparing this manuscript.

.1 Conflict of interest

Funding None

[Bakr et al.] , Al-Jurayyan Na1 , Al-Herbish As , Abo Bakr , A M Al-Rabeeah , AA , Al - Samarrai , A I Jawad , A J Patel , P J Abdullah , MA .

[Weinstein et al.] , Ls1 Weinstein , A Shenker , P V Gejman , M J Merino , E Friedman , A M Spiegel .

[Pouw et al. ()] , I S Pouw , S L Drop , J V Ladée-Levy , F M Slijper . *Tijdschr Kindergeneeskd* 1986. 54 (3) p. .

[Saedi-Wong and Wong ()] , S Saedi-Wong , Al-Frayh A Wong , HY H . *Socio-Economic. Journal of Asian and African Studies* 1989. 24 p. .

[Jean et al. ()] , C C Jean , Juliane L Precocious , J M Eng . 2008. 358 p. .

[(Jun 18)] , 10.1186/1477-7819-11-142. Jun 18. 11 p. 142.

[Mobini et al. ()] 'A case report and literature review'. M Mobini , P Vakili , S Vakili , Mccune-Albright Syndrome . *Int J Pediatrics* 2014. 2 (2) p. .

[Activating mutations of the stimulatory G protein in the McCune-Albright syndrome N Engl J Med ()] 'Activating mutations of the stimulatory G protein in the McCune-Albright syndrome'. *N Engl J Med* 1991. 12 (24) p. .

[Chowdhuri et al. (2001)] 'Adrenal tumor presenting as precocious puberty'. S1 Chowdhuri , M Dharmalingam , K M Kumar . *Indian J Pediatr* 2001 Apr. 68 (4) p. .

[Resende et al. (2007)] 'Assessment of basal and gonadotropin-releasing hormone-stimulated gonadotropins by immunochemiluminometric and immunofluorometric assays in normal children'. Ea1 Resende , B H Lara , J D Reis , B P Ferreira , G A Pereira , M F Borges . *J Clin Endocrinol Metab* 2007. 2007 Feb 6. 92 (4) p. .

[Carel and Léger (2008 29)] 'Clinical practice. Precocious puberty'. Jc1 Carel , J Léger . *N Engl J Med* 2008 29. 358 (22) p. .

[Al-Jurayyan (1995)] 'Congenital adrenal hyperplasia due to 11 beta-hydroxylase deficiency in Saudi Arabia: clinical and biochemical characteristics'. N A Al-Jurayyan . *Acta Paediatr* 1995 Jun. 84 (6) p. .

[Congenital adrenal hyperplasia in a referral hospital in Saudi Arabia: Epidemiology, pattern and clinical presentation Ann Saudi 'Congenital adrenal hyperplasia in a referral hospital in Saudi Arabia: Epidemiology, pattern and clinical presentation'. *Ann Saudi Med* 1995 Sep. 15 (5) p. .

[Eugster EA: peripheral precocious puberty causes and current management hormone research ()] *Eugster EA: peripheral precocious puberty causes and current management hormone research*, 2007. 71 p. .

[Oerter et al. ()] 'Gonadotropin secretory dynamics during puberty in normal girls and boys'. Ke1 Oerter , M M Uriarte , S R Rose , K M Barnes , G B CutlerJr . *J Clin Endocrinol Metab* 1990. 71 (5) p. .

[Haroon et al. ()] 'juvenile granulosa cell tumor presenting as isosexual precocious puberty a case report and review of literature'. N N Haroon , G Agarwal , R Pardey , P Dabadgha . *Indian J Endocrinology Metal* 2012. 17 p. .

[Feuillan et al. ()] 'Long-term testolactone therapy for precocious puberty in girls with the McCune-Albright syndrome'. Pp1 Feuillan , J Jones , G B CutlerJr . *J Clin Endocrinol Metab* 1993. 77 (3) p. .

[Anasti et al. (1995)] 'Nisula BC A potential novel mechanism for precocious puberty in juvenile hypothyroidism'. Jn1 Anasti , M R Flack , J Froehlich , L M Nelson . *J Clin Endocrinol Metab* 1995 Jan. 80 (1) p. .

[Sekkate et al. ()] 'Ovarian granulosa cell tumors: a retrospective study of 27 cases and a review of the literature'. S1 Sekkate , M Kairouani , B Serji , A Tazi , H Mrabti , S Boutayeb , H Errihani . *World J Surg Oncol* 2013.

[Sultan ()] 'Pediatric and Adolescent Gynecology. Evidence-Based Clinical Practice. 2nd, revised and extended edition'. C Sultan . *Endocr Dev. Basel, Karger* 2012. 22 p. .

[Eugster (2009)] 'Peripheral precocious puberty: causes and current management'. E A Eugster . 10.1159/000178041. *Horm Res* 2009 Jan. 2009 21. 71 (1) p. . (Suppl)

[Gideon et al. ()] 'Precocious pseudo puberty due to autonomous ovarian cyst. A report of ten cases and long term follow up'. D S Gideon , W Rainer , A Werner . *Hormones* 2008. 7 p. .

[Sousa et al. ()] 'Precocious pseudopuberty due to autonomous ovarian cysts: a report of ten cases and long-term follow-up'. De Sousa , G1 Wunsch , R Andler , W . *Hormones (Athens)* 2008. 7 (2) p. .

[Muir ()] 'Precocious puberty'. A Muir . *Pediatr Rev* 2006. 27 (10) p. .

[Radaideh et al. (2005)] 'Precocious puberty with congenital hypothyroidism'. Am1 Radaideh , M Nusier , Z El-Akawi , D Jaradat . *Neuro Endocrinol Lett* 2005 Jun. 26 (3) p. .

[Al-Jurayyan and Estrogin ()] 'Secreting adrenocortical adenoma causing gynecomastia in a pre pubertal boy'. N A Al-Jurayyan , Estrogin . *Saudi Medical Journal* 1995. 6 (2) p. .

[Al-Jurayyan and Osman] *The increased prevalence of congenital adrenal hyperplasia in Saudi Arabia*, Nam Al-Jurayyan , H Osman .

[The role of consanguinity and multiple siblings involvement European journal for research and medical science ()] 'The role of consanguinity and multiple siblings involvement'. *European journal for research and medical science* 2015. 3 (11) p. .

[Pasternak et al. (2011)] 'The utility of basal serum LH in prediction of central precocious puberty in girls'. Y1 Pasternak , M Friger , N Loewenthal , A Haim , E Hershkovitz . doi: 10.1530/ EJE-11-0720. *Eur J Endocrinol* 2012 Feb. 2011 Nov 14. 166 (2) p. .

[Mieszczak and Eugster ()] 'Treatment of precocious puberty in McCune-Albright syndrome'. J1 Mieszczak , E A Eugster . *Pediatr Endocrinol Rev* 2007. 4 (4) p. . (Suppl)