

Puberty problems in girls

Article review

Pelvic ultrasonography in the evaluation of central precocious puberty: comparison with leuprolide stimulation. Sathasivam A. et al. J. Pediatr 2011; 159 : 490-5.

Precocious puberty must be screened for and treated early. Indeed, premature secretion of sex steroids (e.g estradiol) increases the growth rate of the child as well as the progression of bone maturation (induction of premature ossification of growth plate cartilage).

Diagnosis is obvious in cases showing advanced signs of puberty such as raised estradiol and luteinizing hormone (LH) levels in girls with physical signs. In contrast, prepubescent serum levels of these hormones can be seen either in cases of benign premature thelarche or in cases of very precocious puberty. In the latter, a stimulation test using gonadotropin releasing hormone (GnRH or LH RH) or its analogue (GnRHa or leuprolide) can evaluate the hypothalamic-pituitary-gonadal axis and the pelvic ultrasound for the effects on the ovaries and the uterus. It is interesting to compare the performance of these two examinations in the diagnosis of precocious puberty.

Definitions and useful data

Normal and pathological puberty

Sexual characteristics usually appear between the ages of 8 and 13 (average age 11.5 years) in girls; the onset of puberty is secondary to activation of the hypothalamus.

Precocious puberty is defined by the development of sexual characteristics before the age of 8 in girls.

Caring for patients with precocious puberty relies on the answers to these 3 questions:

- Is it a pathological precocious puberty or a variant of normal puberty?
- If it is a pathological precocious puberty, does this stem from a central or peripheral mechanism? (check the response to gonadotrophins or better still the response to an analogue such as leuprolide or GnRHa).

N.B. precocious puberty of peripheral origin is attributable to the ovaries or the adrenal gland.

- In cases of central precocious puberty, it is a lesion or an idiopathic condition and a suppression therapy or treatment should be discussed.

Tanner classification: stages of development in puberty (girls)

Breast development		Pubic hair	
S1	No glandular tissue	P1	No pubic hair at all
S2	Glandular tissue is palpable	P2	A few long, downy hairs along the labia majora
S3	Increase in breast size. Breasts extend from around the areola and nipple	P3	Hairs become darker
S4	Increase in breast size; nipple is elevated from the breast	P4	Hairs become coarse covering the pubis
S5	Increase in breast size. Breasts extend from around the areola and nipple	P5	Adult-like hairs extending across the medial thighs

What the term "premature thelarche" means

Isolated premature development of breasts in girls, non-pathological (no evolution within a period of over 1 year).

The mechanism shows either transitory hypothalamic-pituitary-ovarian stimulation, or an enhanced sensitivity of the mammary gland to estradiol.

Summary of the article

The authors retrospectively compared the results of these investigations in 50 girls. The hormonal concentration thresholds defining puberty were: LH \geq 0.3 IU/L, estradiol \geq 10 pg/ml and after stimulation, LH \geq 5 IU/L and estradiol \geq 50 pg/ml. The patients were classified according to their results, (before and after stimulation) into 3 groups.

Girls in group I, prepubescent (n = 30, from 4.5 to 9.2 years) with a Tanner breast level of 2 ; 25 with the beginnings of pubic hair and 5 with no hair at all.

In group II, precocious puberty (n = 9, 4.8 to 9.5 years), 8 with breast development (Tanner 2: 7 cases and Tanner 3: 1 case) and one with pubic hair, the last patient had no hair at all and a Tanner level of 2.

Finally, group III puberty stage (n = 11, 3.1 to 9.5 years) was composed of 8 girls with breast development (6 cases with Tanner level 2 and 2 cases at level 3) and one with pubic hair whereas 3 girls only had breast development (Tanner 2: 2 cases and Tanner 3: 1 case). On average, the trough serum concentrations of LH and estradiol differed between the 3 groups (p < 0.0001), but certain values were only slightly raised, the stimulation by GnRH highlighted the stimulation of the hypothalamic-pituitary-gonadal axis with a sensitivity and specificity of 100%.

The ultrasound measurements considered to be associated with puberty were: ovarian volume \geq 2ml, uterine volume \geq 4 ml, uterine height \geq 4 cm and mucosal fold \geq 0.2 cm. Trough (not stimulated) LH serum concentrations and peak (stimulated) serum concentrations of estradiol were significantly correlated with ovarian and uterine volume. The volumes of the uterus and the ovaries were larger in the pubescent group than in the prepubescent group, but there was a noticeable overlap between all the measurements within the 3 groups; and the dimensions of the ovaries and uterus was not significantly different between the pubescent and prepubescent groups.

The authors' conclusion

The ultrasound by itself cannot distinguish the prepubescent stage at the first signs of precocious puberty, unlike the GnRH stimulation test.

To find out more

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Jacques Ingrand, Biomnis' scientific committee.

