Serum estradiol is associated with inhibin B in healthy 1-6 years old girls

**BACKGROUND**

The female gonadal axis is activated in mini-puberty and thereafter it is quiescent until puberty. We have shown that many girls with no clinical sign of puberty in the age group 1-6 years have a rather strong luteinizing hormone (LH) and follicle stimulating hormone (FSH) response to a gonadotropin releasing hormone (GnRH) test. However, stimulated LH and FSH values decreased in the age interval 1-6 years and no LH/FSH values rose above 0.43. Serum estradiol has until recently not been detectable in pre-pubertal girls after the mini-puberty, but with new highly sensitive techniques estradiol may be measurable in most 1-6 year old girls. As both estradiol and inhibin B are produced in the granulosa cells, we have examined how they associate in the age interval 1-6 years.

**OBJECTIVE AND HYPOTHESIS**

The objectives of the study were to investigate the associations between serum estradiol, serum inhibin B, GnRH stimulated LH (LH₃₀) and sex hormone binding proteins (SHBG) in the age group 1-6 years.

**METHODS**

Forty eight healthy girls aged 3.5 years (range 0.8-5.9 years) were included in the study. All girls underwent a GnRH test. Estradiol concentrations were determined by on-line TurboFlow-liquid chromatography tandem mass spectrometry, inhibin B by two-sided enzyme-linked immunosorbent assay, and LH₃₀ and SHBG by sandwich immunometry (Cobas 8000).

**RESULTS**

Estradiol was measurable in samples from 40 girls. Medians and interquartile ranges of serum estradiol, serum inhibin B, LH₃₀ and serum SHBG are shown in Table. Serum estradiol (r=-0.42, p<0.01), serum inhibin B (r=-0.38, p<0.01), LH₃₀ (r=-0.59, p<0.01) but not serum SHBG (r=0.07, p=0.66) decreased significantly by age (figure 1). Serum estradiol associated positively with serum inhibin B (r=-0.69, p<0.01), while there were no associations between serum estradiol and LH₃₀ and serum SHBG (figure 2), respectively. Neither did serum inhibin B associate with LH₃₀ (r=-0.10, p=0.51).

**CONCLUSION**

By ultrasensitive technique circulating estradiol was measurable in most pre-pubertal girls in the age group 1-6 years. Serum estradiol, serum inhibin B and LH₃₀ decreased in the age interval 1-6 years. We observed a positive association between serum estradiol and serum inhibin B. This association did not seem to be LH driven.