

Reference values for external genitalia size and steroid hormone levels in female neonates.

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Introduction

Prenatal androgen exposure can lead to variable virilization of external female genitalia. The lack of a consensus definition of clitoromegaly makes its diagnosis difficult.

Study	Yokoya, 1983	Oberfield, 1989	Litwin, 1980	Riley, 1980
n	61 fullterm	82 fullterm	69 preterm 217 fullterm	69 preterm 90 fullterm
Clitoral length (mean ± DS, mm)	4,4 ± 1,2	4 ± 1,25	10 ± 1,5	
Clitoral width (mean ± DS, mm)	4,3 ± 1,1	3,3 ± 0,75		2-6
Clitoromegaly	> 6,8	> 6,5	> 13	

The fact that only limited data are available on normal steroid levels in female neonates makes this cases more complicated to manage.

Table 9 Fetal/neonatal serum testosterone concentrations.

	Girls		Boys		Sex unreported		Study
	Testosterone (ng/ml)	n	Testosterone (ng/ml)	n	Testosterone (ng/ml)	n	
1-15	0.12	15	0.68	14			Forest et al. (1974)
1-30			0.1-2.91	215			Lahlou et al. (2004)
2	0.3	13	0.66	57			Bergada et al. (2006)
3	0.85	58	1.95	80			Garagorri et al. (2008)

Objective

The aims of this study were :

1. to define reference sizes for external female genitalia in term and preterm neonates as a function of gestational age and birth weight
2. to determine reference values for steroid hormones in female neonate serum

Method

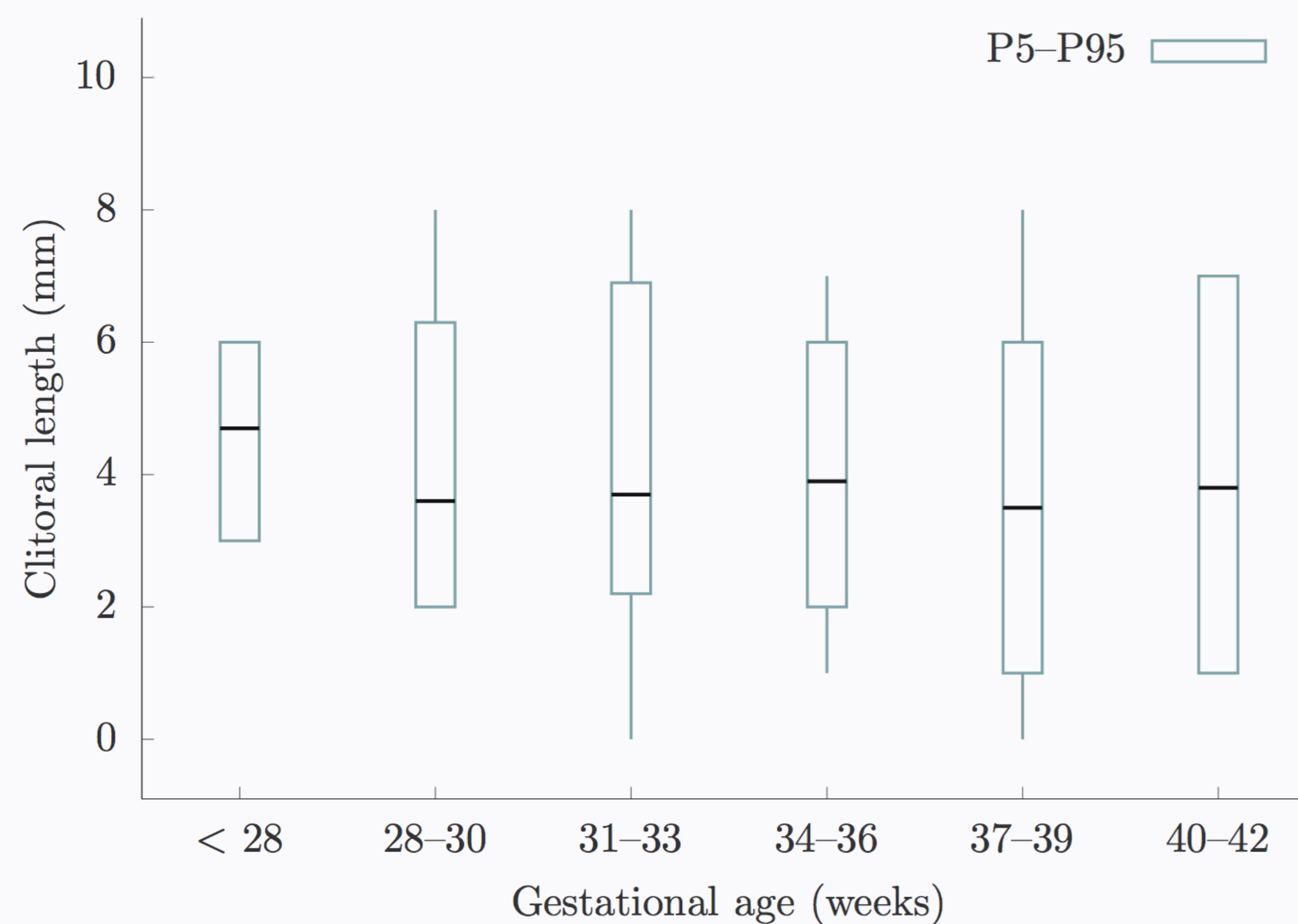
We measured with a plastic caliper the clitoris (length, width) and the anogenital ratio for three-day-old female neonates born at a gestational age of 24 to 42 weeks. For neonates born after 35 gestational weeks the concentrations of nine steroids were analyzed by LC/MSMS.



Anogenital ratio = AF/AC distance

Results

For the 420 full-term and 206 preterm female neonates included, the mean clitoris length is 3.7 mm (P95 = 6 mm), the mean clitoral width is 4 mm (P95 = 7 mm), and the mean anogenital ratio is 0.45 (P95 = 0.6).



Clitoral size does not differ significantly between full-term and pre-term neonates.

The normal values in nmol/L for the main steroids are as follows:

N=125	Testo nmol/l	DHT nmol/l	Delta4 nmol/l	17OHP nmol/l	21DF pmol/l	11 OH nmol/l	DOC nmol/l	Cortico nmol/l	DHEA nmol/l
Mean	<0.125	0.060	0.753	1,065	<0.125	1.383	0.040	4.581	7.444
P5-P95	<0,125 -0.201	0.056- 0.154	0.252- 1.711	0.238- 2.469	<0.125	0.593- 2.969	0.001- 0.125	0.342- 27.3	1.092- 22.2

Testosterone (Testo), dihydrotestosterone (DHT), delta-4-androstenedione (Delta4), 17-hydroxyprogesterone (17OHP), 21-deoxycortisol (21DF), 11-deoxycortisol (11OH), deoxycorticosterone (DOC), corticosterone (Cortico), dihydroepiandrosterone (DHEA)

Conclusion

These results suggest :

- 1) a definition of clitoromegaly in full term neonates as a clitoris longer than 6-7 mm
- 2) an anogenital ratio greater than 0.6 is an indicator of possible in utero virilization

A set of reliable LC/MSMS-based reference values for steroid concentrations in female neonates are proposed

References

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