

Evaluation of vitamin D status and its correlation with gonadal function in children at mini-puberty

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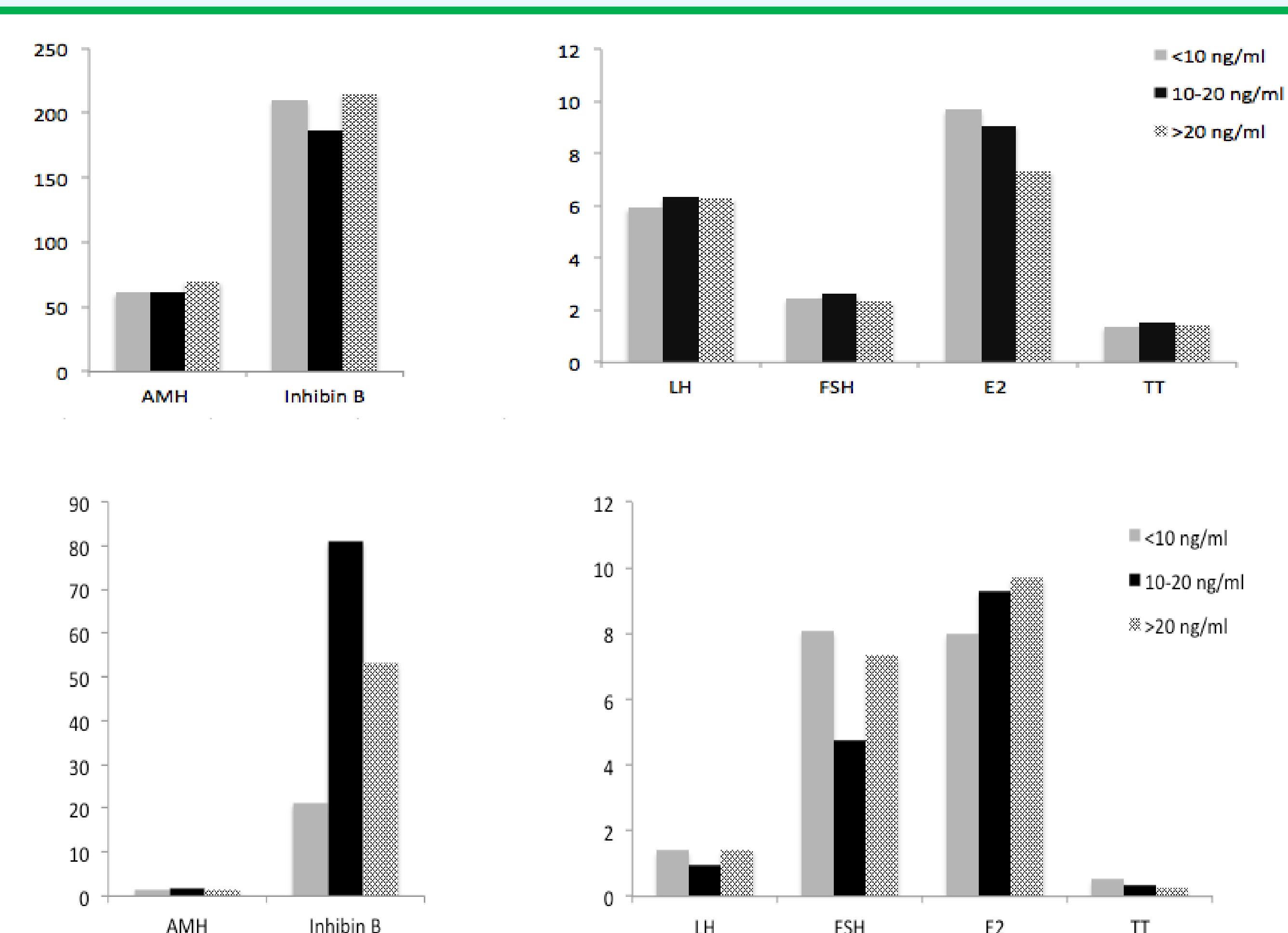
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OBJECTIVE: Most recent evidence from conducted in human and animal studies suggests that vitamin D has a potential role in the physiology of reproductive function in both genders. There is no data regarding the association of gonadal hormones and 25(OH)D levels at mini-puberty. We characterized the associations between 25(OH)D levels and gonadal hormones at mini-puberty.

SUBJECTS and METHODS: 180 (94 boys and 86 girls) healthy appropriate-for-gestational age neonates were included. 25(OH)D, LH, FSH, total testosterone, estradiol, AMH and inhibin B levels were measured at postnatal 30-45 days. All infants were divided into three groups including vitamin D deficiency (<10 ng/ml), vitamin D insufficiency (10-20 ng/ml), and vitamin D sufficiency (>20 ng/ml). Correlations between vitamin D status and reproductive hormones were analyzed.

RESULTS: Average age was 39.75 ± 3.79 days, and the mean serum 25(OH)D concentration was 21.48 ± 12.1 ng/ml. Out of 180 infants, 29 (16.1 %) had vitamin D deficiency, 59 (32.8 %) had vitamin D insufficiency, 92 (51.1 %) had a sufficient level. The average age of boys was 39.46 ± 4.1 days, and the mean serum 25(OH)D concentration was 20.92 ± 13.02 ng/ml. 15.9% had vitamin D deficiency, 39.6% had vitamin D insufficiency, 44.6% had sufficient level. The subgroups were compared in terms of the LH, FSH and gonadal hormones. No significant correlation was found between 25(OH)D levels and gonadal hormones in three groups. The average age of girls was 40.05 ± 3.42 days, and the mean serum 25(OH)D concentration was 22.09 ± 11.05 ng/ml. 16.2% had vitamin D deficiency, 25.5 % had vitamin D insufficiency, 58.1% had sufficient level. The subgroups were compared in terms of the LH, FSH and gonadal hormones. No significant correlation was found between 25(OH)D levels and LH, FSH, E2, and AMH in three groups. But there was a statistically significant difference between TT levels of the three groups ($p = 0.007$). > 20 ng/ml vitamin D group showed a significantly low TT levels compared to <10 ng/ml and 10-20 ng/ml vitamin D groups ($p = 0.003$, $p=0.025$ - Dunn's multiple comparison test). No statistically significant difference was noticed between TT levels of <10 and 10-20 ng/ml vitamin D groups ($p=0.122$). Moreover, there was a statistically significant difference between inhibin B levels of the three groups ($p=0.021$). <10 ng/ml vitamin D group showed a significantly low inhibin B levels compared to 10-20 ng/ml and >20 ng/ml vitamin D groups ($p=0.012$, $p=0.02$). No statistically significant difference was detected between inhibin B levels of 10-20 and >20 ng/ml vitamin D groups ($p=0.325$ - Dunn's multiple comparison test). The correlation between vitamin D and LH, FSH and gonadal hormones in groups and hormone profile of girls and boys with respect to 25(OH)D levels are shown in table.

25(OH)D	<10 ng/ml		10-20 ng/ml		>20 ng/ml	
	Boys (n:15)	Girls (n:14)	Boys (n:37)	Girls (n:22)	Boys (n:42)	Girls (n:50)
LH(IU/L)	5.92 ± 2.93	1.39 ± 0.71	6.32 ± 3.03	0.94 ± 0.38	6.29 ± 2.77	1.41 ± 2.03
FSH(IU/L)	2.43 ± 1.25	8.08 ± 6.01	2.63 ± 1.77	4.73 ± 2.58	2.35 ± 0.98	7.32 ± 5.27
E2(pg/ml)	9.68 ± 8.69	8 ± 5.98	9.07 ± 8.48	9.27 ± 7.02	7.32 ± 7.72	9.69 ± 9.6
TT(ng/ml)	1.37 ± 0.37	0.52 ± 0.32	1.51 ± 1.14	0.36 ± 0.27	1.43 ± 0.7	0.26 ± 0.2
AMH(pg/ml)*	60.93 ± 30.39	1.31 ± 2.91	61.71 ± 32.03	1.76 ± 2.03	69.73 ± 31.29	1.52 ± 1.89
Inhibin B(pg/ml)*	209.83 ± 54.34	21.2 ± 15.71	186.8 ± 67.82	81.07 ± 85.28	214.89 ± 66.94	53.25 ± 47.25



CONCLUSION: A modest effect of 25(OH)D was identified on total testosterone and inhibin B in girls at mini-puberty. 25(OH)D may have an effect on gonadal function during early life. Randomized controlled trials could clarify the importance of vitamin D on gonadal hormones at mini-puberty.

