

PROLACTIN AND DEHYDROEPIANDOSTERONE (DHEA) IN NIGERIAN FEMALES

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SUMMARY

Objective: To evaluate whether there is any correlation between Prolactin and dehydroepiandrosterone (DHEA) level in Nigerian women being managed for infertility.

Setting: Gynaecological Outpatient Clinic of the Lagos University Teaching Hospital (LUTH).

Subjects: Eighty one women investigated for infertility from July 2002 to July 2003 had their blood assayed for prolactin and DHEA.

Results: The mean prolactin level of 15.17 ± 13.88 ng/ml was slightly higher than acceptable high limit of normal (15 ng/ml) with 28.4% of women accounting for this high value. The mean DHEA was 12.51 ± 9.68 ng/ml and also higher (25% higher) than acceptable high limit of normal (9.8 ng/ml) with 43.2% of these women accounting for this high value. There was a strong correlation between prolactin and DHEA ($R = 0.06$; P values = 0.033196).

Conclusion: Prolactin rise is associated with subsequent rise of DHEA and possibly other adrenal androgens which may potentiate the suppression of ovarian function of prolactin. It is recommended that serum androgens should be assayed whenever there is a high Prolactin level.

Keywords: Prolactin, Dehydroepiandrosterone (DHEA); Infertility

INTRODUCTION

Prolactin, a single chain polypeptide hormone is secreted by the anterior pituitary cells which are tonically inhibited by hypothalamic dopamine (Danforth 1995 (1)). Prolactin is responsible for growth and differentiation of the breast and the maintenance of lactation. Prolactin is elevated in hypothyroidism, renal failure and by drugs, which are dopamine antagonist such as tranquillisers and inhibitors of release such as opioids. Stress, pelvic examination and even venepuncture can induce transient hyperprolactinaemia. Significant increased prolactin release inhibit luteinizing hormone pulsatility and can lead to loss of menstrual cycle presenting as amenorrhea and galactorrhoea (Danforth 1995 (1), Strauss et al 1995 (2)).

Dehydroepiandrosterone (DHEA) is a C19 steroid produced in the adrenal cortex and to a lesser extent gonads. DHEA serves as a precursor in oestrogen and testosterone synthesis. It has a relatively weak androgenic activity which has been estimated at 10% of that of testosterone (Meikle et al 1991(3)). Serum DHEA are relatively high in the fetus and neonate, low during childhood and increase during puberty (dePeretti et al 1976 (4), Lashanshy et al 1991 (5)). Increased levels of DHEA during

adrenarche may contribute to the development of secondary sexual hair. No consistent changes in serum DHEA levels occur during the menstrual cycle or pregnancy, parity may however lower serum levels in premenopausal women (Key et al 1990 (6)).

Prolactin and adrenocorticotrophic hormone correlate positively with DHEA as both stimulate adrenal androgen production (Hagag et al 2001 (7), Frias et al 2002 (8)).

There is even an increased plasma testosterone production in women following acute alcohol intoxication (8,9). Dopamine agonist treatment like bromocriptine has however been found to reduce not only the prolactin level but also reduce serum androgens also in hyperandrogenic, hyperprolactinaemic women (8). In this study, we investigated whether prolactin level and DHAS are correlated in Nigerian women.

IENTS AND METHODS

n = 81 (Eighty one) women managed for infertility at the gynaecological out patient clinic from July 2002 to July 2003 had their blood assayed for prolactin and dehydroepiandrosterone. The blood samples were taken in the morning at about 09:00 hours and both were analysed by enzyme immunoassay. The prolactin concentration in females should not exceed 15 ng/ml while the expected normal values for adult females for dehydroepiandrosterone is from 1.3 to 9.8 ng/ml.

RESULTS

Table I shows the maternal characteristics. The mean age was 34.1 ± 6.2 years. The mean parity was 2.2 ± 0.8 while the mean day of menstrual cycle the hormone assay was done was 21.1 ± 2.2 . The women's mean height was 1.63 ± 0.06 metres, mean weight was 73.8 ± 12.4 kg and the mean body

mass index was 27.6 ± 4.2 .

Table II shows the mean prolactin level was 15.17 ± 13.88 ng/ml with 28.4% having values greater than 15 ng/ml. The mean DHEA level was 12.51 ± 9.68 with 43.2% having values greater than 9.8 ng/ml.

Table III shows the correlation between prolactin, DHEA and maternal anthropometric measurements.

Parameter	Mean \pm SD	Range
Age (years)	34.1 ± 6.2	17-49
Parity	2.2 ± 0.8	0-3
Day of Cycle (hormonal test)	21.1 ± 2.2	16-30
Height (meter)	1.63 ± 0.06	1.42-1.81
Weight (Kg)	73.8 ± 12.4	43-115

Table II Serum Hormone Values (n = 81)

Test	Mean \pm SD	Range
Prolactin (ng/ml)	15.17 ± 13.88	? 50
DHEA (ng/ml)	12.51 ± 9.68	1.2-44

Prolactin > 15ng/ml n=23 (28.4%) DHEA >9.8ng/ml n=35 (43.2%)

Table III: Correlation between Prolactin, DHEA and Maternal Factors

Comparison	R	Statistical Significance (P values)
a) Between Prolactin and DHEA	0.06	0.033196
b) Between Prolactin and Body mass index	0.04	0.066752
c) Between DHEA and Body mass index	0.00	0.578491
d) Between Height and weight	0.17	0.000149

DISCUSSION

The mean prolactin level of 15.7 ± 13.88 is slightly higher than the laboratory high limit of normal (15 ng/ml) with 28.4% of the women accounting for this high value. Also the mean dehydroepiandrosterone (DHEA) was 12.51 ± 9.68 and also higher (25% higher) than the laboratory high limit of normal (9.8 ng/ml) with 43.2% of the women accounting for this high value. This is of clinical significance because prolactin is known to suppress ovarian function, coupled with the increased androgen-dehydroepiandrosterone (produced mainly in adrenal glands), may potentiate the prolactin effect on ovarian function making

spontaneous ovulation and conception unlikely. These may have accounted for the infertility in these women.

The strong correlation between prolactin and DHEA ($R = 0.06$; $P = \text{value} = 0.033196$) confirms earlier studies (Frias et al 2002 (8), 2000 (9), Ajayi 1980 (10), 1981 (11), 1981 (12) as prolactin is noted to stimulate adrenal androgen. There was however no correlation between prolactin, DHEA and body mass index in these Nigerian women despite the strong correlation between their height and weight. ($R = 0.17$; $p \text{ value} = 0.000149$).

This study shows that it is necessary to assay the serum androgen level whenever there is a high prolactin level because of the positive correlation between these two to adequately evaluate infertility.

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