An Evaluation of Effects of Exogenous Hormonal Supplement on Gingival Status of Pregnant Females : An Observational Study

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Abstract

Context: Endocrine system plays an important role as a part of complex multifactorial interrelationships that maintain the homeostasis of the periodontium. Effects of increased endogenous hormones like progesterone and estrogen on gingival tissues have been documented however literature of effect of exogenous hormonal supplement on gingival tissues during pregnancy is scarce.

Aims: To evaluate gingival status of pregnant females on exogenous hormonal therapy.

Settings and Design: This observational study was conducted in Obstretics department of Government Medical College.

Methods and Material: Gingival status was assessed using oral hygiene indexsimplified, modified gingival index, papilla bleeding index and gingival enlargement index for 20 pregnant females who were on exogenous hormonal supplement and compared with 20 pregnant females without any exogenous hormonal therapy.

Statistical Analysis Used: unpaired t-test

Results: There was statistically significant increase in oral hygiene index-simplified, modified gingival index and papilla bleeding index ($P<0.05$) except gingival enlargement index score ($P>0.05$) in pregnant females on exogenous hormonal therapy compared with controls

Conclusion: The combined effect of exogenous and endogenous hormones during pregnancy may exaggerate gingival response against microbial plaque.

Key Words: pregnancy gingivitis, hormonal supplement.

Introduction

The female reproductive axis is governed by the interplay of the hypothalamus, the pituitary and the ovary (Table-1). The birth of a healthy child is the culmination of normal reproductive function. Every organ system in some way is influenced by the cyclic endocrine changes that form the backbone of the reproductive axis.[1] Periodontal endocrinology involves the actions and interactions of the endocrine system on periodontal tissues and potentially the reciprocal effects of the periodontium on the endocrine system. The amalgamation of two substantial, comprehensive and wide-ranging disciplines is termed as "periodontal reproductive endocrinology"[2]

During gestation, pregnancy-associated gingivitis is characterized by an increase in the prevalence and severity of gingivitis during the second and third trimester of pregnancy.[3] Human gingiva has receptors for progesterone and estrogen, providing evidence that gingiva is target tissue for actions of steroid hormones.[4] These hormonal variations can be during physiological conditions (puberty, menstruation, pregnancy, and menopause) or non-physiological conditions (hormone replacement therapy, hormonal contraceptives). Estrogen and Progesterone can modulate vascular responses and connective tissue turnover in the periodontium, associated with interaction with inflammatory mediators.[5] Progesterone also suppresses immune response. During pregnancy, there is an increase in levels of progesterone and estrogen, 10 and 30 times the levels during the menstrual cycle, respectively.[6] Pre-existing plaque induced gingivitis may be important factor for detecting hormone induced changes, with prevalence of pregnancy gingivitis ranging from 35-100%.[7,8]

Pre-votella intermedia is able to substitute progesterone and estrogen for menadione as an essential nutrient.[9] Higher concentrations of Porphyrom on as gingival is and Bacteroi desmelanino genicus and positive correlation between pregnancy and Campylobacter rectus levels have also been reported.

Effects of increased endogenous hormones like progesterone and estrogen on gingival tissues have been documented however literature of effect of exogenous hormonal supplement on gingival tissues during pregnancy is scarce. Hence this study aims to evaluate gingival status of pregnant females on exogenous hormonal therapy.

Subject & Methods

Study Population: All patients who participated in the study provided written informed consent. The test group consisted of 20 pregnant women who were given hormonal supplement. Patients were excluded if one or more of following conditions were observed: 1. Complicating systemic condition like diabetes, hypertension or cardiovascular complications; 2. use of anti-inflammatory drugs or antibiotics; 3. Periodontal therapy undertaken within past 6 months; 4. Smoking. All patients

under test group were taking Susten 100 mg tablets containing progesterone. The control group consisted of 20 pregnant women who were not taking any exogenous hormonal supplement. Patients in second and third trimester were selected for study. Both the groups were matched at baseline for age and month of pregnancy. (Table -2,3)

Collection of Clinical Data: All subjects were clinically examined for oral hygiene (oral hygiene index-simplified Greene and Vermilion, 1964), gingival inflammation (modified gingival index, Lobene, Weather, Ford, Ross, Lamm, 1986), bleeding (papilla bleeding index,Saxer and Muhlemann 1975) and enlargement (Mc Graw gingival enlargement index). The results were compared with control group matched for age and month of pregnancy. All measurements were performed with a manual periodontal probe by the same examiner.

Statistical Analysis: Analysis was done using Graph Pad Prism version 6.0 for windows. Unpaired t-test was used to compare the two groups.

Results

Oral Hygiene: There was significant difference between the mean values of oral hygiene index simplified scores of the study group and the control group ($p < 0.05$), indicating poorer oral hygiene status in the test group. (Table:4)

Gingival Inflammation: There was significant difference between mean values of modified gingival index when compared with controls ($p < 0.05$) indication greater amount of gingival inflammation in the test group.(Table-5)

Bleeding: The mean values of papilla bleeding index differed significantly in the test group compared with the controls ($p < 0.05$) indicating greater amount of bleeding in the test group. (Table 6)

Gingival Enlargement: Even though there was difference between the gingival enlargementsin both groups, the results were not statistically significant ($p > 0.05$). (Table-7)

There was statistically significant increase in oral hygiene index-simplified, modified gingival index and papilla bleeding index ($P<0.05$) except gingival enlargement index score ($P>0.05$) in pregnant females on exogenous hormonal therapy compared with controls.

Discussion

Changes in gingiva during pregnancy have been discussed for over more than two centuries. Remarkable endrocrine and oral alterations accompany pregnancy due to the prominent increase in plasma hormone levels over several months. As compared to post-partum subjects, there is statistically significant difference in prevalence and severity in the pregnant women.[3] Hormonal changes of the estrogen progesterone complex can accentuate plaque-induced gingivitis. This is most profound when it occurs in pregnancy, but cyclic menstrual changes, puberty and the use of hormonal-based contraceptives can make gingivitis more severe.

Oral contraceptive users may have poorer periodontal health. This response may be caused by an altered micro-vasculature, increased gingival permeability, and increasing synthesis of prostaglandin PGE, a potent mediator of inflammation which appears to rise significantly with increasing levels of sex hormones.[10] One of recent study suggested an association between depot medroxyprogesterone acetate (DMPA) injectable contraception and the prevalence of periodontal diseases among US premenopausal females.[11]

Another recent study evaluated the effect of Ovulation induction during infertility treatment in non-pregnant females on gingival inflammation, and found that, ovulation induction which is the most common method in management of infertility, exacerbates gingival inflammation, bleeding and GCF volume.[12]

In this study, the gingival status of women subjected to exogenous hormones was assessed with pregnant women who were not using these drugs. All 20 cases selected for studies were taking oral progesterone tablets. These tablets are given many a times as prophylaxis for prevention of miss-carriages, as part of maintenance of pregnancy and may be available over-the-counter, hence its effect needs evaluation. It was found that there was significant poorer hygiene status in case group along with higher levels of gingival inflammation and bleeding. These effects may presumably be correlated with the effect of progesterone on periodontopathogens and their effect of vascular changes and immune response. These patients have increased levels of progesterone due to two factors, one internal and other external. The results showed significant increase in gingival inflammation and bleeding as compared to controls however unlike other studies there was also significant increase in oral hygiene index which suggests two possibilities.

1. Increased plaque levels because of increased hormone levels 2. The other indices were significant because of poorer hygiene. Oral progesterone tablets may affect periodontal health during pregnancythough results are not conclusive.

Prenatal health care should include an assessment of oral health, which may often be overlooked. Most gingival disease during pregnancy can be prevented by the removal of plaque and calculus, as well as the institution of fastidious oral hygiene.[13] Since only gingival status was evaluated, further studies evaluating the periodontal status including probing depth, clinical attachment levels and bone loss are required. Studies matching hygiene status at baseline with a larger sample size and multi-center trials are required to confirm any association. Under limitations of this study it is concluded that the combined effect of exogenous and endogenous hormones during pregnancy may exaggerate gingival response against microbial plaque.

References

References are available on request at editor@healtalkht.com

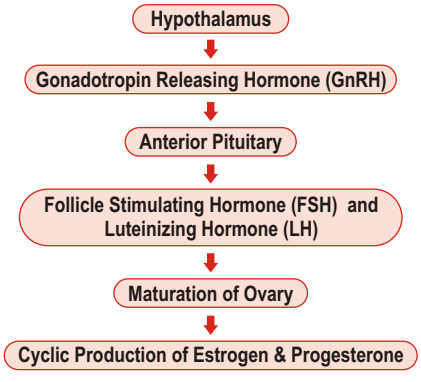


Table-1 Female Reproductive Axis

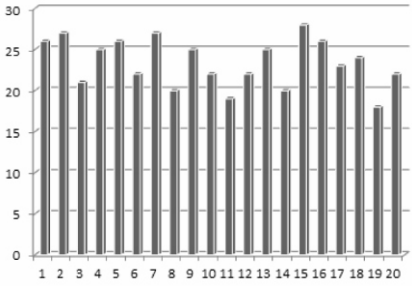


Table-2 : Mean Age of Cases: 23.4yrs

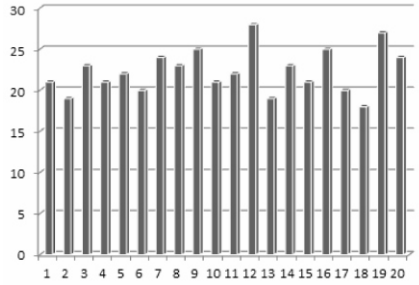


Table-2 : Mean Age of Controls: 22.3yrs

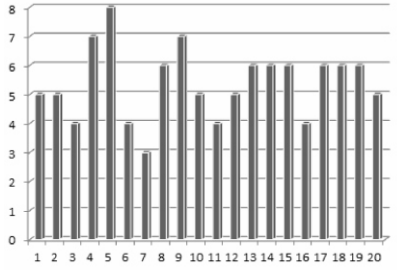


Table-3 : Mean Month of Pregnancy of Cases: 5.05 Months

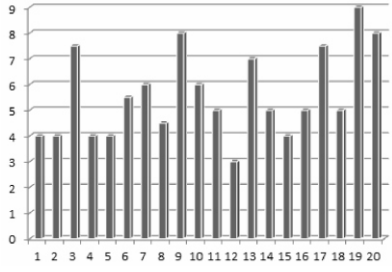
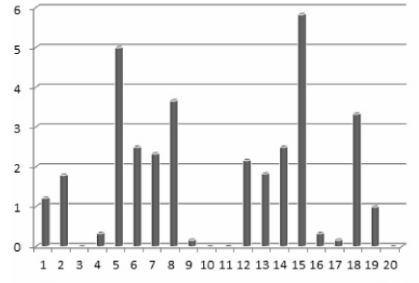
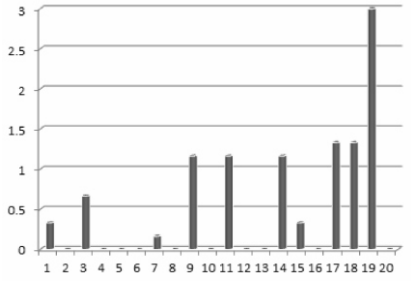


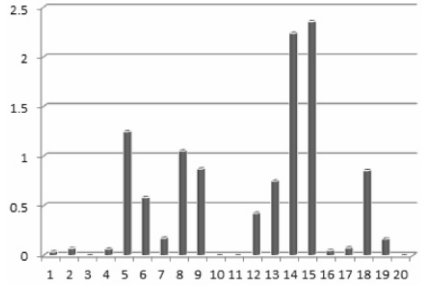
Table-3 : Mean Month of Pregnancy of Controls: 5.05 Months

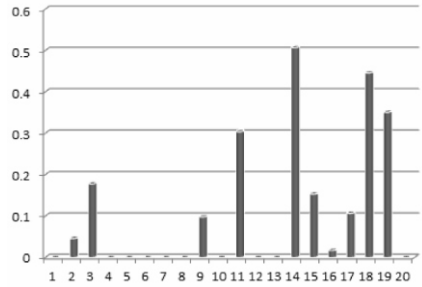




Group	Cases	Controls
Mean	1.70920	0.48310
SD	1.73432	0.77207
SEM	0.38781	0.17264
N	20	20

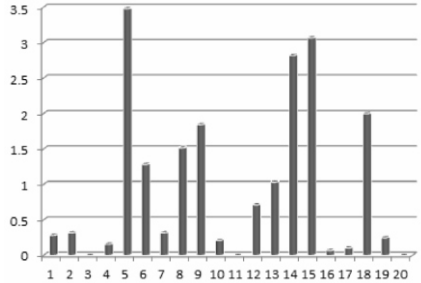
Table-4 : Oral Hygiene Index-Simplified: There was statistically significant difference betweenOral hygiene index-simplified scores between the cases and controls

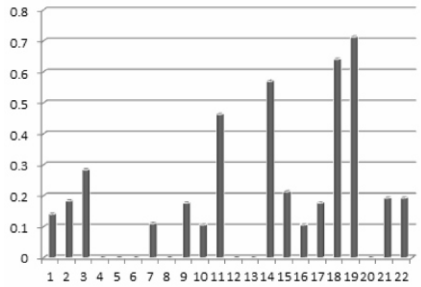




Group	Cases	Controls
Mean	0.55325	0.11035
SD	0.71870	0.16329
SEM	0.16071	0.03651
N	20	20

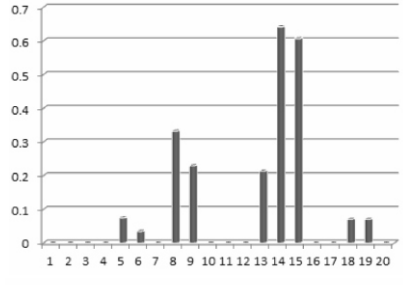
Table-5 : Modified Gingival Index: There was statistically significant difference between Modified Gingival Index scores between the cases & controls

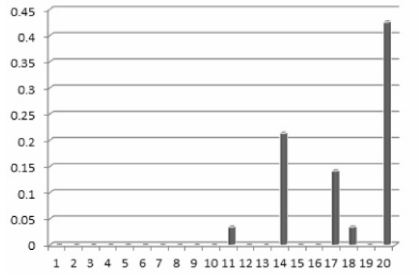




Group	Cases	Controls
Mean	0.97500	0.19490
SD	1.12099	0.22752
SEM	0.25066	0.05088
N	20	20

Table:6 Papilla Bleeding Index: There was statistically significant difference between Papilla Bleeding Index scores between the cases and controls





Group	Cases	Controls
Mean	0.11390	0.04484
SD	0.19837	0.10844
SEM	0.04436	0.02488
N	20	19

Table-7 : Gingival Enlargement Index: There was difference between Gingival Enlargement Index scores between the cases & controls however the results were not statistically significant

	P-value	95% CI	SED
OHI-S	**0.0064***	0.36675 to 2.08545	0.424
MGI	**0.0106***	0.10927 to 0.77653	0.165
PBI	**0.0042***	0.26232 to 1.29788	0.256
McGI	0.1888	-0.03546 to 0.17358	0.052

Table-8 : P Values, 95% confidence Intervals (CI) & Standard Error of Difference (SED) of Oral Hygiene Index-Simplified (OHI-S), Modified Gingival Index (MGI), Papilla Bleeding Index (PBI) and McGraw Index (McGI). *P,0.05 was considered as statistically significant