

RELATIONSHIP OF GINGIVAL DISEASE WITH OVULATION AMONG YOUNG GIRLS

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ABSTRACT

The current study was carried out in order to estimate the effects of estrogen levels on gingival health. It was a cross sectional study and it was conducted at de, Montmorency College of Dentistry over a period of one month. A total of two hundred young females with good oral hygiene, in age range of 20-22 years formed the study group. Blood samples were drawn thrice specially at the time of ovulation which was estimated by history. Samples were investigated for serum concentrations of estrogen by using standard ELISA technique. Estradiol (micro grams/ day) levels in Early Follicular phase among 200 young girls was estimated as (34.66 ± 5.07) and in Preovulatory phase it was calculated as (377 ± 3.40) where as in Mid Luteal phase it was found to be (246 ± 4.77) . These values show that the Estradiol (micro grams / day) levels were highest during Preovulatory phase. It was concluded that at time of ovulation the estrogen concentration in serum was significantly higher and at the same time gingivitis and periodontitis were diagnosed in acute form in most of the girls using standard diagnostic tools and techniques.

Key Words: Estrogen, ovulation, relationship to gingivitis.

INTRODUCTION

Gender based hormones are assumed to be a risk factor for gingival disease and can even lead to chronic periodontitis. These hormones are able to flourish periodontal microorganisms and alter host immunologic feedback.¹ In recent researches estrogen has established its role in adjustment of immune response of humans also. Gingival inflammation arises during the menstrual cycle, even if good oral hygiene is preserved. At same plaque index more inflammation can be seen in relation to menstrual cycle.^{2,3} The sudden onset and without treatment drop in the gingival inflammation in otherwise healthy young girls was the stimulator of the hypothesis that there might be some relation between gingival inflammation and menstrual cycle stages.⁴⁻¹¹

It was hypothesized that gingival inflammation has a link with the ovulation period, when estrogen levels are high.

We studied the influence of estrogen concentration during ovulation at gingival health.

METHODOLOGY

It was a cross sectional study and involved two hundred girls with good oral hygiene belonging to age group of 20-22 years and their oral health was examined at various stages of menstrual cycle, especially during ovulation by two dentists and one medical doctor. Body weight, height, BMI and blood pressure were determined in all study subjects. Blood samples were drawn thrice such as 5th day, 14th day, at the time of ovulation which is estimated by history and 20th day. Samples were analyzed for serum concentrations of estrogen by using standard ELISA technique.

Periodontal health was examined at the same time by using Community Periodontal Index of Treatment Needs (CPITN) and plaque index.

The girls according to the inclusion criteria having good oral hygiene, systemic and reproductive health and belonging to age group of 20-22 years were selected.

The patients with history of menstrual irregularities and complications, hypertension, smoking, diabetes mellitus, autoimmune disease, asthma, familial hypercholesterolemia, and history of steroid intake or with

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any other acute and chronic illness were excluded from the study and also those who had received periodontal treatment in the last six months before the beginning of this study were not included in the study.

RESULTS

The results of this study showed that the serum concentration of estrogen was statistically significantly higher on 14th day, that is Preovulatory phase and there was gingival inflammation ranging from gingivitis to moderate periodontitis depending upon the host defense and hormone concentration varying from person to person.

Estradiol (micro grams/ day) levels in Early Follicular phase among 200 young girls was estimated as (34.66 ± 5.07) and in preovulatory phase it was calculated as (377 ± 3.40) where as in Mid luteal phase it was found to be (246± 4.77). These values show that the Estradiol (micro grams / day) levels were highest during preovulatory phase (Table 1).

Now comparing (Table 1) with gingival state of these girls (Table 2) it is quite obvious that girls in

Preovulatory phase exhibited maximum bleeding gums and 30% girls were observed with severe bleeding from gums along with maximum pocket depth. The plaque level which is considered as the major cause of the disease of gingiva was constant and very low in girls examined in this study during all the three stages of menstruation cycle. It was observed that the inflammation vary with the hormonal level of girls cycle and maximum severity of gingival disease was observed during preovulatory phase which clearly confirms the hypothesis that gingival disease vary with the level of female hormones during ovulation.

DISCUSSION

Estrogen is a female sex hormone secreted in high concentration at time of ovulation. In middle cycle there is a noticeable change of events such as elevated blood concentration of estrogen. About 24-48 hours after the peak of estrogen elevated level a surge of the gonadotrophins especially of luteinizing hormone (LH) crop up which guide to the rip of follicle and discharge of its egg in almost around 9-12 hours. LH surge is started by a remarkable rise of estradiol produced by the preovula-

TABLE 1: PRODUCTION RATE OF ESTRADIOL IN GIRLS AT DIFFERENT STAGES OF THE MENSTRUAL CYCLE IN EARLY FOLLICULAR PHASE, PREVULATORY PHASE AND MID LUTEAL PHASE

Parameter	Early Follivular phase	Preovulatory phase	Mid luteal phase	P value
	Mean ± standard deviation (n=200)	Mean ± standard deviation (n=200)	Mean ± standard deviation (n=200)	
Estradiol (microgram / day) (n-200)	(34.66+5.07)	(377+3.40)	(246+4.77)	0.001*

*= Highly Significant (p-value < 0.05)

TABLE 2: DENTAL DIAGNOSTIC PARAMETR IN EARLY FOLLICULAR PHASE, PREOVULATORY PHASE AND MID INTEAL PHASE

Dental diagnositic parameters	girls in early follicular phase mean ± SD (n=200)	Girls in preovularoty phase mean±SD (n=200)	Girls in mid luteal phase mean ± SD (n=200)
Bleeding from gums	10% bleeding in patients 1%=Severe Bleeding 5%=Moderate Bleeding 4%=mild Bleeding	100% bleeding in patients 30%=Severe Bleeding 50%=Moderate Bleeding 20%=mild Bleeding	20% bleeding in patients 5%=Severe Bleeding 10%=Moderate Bleeding 5%=mild Bleeding
Plaque index	0.5 ± 0.40	0.5 ± 0.40	0.5 ± 0.40
Community Periodontal Index of Treatment Needs (CPTIN)	1.5 ± 0.13	2.50 ± 0.26	1.6 ± 0.20
Mean pocket depth (mm)	0.45 ± 0.33	2.96 ± 0.59	0.95 ± 0.11

tory follicle and it is the relatively accurate forecaster for timing the ovulation. The estrogens in women are estrone (E1), estradiol (E2), and estriol (E3). Estrone is secreted in women with menopause, estradiol is the main hormone founded in nonpregnant females, and estriol is most important hormone seen in the span of pregnancy.²⁻¹¹

Not much literature is available on this topic. In 2004 a research was published by Cenk Haytaç in *Journal of Periodontology*, showing “The Effects of Ovulation Induction During Infertility Treatment on Gingival Inflammation” The results of his study throw light on the effects of hormone that are secreted after ovulation induction, which is considered as the usual treatment method in the management of infertility. The drug causes gingival inflammation, bleeding from gums and other signs of gingival disease and it also shows that the usage of these drugs is powerfully connected with the harshness of gingival inflammation.⁹

Study done by Machtei revealed a positive link between the periodontal health and gum disease.⁸ One more research was found suggesting that hormones have a negligible effect on clinically healthy periodontium.¹²

In this study a clear relation of inflammation was observed with variation of hormonal level of girl's menstrual cycle. It was also observed that the severity of gingival disease during preovulatory phase reaches at its peak which clearly confirms the hypothesis that gingival disease vary with the level of female hormone during ovulation.

CONCLUSION

Under the influence of estrogen in otherwise healthy young girls, the probability of developing gingivitis and periodontitis was noticeably great. The result of this research confirms that estrogen has significant effect on the gingival health of the girls. During different stages and levels of this hormone in female menstrual cycle the gingival disease acuteness varies showing a

positive correlation of gingival disease with hormone level. This research also specifies the necessity of future researches to confirm the relation of hormone vacillation and gum disease.

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