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Original Article

The comparison of salivary level of estrogen and progesterone in 1st, 2nd and 3rd trimester in pregnant women with and without geographic tongue

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ABSTRACT

Background: Geographic tongue (GT) was first reported as a wandering rash of the tongue in 1831; however, its etiopathogenesis remains unclear. Increased prevalence of GT has been documented in the pregnancy. The aim of this study was to compare the level of salivary estrogen and progesterone in pregnant women with and without GT.

Materials and Methods: This analytical-descriptive study consisted of 26 pregnant women (13 with GT, 13 without GT) with an age range between 18 years and 45 years. The estrogen and progesterone level was measured during 1st, 2nd and 3rd trimester of pregnancy. Saliva sampling was performed to determine the level of sex hormones. The samples were stored at –80°C and determined by Eliza method. The results were analyzed by *t*-test and repeated measure ANOVA ($\alpha = 0.05$).

Results: The mean level of estrogen for control and case group was 49.4and 52.33 in the 1st, 71.05 and 74.12 in the 2nd and 109.1 and 112.16 in the 3rd trimester respectively. The mean level of progesterone was 0.72 and 0.72 in the 1st, 1.14 and 1.21 in the 2nd and 1.3 and 1.28 in the 3rd trimester of pregnancy for the control and case groups respectively. Even though, there was no significant difference regarding the level of sex hormones between case and control groups ($P > 0.05$), but the difference between the level of these hormones during 3 trimesters of pregnancy was significant in each group ($P = 0.001$).

Conclusion: The level of sex hormones is not the only etiologic factor of GT in pregnant women, but other factors such as genetic potential, *human leukocyte antigen* marker and stress may aggravate the incidence of this lesion.

Key Words: Estrogen, geographic, pregnancy, progesterone, tongue

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INTRODUCTION

Geographic tongue (GT) was first reported as a wandering rash of the tongue in 1831; however, its etiopathogenesis has remained unclear.[1] GT is a common condition characterized by an asymptomatic presentation of multiple variable sized, well-demarcated, erythematous areas usually surrounded by elevated, yellowish-white borders,[2] which usually occurs on the anterior 2-3rd of dorsal tongue. Different risk factors have been proposed for GT such as genetic factors,[2] hormonal changes and oral contraceptive pills,[3] pregnancy,[4] psychological findings[5] and diabetes mellitus.[6]

Pregnancy constitutes a special psychological state characterized by a series of temporary adaptive changes in the body structure, which results in an increased production of estrogen and progesterone (100 fold or more).[7-9] The oral mucosa can also be affected

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by these endocrine imbalances. Increased prevalence of GT and pyogenic granuloma (PG)[2,4,10,11] have been postulated during pregnancy. However, no documented study has been carried out to investigate any possible relation between increased level of estrogen and progesterone and GT prevalence in pregnant women. Therefore, the aim of this study was to compare the level of salivary estrogen and progesterone in otherwise healthy pregnant women with GT and without GT.

MATERIALS AND METHODS

Study population

This analytical-descriptive study consisted of 26 pregnant women seeking dental treatment in community clinics in Esfahan province, Iran (13 with GT, 13 without GT) with the age range of 18-45 years. Women who signed the consent forms were included in this study. Patients who suffered from dermatological disease, systemic disease, allergic and atopic conditions, immune disorders and smokers were excluded from the study.

Oral mucosa examination

All patients were examined by an oral medicine specialist. Examination procedures were based on the World Health Organization's guide to epidemiology and diagnosis of the oral mucosa disease and conditions.[12]

A lesion was classified as GT when:[1] There was localized absence of filiform papillae [2] The affected area was irregularly shaped [3] The location of the affected area changes over time.

A total of 26 patients were assigned to the case (n = 13) and control (n = 13) groups according to the criteria, which is followed to diagnose GT.

Saliva collection

The measurement of estrogen and progesterone levels was performed during the 1st, 2nd and 3rd trimester of their pregnancy. Saliva sample was used to determine the level of sex hormones. Since, saliva can be easily collected by the subjects at repeated intervals and requires no special collection or storage equipment, saliva sampling was conducted in the present study.[13]

The level of salivary sex hormones was determined using spitting technique.[14]

Saliva samples were collected in the morning following an overnight fasting. First patients rinsed their mouth using distilled water. After 5 min, un-stimulated saliva samples were collected while patients were sitting in a comfortable position and spitting into the plastic tubes five times per min for 5 min. The samples were stored at –80°C and estrogen and progesterone levels tested using statistical analysis enzyme immune assay procedure.

Data analysis was performed using t-test and repeated measure ANOVA ($\alpha = 0.05$) (SPSS version 14.5).

RESULTS

The mean level of estrogen was 49.4 ± 1.2 ng/mi and 52.32 ± 1.3 in the 1st, 71.05 ± 1.7 and 74.12 ± 2.2 in the 2nd and 109.1 ± 0.7 and 112.16 ± 1.2 in the 3rd trimester in control and case groups respectively [Figure 1].

The results of t-test analysis showed no significant difference between both groups in each trimester of pregnancy (P = 0.07).

The mean level of progesterone was 0.72 ± 0.09 ng/mi and 0.72 ± 0.04 in the 1st, 1.14 ± 0.11 and 1.21 ± 0.13 in the 2nd and 1.3 ± 0.14 and 1.28 ± 0.24 in the 3rd trimester of pregnancy in control and case groups respectively [Figure 2].

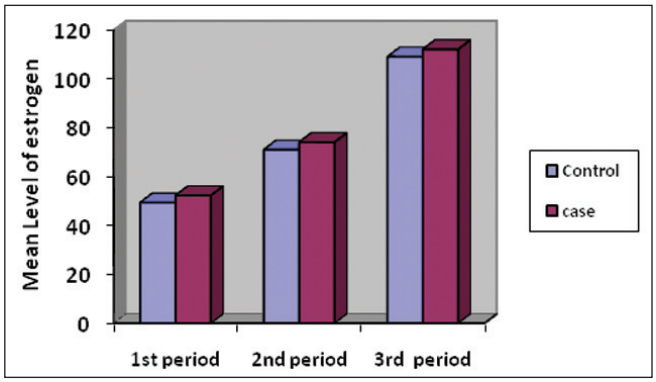

Figure 1: The mean level of estrogen in saliva 3 periods of pregnancy for both groups: Case and control

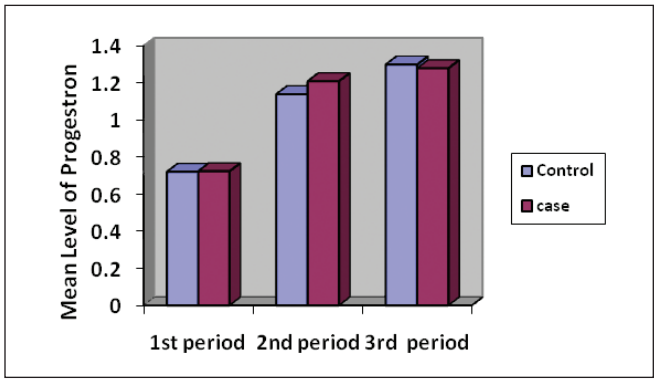

Figure 2: The mean level of progestron in saliva 3 periods of pregnancy for both groups: Case and control

The mean levels of progesterone in both groups revealed no significant difference in each trimesters of pregnancy ($P = 0.06$).

Even though, there was no significant difference between the case and control groups regarding the level of sex hormones, but there was a significant difference between each trimester of pregnancy regarding the level of measured hormones in both case and control groups ($P = 0.001$).

DISCUSSION

The present study was designed to compare the salivary level of estrogen and progesterone in pregnant women with and without GT for the 1st time.

Numerous studies which have examined the reliability of saliva assay have announced that salivary levels can be a reliable indicator of serum concentration.[14-16] Worthman *et al*. revealed significant positive correlations (0.82) between sex hormones in serum and saliva.[16] Therefore, in this study, saliva samples were collected to measure the level of sex hormones.

Different studies have been carried out to assess the prevalence of GT in pregnant women.[2,4,10,17] Díaz-Guzmán *et al*. reported a more common occurrence of mucosal lesions including GT and PG in pregnant women.[4] Their findings showed that the prevalence of GT in pregnant and non-pregnant women was 3.23% and 0.72% respectively. These studies demonstrated that the increased level of sex hormones during pregnancy may play an etiological role in the high incidence of this lesion during pregnancy.

However, Sarifakioglu *et al*. study revealed no significant difference between the prevalence of GT in pregnant and non-pregnant women.[18]

Since there was no conclusive study to evaluate any possible relation between elevated levels of sex hormones and GT prevalence during pregnancy, the present study was designed to measure the level of estrogen and progesterone hormone in pregnant women with GT and without GT.

The findings of this study showed that there was no significant difference between the level of these hormones in pregnant women with GT and without GT.

However, the salivary level of sex hormones significantly increased from 1st to 3rd trimester and reached to its maximum level during the 3rd trimester, which is in accordance to the results of the previous studies.[19-20] Lu *et al*. compared the level of sex hormones during three trimesters of pregnancy and 6 weeks post-partum. The mean level of these hormones increased during pregnancy, but it showed a significant reduction in 6 weeks post-partum.[19]

CONCLUSION

According to the results of the present study it can be concluded that the increased level of sex hormones is not the only etiological factor of GT in pregnant women and other factors such as genetic potential, *human leukocyte antigen* marker and stress may aggravate the incidence of this lesion.

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