PRELIMINARY CLINICAL OBSERVATIONS ON THE GINGIVAL-PERIODONTAL MANIFESTATIONS IN IN VITRO FERTILIZED FEMALE PATIENTS

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Abstract

Scope of the study – determination of the types and intensity of the gingival-periodontal manifestations in in vitro fertilized pregnant women, and establishment of the role played by the hormonal treatment in the initiation and maintenance of such manifestations.

Materials and method. The study was performed on patients fertilized in vitro between the years 2010-2012, in the Section of Assisted Human Reproduction of the “Panait Sârbu” Clinical Hospital of Obstetrics and Gynecology – Bucureşti. All patients received the same amount and concentration of progesteronic compounds for maintaining their state of pregnancy, being examined in the first gestation weeks, immediately after confirmation of pregnancy through the β-hCG blood test.

Results and discussion: In the last decades, the effects of estrogen and progesterone have drawn special attention from the part of the researchers. During pregnancy, the gingiva represents the mantissular target for the action of steroid hormones. Pregnancy-induced gingivitis is directly correlated with the presence of the microbial flora, known as the determining factor of the disease, being still exacerbated by the action of the sexual hormones, especially during the second and third quarter of pregnancy.

Conclusions: The influence of gestational hormones upon the immune system of the organism may further contribute to the initiation and worsening of pregnancy-induced gingivitis, by reducing the immune response vs. the bacterial plaque.

Keywords: pregnancy gingivitis, estrogen, progesterone.

INTRODUCTION

The motivation of such an investigation theme for a scientific research is based on the fact that the in vitro fertilization procedure is nowadays applied on large scale in almost all departments of assisted human reproduction of Romania.

In latest years, our country has been facing a problem that is to become the main cause of an alarmingly decreasing birth rate, namely infertility. At present, in most European countries, one of six couples has problems of fertility. The explanation lies in the invisible health problems of both women and men, which seriously affect the reproduction function.

The most important aspect of the in vitro fertilization procedure is the very complex range of hormonal treatments applied for stimulating ovulation and for preparing the organism for the implantation of the previously in vitro fertilized ovule. Together with the massive hormonal prostegative treatment applied for supporting the pregnancy during almost all three quarters of the gestation period, this episode leads to the possible conclusion that the gingival-periodontal manifestations in this special category of patients seem to have a rather more acute and persistent character. This theory represents the theoretical basis of the present study, performed on a group of in vitro fertilized patients.

Theoretical considerations on the pregnancy-induced gingival-periodontal manifestations

The most frequently occurring form of disease of the marginal periodontium during pregnancy, undoubtedly, pregnancy-induced gingivitis.

Etiology and epidemiology – The gingival inflammation determined by the existence of the bacterial plaque and exacerbated by hormonal modifications, especially along the second and third quarter of pregnancy, has been generically defined as pregnancy-induced gingivitis [1].

The severity of gingivitis symptomatology during pregnancy is first caused by the higher
progesteron levels and by its effects upon the capillary vessels from the gingival tissue [2]. 65-70% of the pregnant women may be affected by this type of gingivitis [3], however its incidence is of only 0.3% [4] if, in the beginning of the gestation period, a professional oral hygienization is made and if, during the whole time of pregnancy, the patients maintain a very good local hygiene.

Subsequent observations have been put forward by Hugoson (1970) [5], as a result of a longitudinal study performed on 26 pregnant women during the three quarters of gestation. The study demonstrated that the severity of gingival inflammation was correlated with the hormonal concentrations recorded during pregnancy.

SCOPE OF THE STUDY: determination of the types and intensity of the gingival-periodontal manifestations in in vitro fertilized pregnant women, and establishment of the role played by the hormonal treatment in the initiation and maintenance of such manifestations.

MATERIALS AND METHOD

1. The study was performed on patients fertilized in vitro between the years 2010-2012, in the Section of Assisted Human Reproduction of the “Panait Sârbu” Clinical Hospital of Obstetrics and Ginecology – București. All patients have been hospitalized in ambulatory (outpatient) services.

2. Standardization of the bacterial plaque indices was performed, involving the fact that all patients had a satisfactory oral hygiene, without significant antecedents of dento-periodontal diseases, all being non-smokers.

3. All patients received the same amount and concentration of progesteronic compounds for maintaining their state of pregnancy which, in the case of in vitro fertilization, lacks the natural secretion of progesterone of corpus luteum, which is absent, due to the aspiration of the ovarian follicle during taking over of ovocytes.

4. The patients were examined in the first gestation weeks, immediately after confirmation of pregnancy through the β-hCG blood test.

5. No differentiation was made among the types of pregnancy (unique, double or triple).

6. Complete anamnesis was performed for each patient, a periodontal observation sheet was filled in, the indices of plaque, scale and bleeding were calculated, and photographic images of the gingiva, periodontium and buccal mucosa were taken.

7. All these parameters will be subsequently compared with those recorded in the last months of pregnancy, a moment in which it is assumed that all gingival-periodontal manifestations will become more intense, due to the concomitant increase of the concentration of steroid hormones.

8. In the same stage, BANA-type microbiological tests, histopathological and microbiological examinations from the subgingival bacterial plaque were made.

RESULTS

Clinical picture – the main signs of the gingival disease are hyperplasia and gingival bleeding.

The clinical signs of pregnancy-induced gingivitis get intensified starting with the second or third month, become sufficiently pronounced in the seventh month, then decrease during the ninth one.

The gingiva is tumefied, showing a bigger volume, appearing either smooth or irregular, glossy, soft and detached off the teeth.

Pregnancy-induced hyperplasia is developed mainly on behalf of the interdental papillae, yet it may also affect other portions of the gingiva.

Colour varies from intense red up to purplish-blue red, being frequently covered by fibrinous or purulent deposits. Bleeding, produced by the slightest contact, is caused by hypervascularisation, by capillary fragility as well as by the numerous ulcerated zones.[1]

Figure 1 illustrates a typical aspect of pregnancy-induced gingivitis, in acute phase, of a pregnant woman in the last gestation quarter:
Fig. 1 – Pregnancy-induced gingivitis in a 36 week pregnant woman (original)
Clinical aspect of the frontal zone

CLINICAL CASE 1

Patient D.C, 36 year-old, 11.4 gestation week, IVF-induced unique gestation, urban condition, high-school education

Fig. 2 – 36 year-old patient, 11.4 gestation week, IVF-induced gestation.
Clinical aspect of the frontal zone

One may observe 3-4 mm gingival retraction at level 42, fibrin deposit, localized congestion of the gingival margin in front of 42, amputation of the interdental papilla 42-43, gingival hyperplasia localized at papillary level. The patient complains of pain during dental brushing and moderate gingival bleeding, caused by hyper-vascularisation and capillary fragility.

CLINICAL CASE 2

Patient S.M., 34 year-old, 12.5 gestation week, IVF-induced unique gestation, urban condition, university education

Fig. 3 – 34 year-old patient, 12.5 gestation week, IVF-induced gestation.
Clinical aspect of the frontal zone

- tumefaction, increased volume of the gingival papillae and of the gingival free margin generalized at the mandibular front.
- glossy, smooth, irregularly, slightly congestive gingiva, small (1 mm) gingival retraction at the level of the inferior incisors.
- soft consistency of the gingiva, detached off the tooth.
- the surface of the gingiva loses its aspect of stippling (engraved points) or of “orange skin”.
- subgingival tophus 31-41.

CLINICAL CASE 3

Patient T.M., 39 year-old, 4.2 gestation week, IVF-induced unique gestation, urban condition, university education

Fig. 4 – 39 year-old patient, 4.2 week pregnancy obtained through IVF.
Clinical aspect of the frontal zone
- gingival hyperplasia at the level of the interdental papillae 41-42 and 42-43, gingival congestion, irregularity, smooth aspect of the above-mentioned gingival papillae. Loosing of the stippling aspect at this level. Slight gingival retraction at level 42.

**DISCUSSION**

Through itself, pregnancy does not induce gingivitis, however, through hormonal modifications, it may influence the local reaction of the tissues vs. the bacterial plaque, which is the real cause of the gingivitis produced during pregnancy.

Table 1 lists some of the effects of the steroid hormones at periodontal level.

90% of the patients live in an urban medium, have high school or university education, being well-informed on oral hygiene, applying a correct brushing technique, also declaring that they use additional means for the removal of the bacterial plaque (mouthwash solution and dental-floss), as well.

The aspects referring to the educational level of the patients only support an already demonstrated theory, according to which infertility affects mainly the couples with a high intellectual level.

Within the experimental group, 95% of the patients complained of xerostomia as a symptom manifested immediately after the administration of the hormonal treatment of ovarian stimulation and maintained even up to the moment of the first periodontal examination after the echografic acknowledgement of the pregnancy state.

Congestion, localized at the level of interdental papillae, was identified in 52% of the patients.

33% of the patients suffered slight gingival bleeding on brushing, a clinical sign also evidenced by the bleeding indices calculated during this first examination.

Hyperplasia was noticed as debut forms (being correlated with the age of gestation) in 41% of the patients.

In 30.7% of the patients, fibrinous deposits could be identified along the gingival margin.

**Table 1 – Effects of steroid hormones at the level of marginal periodontium**

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| **ESTROGEN**          | • Contributes to cell proliferation from the blood vessels, a phenomenon produced at endometrial level  
|                       | • Decreases keratinization and, concomitantly, contributes to increasing epithelial glycogen  
|                       | • Has specific receivers at epithelial level[6]                                       |
| **PROGESTERONE**      | • Increases vasodilatation and permeability, producing a local oedema caused by the accumulation of cells involved in inflammation [7]  
|                       | • Increases the tendency of gingival bleeding through proliferation of the blood vessels newly formed from the gingivalt issue  
|                       | • Alters collagen production  
|                       | • Influences the decrease of type 2 activator inhibitor plasminogen (PAI-2), leading to tissular proteolysis [8] |
| **ESTROGEN and**      | • Estrogen and progesterone have the capacity to modulate the vascular and tissular response at periodontium level, associated with the interaction of inflammation mediators [9]  
| **PROGESTERONE**      |                                                                                     |
The above described clinical signs occur in an incipient stage, if considering, too, the young age of gestation and the progestative treatment administered only recently (a few weeks).

However, some of the specific signs of pregnancy-induced gingivitis – such as hyperplasia or congestion – could be evidenced, being localized mainly at the level of the interdental papillae of the mandibular front.

The authors consider that the symptomatology and the clinical signs will be much more obvious during the second examination, performed in the last quarter of the pregnancy.

CONCLUSIONS

1. The influence of gestational hormones upon the immune system of the organism may further contribute to the initiation and aggravation of the pregnancy-induced gingivitis by lowering the immune response to the bacterial plaque.
2. The determining factors in the destructive-type diseases of the marginal periodontium are, beyond any doubt, of microbial nature, the increased levels of steroid hormones during pregnancy acting as favourizing or predisposing factors.
3. Identification of the gingival-periodontal manifestations produced with in an endocrine context is important for the establishment of a timely, correct diagnosis and of the corresponding interdisciplinary prophylactic and therapeutical recommendations.

References