Certain hematological indices in pregnancy gingivitis

Natalia Sergeevna Orekhova[1], Elena Leonidovna Tsepova[2], Leonid Makarovich Tsepov[3]

Smolensk, Russia

Summary

Objective. This study is aimed at evaluating the effects of gingivitis on white blood cell count and certain hematological indices of pregnant women in their first, second, and third trimesters.

Material and methods. General, oral and dental health status examinations were performed on 86 pregnant women, aged between 17 and 37 years (mean age = 25.0 ± 0.5 years), in their first, second, and third trimesters. The incidence of gingivitis among pregnant women was 70.9%. The total incidence of complicated pregnancy was 88.36%. Based on parameters of complete blood count certain hematological indices were calculated.

Results. Analysis of hematological indices in various pregnancy trimesters showed that there was an appreciable increase in certain indices in pregnant women with gingivitis, compared with controls. Leukocytic intoxication index and index of leukocyte and ESR ratio were found to be the most relevant calculated hematological indices in pregnant women with gingivitis as well as in threatened premature delivery and gestosis, particularly in the second and third pregnancy trimesters. The results of present study illustrate the intensification of endogenous intoxication in pregnancy gingivitis from trimester to trimester.

Conclusions. The use of hematological indices is justified and advisable for evaluation of one patient management as well as for group of patients. Dentists should pay more attention to the general health of their patients and interact with medical colleagues

Keywords: denture teeth, acrylic resin, glass fiber, sorption, solubility.

Introduction

The essence of modern concept of periodontal disease pathway and its relationship to endogenous intoxication syndrome may be summarized as follows: dental biofilms release a variety of biologically active products which stimulate the host to produce a variety of periodontal responses, among them the production and release of potent agents of endogenous intoxication [1]. There is a spectrum of endotoxemia indicators from biochemical markers to hematological indices.

Objective

This study is aimed at evaluating the effects of gingivitis on white blood cell count and certain hematological indices of pregnant women in their first, second, and third trimesters.

[1] Stomatologist in Clinical Maternity Hospital, Smolensk

[2] PhD, Department of Propedeutics of Internal Diseases, Smolensk State Medical Academy

[3] MD, PhD, Professor, Honored Fellow of Higher Education, Corresponding Member of R.F. Natural Science Academy, Chief of the Therapeutic Stomatology Department, Smolensk State Medical Academy

Material and methods

General, oral and dental health status examinations were performed on 86 pregnant women, aged between 17 and 37 years (mean age = 25.0 ± 0.5 years), in their first, second, and third trimesters. Of these 86 subjects, only four women had uncomplicated pregnancy and no gingivitis. The incidence of gingivitis among pregnant women was 70.9%. The total incidence of complicated pregnancy was 88.36%, of which the incidence of anemia was 34.88%, the incidence of threatened premature delivery was 26.74%, and the incidence of gestosis was the same.

Based on parameters of complete blood count certain hematological indices were calculated [2,3,4]. Differential white cell count as percentage of white blood cells and also erythrocyte sedimentation rate (ESR) were used.

Leukocytic intoxication index (LII) was calculated by the formula of Kalf-Kalif Ya.Ya. [2]:

$$LII = \frac{(myelocytes \times 4 + metamyelocytes \times 3 + band\ cells \times 2 + segmented\ cells) \times (plasma\ cells + 1)}{(lymphocytes + monocytes) \times (eosinophils + 1)}$$

The index of leukocyte and ESR ratio (ILESR) was calculated as [3]:

$$ILESR = \frac{lymphocytes \times ESR}{100}$$

Statistical tests used were Kolmogorov-Smirnov and Wilcoxon tests. The level of statistical significance was established at p = 0.05.

Results

Analysis of hematological indices in various pregnancy trimesters showed that there was an appreciable increase in certain indices in the pregnant women with gingivitis, compared with controls. Such indices as LII and ILESR were found to be the most informative in pregnancy gingivitis as well as in threatened premature delivery and gestosis. Mean values of LII and ILESR in pregnant women with gingivitis are given in *Table 1* according to pregnancy trimesters.

It is well known that leukocytic intoxication index represents the level of endogenous intoxication and activity of tissue damage. There were statistically significant differences between LII value in non-pregnant healthy women and LII values in pregnant women in each trimester. Among pregnant women with gingivitis there were statistically significant differences between LII value in the first trimester and in the second one as well as the third. These results illustrate the intensification of endotoxemia in pregnancy gingivitis from trimester to trimester.

LII and ILESR showed similar alterations in women with pregnancy gingivitis, though the most marked changes were found in the history of the former.

Table 1. Hematological indices in pregnant women with gingivitis in the first, second, and third trimesters. (n ± standard error of mean)

Hematological indices	Non-pregnant healthy women (n = 25)	Pregnant women with gingivitis (n=61)		
		1 trimester	2 trimester	3 trimester
LII	0.83 ± 0.07	1.01 ± 0.05	1.23 ± 0.08	1.33 ± 0.06
ILESR	1.65 ± 0.24	2.58 ± 0.23	3.43 ± 0.24	4.64 ± 0.26

There were statistically significant differences between normal value of ILESR and its values in pregnant women in their first, second and particularly third trimester. It confirms the presence of endogenous intoxication in pregnancy gingivitis. Such findings may also suggest that both infectious and autoimmune patterns of pathologic process are significant in progression of pregnancy gingivitis.

Based upon present study results we agree to the opinion [5] that an issue of the possible biological pathways by which blood reacts as a whole in various conditions of host functioning such as pregnancy and particularly in its complications and/or development of associated diseases (gingivitis) has not attracted proper attention of researchers. Although it is widely believed that blood is an integral internal system that takes crucial part in non-specific and specific reactions of host defenses through influence on its resistance and reactivity.

Therefore the differential white cell count as the major part of complete blood count gives valuable diagnostic and prognostic information for dental and medical practitioners. In our clinical observations, LII and ILESR were found to be the most relevant calculated hematological indices in pregnant women with gingivitis as well as in threatened premature delivery and gestosis, particularly in the second and third pregnancy trimesters. These findings may have implications for periodontal control in pregnant patients.

Conclusions

We came to the conclusion that pathological damage of white blood cells takes place even in physiological (normal) pregnancy [6], this damage amplifies in threatened premature delivery and gestosis, particularly in association with chronic gingivitis, that was proved by alternations of LII and ILESR. This study supports the point of view of some scientists [3] that the use of hematological indices is justified and advisable for evaluation of one patient management, as well as for group of patients.

The further study of mechanisms of intercellular relationships of gingival cells, gingival fluid, and also peripheral blood will contribute to the explanation of their biological role in the origin, development, course and outcome of inflammatory periodontal diseases.

Dentists should pay more attention to the general health of their patients and interact with medical colleagues.

References

1. Scannapieco FA. Periodontal inflammation: from gingivitis to systemic disease? *Compend. Contin. Educ. Dent.* 2004; **25**(7), Suppl. 1: 16-25.

2. Кальф-Калиф Я.Я. О лейкоцитарном индексе и его практическом значении (сообщение первое). *Врачебное дело*. 1941; No. 1: 31-35.

3. Мустафина Ж.Г., Краморенко Ю.С., Кобцева В.Ю. Интегральные гематологические показатели в оценке иммунологической реактивности организма у больных с офтальмопатией. *Клиническая лабораторная диагностика* 1999; No. 5: 47-49.

4. Солдатов А.А., Соболев А.В., Берензон М.В. и др. Расчетный индекс лейкоцитов в оценке аллергического процесса. *Клиническая лабораторная диагностика* 1997; No. 11: 35-36.

5. Горизонтов П.Д., Белоусова О.И., Федотова М.И. Стресс и реакция системы крови / АМН СССР. М.: Медицина, 1983; 240 с.

6. Ветров В.В., Пестряева Л.А. Значение синдрома эндогенной интоксикации в патогенезе гестоза. *Эфферентная терапия* 2005; 11(3): 3-9.

Correspondence to: Dr. Elena Leonidovna Tsepova or Prof. Leonid Makarovich Tsepov, Smolensk State Medical Academy, 28, ul. Krupskoy, Smolensk, 214019, Russia. E-mail: elena_tcepova@mail.ru