Premature labor in pregnant women with periodontal diseases

ALEKSANDRA STUPAK, ANNA KWAŚNIEWSKA

Abstract
The majority of pregnant women is subjected to regular gynecological examinations and at the same time fails to comply with follow-up examinations of the mouth. Cooperation is needed in the care of pregnant women between the gynecologist and dentist. During pregnancy changes are observed in the periodontis. Periodontal infection by maternal immune response may lead to the production of cytokines and eicosanoids and for the initiation of uterine contractions. The results of cohort studies are showing the relationship between periodontal disease and preterm birth or low birthweight. Despite that many studies were not free from methodological inaccuracies so that the overall results should be treated with caution. To avoid errors in estimating the risk of various conditions and procedures a planned clinical trials should be conducted in accordance with the standards of evidence-based medicine. The introduction of mandatory dental examinations for women in early pregnancy should encourage the dentists to introduce a new approach of prevention services and, therefore, result in closer cooperation with obstetricians in order to reduce the prevalence of preterm labor and premature morbidity and mortality.

Key words: premature labor, pregnancy, periodontal diseases

The majority of pregnant women are subjected to regular gynecological examinations and at the same time fails to comply with follow-up examinations of the mouth. According to the statement of the Minister of Health from 2011 every pregnant women up to the 10th week of gestation should take a visit to the dentist. Cooperation is needed in the care of pregnant women between the gynecologist and dentist.

Physiological changes in pregnancy
The changes occurring in the women body are the result of adaptation in order to create and maintain the conditions for the development of the fetus and birth. The changes apply to all physiological systems and processes in the body. This leads to increased levels of progesterone in the blood resulting in a proliferation of small blood vessels and increase their permeability. The increase in estrogen levels affect cell proliferation and an increase in gingival epithelial glycogen and reduce the effectiveness of the epithelial barrier. In the soft tissues of the mouth are estrogen and progestagen metabolite of periodontal pathogenic bacteria [1]. The immune response is inhibited resulting in increased susceptibility to infections bills mucous and inflammation [2]. High concentrations of progesterone inhibits the production of matrix metalloproteinases which cause the destruction of the collagen fibers in the course of periodontitis [3].

Increased emotional lability in pregnant as well as increased energy intake contributes to the changes in eating habits (increased appetite, high carbonate food, snacking between meals). By vomiting a significant reduction of the pH may occur in the oral cavity which in turn directly affects the health of the mouth [4].

During pregnancy changes are observed in the periodontis. Approximately in 8-12 weeks of gestation occur redness, leavening, gingival hypertrophy, which is known as pregnancy gingivitis [5]. This condition arises due to hormonal changes and the inflammatory response to the presence of plaque, which damages the enzyme in a manner of epithelium and connective tissue cells. Untreated gingivitis can lead to periodontal disease. Prevalence of periodontitis in people aged 35-44 years in Poland is around 5%. In the pregnant population ratio is 30-100% [6-8].

The incidence of prematurity in Poland, according to CSO data is estimated to be around 10%. Province with the lowest rate of preterm birth is the province of Lublin. This result is 6.5% and is the leading since 2001.

Risk factors for the incidence of periodontal disease are similar to that in preterm labor:
• age above 35 years of age,
• black race,
• diabetes,
• smoking,
• stress,
• low-economic status.

**Association of periodontal disease with preterm birth and low birth weight newborns**

The mechanism of this process is multifactorial and not fully understood. It has been hypothesized that a potential hazard may be an excessive oral colonization of Gram-negative bacteria. Overproduction of pro-inflammatory mediators include: PGE2, IL-6, IL-8, and TNF can stimulate processes of proteolysis and tissue osteolysis.

Periodontal infection by maternal immune response may lead to the production of cytokines and eicosanoids and to the initiation of uterine contractions.

You can also transfer bacteria or their metabolic products of periodontal through the placenta to the fetus and amniotic cavity.

Compatibility of this hypothesis is confirmed by observations made at the coincidence of the occurrence of vaginal infections and the incidence of preterm birth [9]. In addition, in the pathogenesis of other disease, which often entangled pregnancy as preeclampsia, proinfective modulators in periodontis play a significant role [10].

The hypothesis that maternal periodontal disease may be an independent risk factor for preterm delivery and low birth weight of baby should be reviewed. The first representative study to prove this hypothesis was conducted in 1996 by Offenbacher Periodontal Research was carried out before 26 weeks of pregnancy and 48 hours of birth [11]. The criterion adopted minimum of periodontal disease periodontal space with increasing depth of periodontal pockets ≥ 2 mm. Published results indicate that periodontal inflammation is an important indicator of the risk of premature baby of low birth weight PLBW (preterm low birth weight). Pregnant patients who had preterm delivery and low birth weight in the infant meant a more severe periodontal disease (greater loss of connective and deep periodontal pockets). After analyzing the logistics regression risk factors for PLBW it was found that the loss of connective ≥ 3 mm is associated with 7.5 times higher risk of preterm delivery (with the square root of 7.9).

A study by Offenbacher published in 2001 checking a compound rate of preterm births in the ongoing progression of the inflammatory process in the periodontal tissue [12]. In the group of patients with healthy dentition risk of preterm delivery before 28 weeks of gestation was 1.1%, with mild periodontitis 3.5%, with advanced 11.1%. The results of the work above concerning the birth weight of the newborns were as followed. The group of healthy newborn stated below 1000 g in the group with mild inflammation was observed newborn’s 6.1%, the group is advanced until 14.4%.

In 2003, Jeffcoat reported the results of periodontal treatment in 366 pregnant women divided into three groups:
• 1 group – prevention and placebo capsules,
• 2 group – scaling and smoothing the root surface and placebo capsules,
• 3 group – scaling and smoothing the root surface and metronidazole (250 mg per week) [13].

The results indicated the occurrence of preterm birth < 35 week of gestation in the untreated control group: 6.3%, in 4.9% of group 1, group 2 0.8%, the 3.3% group 3. Additional treatment with metronidazole had no effect on improving the results.

The calculation of risk of preterm birth in pregnant women with periodontal disease is made on the basis of cohort studies or intervention studies. Cohort studies – conducted in pregnant women with healthy periodontium and periodontal disease, and only after giving birth to know what is the incidence of prematurity in the group exposed to periodontitis and without this pathology. The advantage of this type of research on case-control studies is that the risk precedes the effect. Such research still has not been conducted in Poland.

In the study performed in 2005 in Polish population the researchers discovered that the more advanced pathological chances in the periodontal the higher risk of delivering child before term with low birthweight [14].

The results of cohort studies are showing the relationship between periodontal disease and preterm birth or low birth weight are very sensitive to the influence of confounders (smoking, etc.), correct estimation of other risk factors and homogeneous criteria for preterm delivery.

From the Medline and Cochrane Library a number of cohort studies concerning the relationship of preterm birth and periodontal disease was published in October 2010 [15]. From 1680 publication only 12 that met all inclusion criteria (selection of study groups, comparability of groups, proper gestational risk assessment, statistical evaluation). The results of this prospective studies review supports the hypothesis that periodontal disease is associated with the risk of premature birth and/or low birth weight infant.

Despite the clear relationships between these diseases analyzed studies were not free from methodolo-
gical inaccuracies so that the overall results should be treated with caution. Uniform criteria for inclusion of pregnant women to allow research groups to avoid erroneous conclusions eject.

A meta-analysis developed in 2012 by Konopka et al. reported similar findings [16]. The Polish population need well designed, multicenter cohort studies and intervention in pregnant patients. In contrast to the results of previous investigators Farrell et al. showed a significant effect of periodontitis in pregnant non-smokers only with late miscarriage (12-24 gestational week) and did not observe such an influence on the incidence of birth in the classical period to the end of the 37th week of pregnancy [17].

Intervention studies compared two groups of pregnant women with periodontal disease in whom conventional non-surgical treatment will be introduced and in other, the control, only oral hygiene. Online Cochrane, Medline and Embase up to October 2010, the 1683 study for the analysis included 14 papers. We studied 7107 women with 6813 pregnancies which ended in a live birth [18]. All authors conducted scaling treatment of inflammation, polishing tooth roots. In one study the patients were treated additionally with metronidazole. The results of this meta-analysis were not conclusive. Despite the good results of treatment in individual patients, in more than half of the presented works, none of the studies did not show a clear connection method for the treatment of periodontal inflammation and the risk of preterm delivery.

All researches are characterized by a large heterogeneity, poor methodological differences in definitions and the lack of assessment of the impact of other risk factors. So far, only one job was evaluating the risk of making dental treatment during pregnancy between 13 and 21 weeks. Research of Michalowicz and coworkers demonstrated the absence of any complications of pregnancy after dental treatment including pregnancy [19].

The type of performed local anesthesia also had no impact on obstetric outcome. Due to the high risk of bacteremia and the severity of the treatment of pregnant it seems appropriate to correct dental treatment of women seeking to be pregnant.

The case of dental treatment before getting pregnant discuss Xiong and cowriters [20]. This is a meta-analysis of 13 clinical trials on the effects of treating periodontitis in pregnancy. The results are not conclusive. Many clinicians concluded that dental treatment during pregnancy increases the risk of premature birth and low birth weight newborns. The authors suggest conducting more randomized controlled trials to confirm this hypothesis.

To avoid errors in estimating the risk of various conditions and procedures planned clinical trials should be conducted in accordance with the standards of evidence-based medicine.

Summary

The introduction of mandatory dental examinations for women in early pregnancy should affect the dentists for a new approach to prevention services and resulted in closer cooperation with obstetricians in order to reduce the prevalence of preterm labor and premature morbidity and mortality.

References


Aleksandra Stupak
Department of Obstetrics and Pathology of Pregnancy Medical University in Lublin, Poland
ul. Staszica 16, 20-081 Lublin