THE MODIFICATIONS OF CALCIUM AND PHOSPHORUS METABOLISM IN PREGNANCY. IMPLICATIONS IN ORAL AND DENTAL PATHOLOGY

ABSTRACT

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Introduction

I started my research wanting to maintain a high quality level in pregnant women’s lives with oral and dental pathology. I wanted to demonstrate the biological importance of the oral and dental apparatus in the ensemble of the normal function of the organism. In my study I have followed the physiology of the oral and dental structures and its pathology in relation to the mineral metabolism.

In pregnancy ample adaptive modifications of all the body’s metabolism occur in order to maintain and establish a healthy pregnancy. The modifications in the mineral metabolism in pregnancy are in some cases implicated in the initiation of dental and oral pathology.

My study also has a practical role in relieving the importance of conservative dental therapy in pregnancy versus surgical therapy.

The prevention of oral and dental pathology is very important. In order to prevent this pathology we have to know the modifications of calcium and phosphorus metabolism and how these modifications influence the evolution of a healthy pregnancy. The calcium and phosphorus ions are implicated in the fetal skeletal development, in the activity of some hormones and enzymes, in the blood coagulation status, in the uterine contraction and the nervous system’s functionality.

Pregnant women’s diet, sialorrhea, nausea and vomiting, microbial tolerance in the modifications of the dental plaque are some of the essential elements upon which the oral cavity - pregnancy equilibrium depends.

My interdisciplinary study is complex being based on one hand on the data that I found in the scientific literature and on the other hand on my practical observations. I am convinced that my research will provide the basis to deepen knowledge on the relationship between pregnancy and the oral cavity, and in applying practical benchmarks, for a healthy evolution of the pregnancy and a healthy fetus. The mineral ions are implicated in the activity of some enzymes, in the muscular excitation and contraction and the intermediary metabolism. The calcium and phosphorus ions are implicated in the processes of development, in osteogenesis and ossification. They are also implicated in the exo and endocrine secretion, the synaptic transmission, the membrane stability and the blood coagulation.

Keywords: oral and dental pathology, pregnancy, calcium and phosphorus metabolism
Material and method

The study included a lot of 610 pregnant women with oral and dental pathology which were obstetrical and dental examined between 2009-2012.

Method

For the data base we used enquiries and ‘data base’ folders which contained the following parameters:
- clinical parameters, microbiological parameters, biological parameters, imagistical parameters
The data sources from which we collected the material:
- patient’s charts
- biochemical and imagistical results
- obstetrical exams
- dental exams
The obtained results were compared to the results we got from lots of pregnant women without any dental and oral pathology and from lots of non-pregnant women.

Clinical trial

In the study I analysed a set of clinical parameters considered to be have the potential to contribute to the initiation of oral and dental pathology:
- the occurrence of oral and dental pathology
- annual distribution
- the specific oral and dental pathology
- pregnant women’s age
- pregnant women’s social status
- symptomatology
- associated pathology
- pregnancy age
- natural birth vs caesarean birth
- treatment indications
**The microbiologic study**

The following algorithms of evaluation have been used:
- the identification of the classes and types of microbial agents from the dental plaque
- the identification of the classes and types of microbial agents from saliva.

**Data processing**

The data related to the clinical, biological and microbiological parameters have been introduced in data bases.

The pregnant women were aged between 20 - 40 years, 70% from the urban environment and 30% from the rural environment. The most important symptoms included dental pain, sialorrhea, gingival bleeding.

By analyzing the enquiries we observed a high percentage of oral and dental pathology in pregnant women from the rural environment as result of a poor sanitary education.
Conclusions

The calcium and phosphorus metabolism is profoundly modified in pregnancy because of his implication in multiple regulatory and stability mechanisms.

The lack of calcium and magnesium in the pregnant women’s diet and rich in phosphorus produces a lack of mineral ions.

The modifications of calcium concentration in pregnancy is caused by a deficietary diet, by a physiological increase in the plasma volume and a limitation in the renal tubular reabsorption and a drop in plasmatic protein concentration.

The total and ionic calcium levels drop significantly during pregnancy because of the massive fetal needs.

The level of phosphatemia drops just a bit in pregnancy, this decrease being insignificant and irrelevant.

Calcium dosing from the umbilical cord proves the higher calcium levels in fetus in comparison with the maternal calcium levels. This demonstrates that the calcium transport from mother to fetus is an active mechanism, against the concentration gradient.

I have observed low levels of calcium in premature babies, babies born after prolonged labor and the babies born through caesarean birth. These results are probably related to an immaturity of the parathyroid fetal glands.

There is an important osseous remodelling during pregnancy demonstrated by the rise in the frequency of osteoporosis, in hydroxyprolinemia levels – these remodelling affects the alveolar bone and the dental ligaments causing tooth mobility.

The drop in calcium ionic concentration, especially in the last trimester of pregnancy causes frequent tonic-clonic contractions in the muscles of the inferior limbs and neuromuscular irritability.
The concentration of the ions in saliva, the modification in the salivary pH are of great importance in the demineralization and remineralization processes taking place at the surface of the tooth.

The increased frequency of oral and dental pathology in pregnancy (gingivitis, dental cavities, periodontal disease) demonstrates the important negative influence pregnancy has on oral and dental structures. This is caused by a diet depleted in calcium and rich in fats and carbohydrates, by a modified qualitative and quantitative salivary secretion, by modifications in the immune system and in the metabolism of calcium and phosphorus. The supplementation with calcium and vitamin D are of great importance.

Oral and dental diseases are also a potential cause of premature labor.

My study emphasizes on the lack of education regarding hygiene and diet in pregnant women.
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