

The Institute of Perinatal medicine and Obstetric-Gynecology

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Abstract

The authors have studied the maintenance of nitrogen and its complexes in the myomatic knots and the myomatose tissues out of this tumor. Author has set that in the tissue of myomatic knot insufficiency of free nitrogen. The tissue of myomatic tumor is characterized with high intensity of free radical oxidation and hypoxia.

Keywords: *myoma uteri, oxidative stress, Fe²⁺, Mn²⁺, free radicals, nitric oxide*

It's known the main significance of the oxidative stress for the tumor growth. The ions of the metal of transitory group (Mn²⁺, Fe²⁺ ions) serve as basic parameters of the peroxidation; the activity of NO also depends on the intensity of the oxidative processes. Therefore the intensification of free radicals, the process of NO production and development of hypoxia are of the great interest.

According to these data the aim of our investigation is to study of Mn²⁺, Fe²⁺ ions and the contents of NO and their complexes.

The Election Spinal Resonance (ESR) specters of the myometrium and myoma have been measured by radiospectrometer PЭ 1307 liquid nitrogen. In order to measure the free nitric oxide, the tissue taken from myometrium and myoma were put in the solution of Na dietildetiocarbomat IM, for 1/2 hour.

There were investigated 30 women with uterine myoma.

Comparative analysis of paramagnetic centers of the myoma and myometrium reveals significant increase of the concentration of Mn²⁺-containing low molecular complexes in the myometrial tissue.

It's well known that like other ions of metals with variable valence Mn²⁺ ions actively participate in the reaction of Fenton and Haber-Vais and lead to intensification of the free radical reaction.

At the same time *Tab.1* shows, that in the tissue of the myoma the quantity of Ferum ions (Fe²⁺) is also increased. We revealed that ferum ESP spectrum of myoma specimens (H=20HS) is significantly decreased in comparison with the same index of myometrial tissue (H=250). The EPR signal registered in the myometrium can be attributed to ferritin bound spectrum. This signal is often registered in the EPR specter of the different tissue in normal and pathological condition and it apparently may reflect the concentration of connected iron in ferritin.

It's well known that different ligands, among them ascorbine acid, the hydrogen peroxide contribute the releasing of the Fe²⁺ and formation of low molecular complexes of Fe²⁺. This solution have EPR signalization 2,20; (H=20Hs), what lead us to the conclusion that the tissue of myomatous tumors, in opportunity to myometrium, have abundance of iron ions free from ferritin (P<0,001), which together with Mn₂ ions are the strong promoter of the hyperoxid oxygenation and assist the development of oxigenal stress in the myomatic tissue, in agreement with by literature data's. [2,5]

Besides, we have studied the maintenance of free nitric oxide in the myomatic tissues; what is given in the table. If in magnetic tissue the intensity of EPR signal of free NO is equal to 26,3 (2,5 mm/mg, the intensity of this signal in myomatous tissue significantly decrease (to 40%).

It is necessary to note that in EPR spectrus of the myomatic tissue often is discovered the EPR signal at complexes of nitric oxide with haemic iron. In the literature we dispose the data's about NOS-expression in the tissue of myoma. [3,4] These authors have shown that the expression of eNOS in the myoma is much more high then in the tissue of myometrium. This may explain, that the deficient of NO in myomal tissue develops by the nitric oxide with haemic iron complexes and reveal by the HbNO signal, discovered by us, HbNO signal in the EPR spectrum of the myomatous knot.

We know, that hemoglobin has high affinity to NO, which significantly increased in the condition of hypoxia (within the origin of dessoxihemoglobin). [1] This permits

us to conclude, that the myomal tissue, is characterized by the insufficiency of oxygen, which as we have noted, may be insufficient of NO.

All aforesaid, stated on the analyze of our datas, give us possibility to conclude:

1. The myomal tissue is characterized by insufficiency of free nitric oxide.
2. The tissue of myomal knot is characterized with high intensity of free radical oxidation and hypoxia, which reveal by striking increase of the parameters Fe^{2+} and Mn^{2+} of free radical oxidation with formation of HbNO complexes.

	MYOMETRIUM	MYOMA
Mn^{2+}	32,0±3,4	47±2,6
Fe^{2+}	58±1,7 ΔH=250 hs	100±2,3 ΔH=20 Hs
NO	26,3±2,5	15,3±1,5
HbNO	-	+

Tab.1 *The paramagnetic centres of myometrium and myoma (P<0,001).*

Reference

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Некоторые ЭПР-спектроскопические особенности миомы и ткани миометрия

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Р Е З Ю М Е

Изучены содержание Mn^{2+} , Fe^{2+} ионов оксида азота и его комплексов в миоматозном узле и ткани миометрия. Установлено, что в ткани миоматозного узла отмечается недостаточность свободного оксида азота. Согласно резкому повышению параметров свободнорадикального окисления Fe^{2+} и Mn^{2+} с формированием комплексов HbNO ткань миоматозного узла характеризуется высокой интенсивностью свободнорадикального окисления и гипоксии.

Ключевые слова: *миома матки, оксидационный стресс, Fe^{2+} , Mn^{2+} , свободные радикалы, оксид азота*