ROLE OF GELATINASE B AND INTRAERYTHROCYTIC MAGNESIUM IN FORMATION OF THE CHRONIC ENDOMETRIUM INFLAMMATION IN RATS

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In the study was evaluated the role of intraerythrocytic magnesium, the specific number and intensity of expression of gelatinase B positive cells on the mechanisms of chronic experimental inflammation of the endometrium in rats. Experiment was performed on 40 adult female white Wistar rats, which were divided into 3 groups. The first group (n=10) – initial state, the second group (n=10) – control series, the third group (n=10) – simulation of endometritis. On the 51st day after modeling chronic inflammation of the endometrium of the rats were receiving the blood from the inferior Vena cava and subclavian veins, the tissue of the uterine wall. Our study showed a reduction in the specific number of gelatinase B positive cells in the stroma (cellular component), the intensity of expression decreased of gelatinase-B in both the stroma and glandular epithelium. The decrease in intraerythrocytic levels of magnesium in the blood from different regions is a strong direct correlation with the number and intensity of expression gelatinase B. Thus, the decrease of intraerythrocytic magnesium, immunohistochemically activity indicators of gelatinase B on the background of the morphological picture of chronic endometritis, act as important links of the chronic endometrium inflammation.

Key words: chronic endometritis, gelatinase, magnesium
died the problem of these enzymes activity correcting. The literature contains data on the role of cytokines, free radicals in regulating the activity of metalloproteinases. A separate work on the role of magnesium in the modulation of gelatinase B activity [1, 10, 11].

The aim of the study was to evaluate the role of intracellular magnesium, the specific number and intensity of expression of gelatinase – B positive cells in the mechanisms of chronization of experimental inflammation of the endometrium in rats.

Material and Methods. The experiment was performed on 40 adult female white Wistar rats weighing 180–3.8 g. Experimental animals of experimental and control groups were kept in standard conditions in compliance with the Declaration of Helsinki of the world medical association (1964), ethical principles of the European science foundation (ESF), the order of the USSR Ministry of health № 755 from 12.08.77 «About measures on further improvement of forms of work with experimental animals», the rules of work with experimental animals (Shalimov, 1990; Berezovskaya, 1993; Sufin, 1993); Federal law dated 24.04.1995, № 52-FZ «On fauna», the GLP – rules of laboratory practice (order of the Ministry of health of the Russian Federation dated 19.06.2003, № 266).

Before the experiment the animals were divided into 3 groups. In group 1 (n=10) was determined the studied parameters in the initial state. The second – control series (n=10) performed the same manipulations as in the main (third group), but did not display chronic inflammation of the endometrium. In the third (n=20) simulated chronic inflammation of the endometrium by introduction into the uterus of autoclaves suspension in a volume of 0.1 ml [9]. From the third day after surgery, the animals of the second and third groups underwent antibacterial therapy with broad-spectrum drug Ceftriaxone in accordance with the weight of the animal within 7 days.

51 day withdrawal of animals from the experiment, by injecting lethal doses of Rometar. After having received the blood from the subclavian veins and the lower hollow veins was performed tissue sampling for histological and immunohistochemical studies. The resulting preparation was fixed in neutral buffered formalin and after dehydration in a series of alcohols of concentration of the endometrium in rats.

The performance of cellular infiltration in the endometrium (in points) (Me [25 and 75 percentiles]).

<table>
<thead>
<tr>
<th>Group 1</th>
<th>Neutrophil</th>
<th>Macrophage</th>
<th>Lymphocyte</th>
<th>Plasma</th>
<th>Eosinophyl</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 [0;1]</td>
<td>1 [0;2]</td>
<td>1 [1;0]</td>
<td>1 [0;2]</td>
<td>0 [0;0]</td>
<td>1 [1;0]</td>
</tr>
<tr>
<td>Group 2</td>
<td>1 [0.25;1]</td>
<td>0 [0;0]</td>
<td>1 [0;2]</td>
<td>1 [1;2]</td>
<td></td>
</tr>
<tr>
<td>Group 3</td>
<td>1 [0;1]</td>
<td>1.5 [1.5;2]</td>
<td>2.5 [1.5;3]</td>
<td>2 [1;3]</td>
<td></td>
</tr>
</tbody>
</table>

Table 1

Q – the reliability of differences between the initial state and control; Q – reliability of differences between the group with experimental chronic inflammation of the endometrium and control.

In the third group in the histological material were found: inflammatory infiltrates of lymphoid cells, to a lesser degree from the leucocytes, often located around glands and blood vessels, rarely diffuse, plasmatic elements, single macrophages, mild stromal fibrosis, slight sclerosis of the walls of arteries of the endometrium. In animals of the third group significantly increased level of macrophages 1.5 [1.5; 2], (Q<0.05), lymphocytes of 2.5 [1.5; 3], (Q<0.01), and plasmocytes 2 [1; 3], (Q<0.001), eosinophilia 1.5 [1.5; 2], (Q<0.01).

As is known, the morphological criteria of chronic endometritis are lymphocytes and plasmocytes infiltrates, detection of focuses of fibrosis in the stroma and in the walls of the spiral arteries, predominantly in the basal layer of the endometrium [3].

Analysis of the results shows that in the tissues of the uterus, the endometrium, formed morphological signs of chronic inflammation. Simultaneously with the change of parameters of cellular infiltration changed the specific number and intensity of expression of gelatinase – B positive cells in the tissues of the endometrium in the study groups (Table 2). At 51 days after modeling in experimental animals revealed a reduction of the specific number and intensity of expression of gelatinase-B positive cells in the stroma elements (Q<0.05) on the background of practically unchanged specific numbers in the glandular epithelium (Q>0.1).
Specific number and intensity of expression of gelatinase B-positive cells in the tissues of the endometrium on the background of experimental chronic inflammation (in points) (IU [25 and 75 percentiles])

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
<th>Q</th>
<th>Q1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stromal (cellular component) specific number</td>
<td>28 (26;30)</td>
<td>28 (20;30)</td>
<td>18 (17;20)</td>
<td>&gt;0.1</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Intensity of expression (in points)</td>
<td>2 [0;1]</td>
<td>2 [0;2]</td>
<td>0 [1;2]</td>
<td>&gt;0.1</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Glanular epithelium specific number</td>
<td>29 (28;30)</td>
<td>30 (28;30)</td>
<td>26.5 (22;25)</td>
<td>&gt;0.1</td>
<td>&gt;0.1</td>
</tr>
<tr>
<td>Intensity of expression (in points)</td>
<td>2 [0;1]</td>
<td>2 [0;1]</td>
<td>1 [1;2]</td>
<td>&gt;0.1</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

Q – the significance of differences between baseline and follow-up; Q1 – the significance of differences between the group with experimental chronic inflammation of the endometrium and control.

Conclusions. Our study showed that decreasing the number and intensity of expression of gelatinase – B positive cells in the structures of the endometrium on the background of development of hypomagnesaemia act as the factors of endometrium experimental inflammation chronization.

References

The content of magnesium in erythrocytic mass in rats on the background of chronic inflammation of the endometrium

<table>
<thead>
<tr>
<th>Mg2+ mmol/l</th>
<th>Group 1</th>
<th>Group 2</th>
<th>P</th>
<th>Group 3</th>
<th>P1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower hollow vein (er.mass)</td>
<td>1.91±0.07</td>
<td>1.87±0.09</td>
<td>&gt;0.1</td>
<td>1.63±0.06</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Subclavian vein (er.mass)</td>
<td>1.78±0.12</td>
<td>1.73±0.12</td>
<td>&gt;0.1</td>
<td>1.49±0.06</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

P – significance of differences between baseline and follow-up; P1 – significance of differences between the group with experimental chronic inflammation of the endometrium and control.

On the background of experimental chronic inflammation of the endometrium in red cell mass in the blood from the lower hollow and subclavian veins and a specific number of gelatinase B positive cells in the tissues of the endometrium r = 0.71; r = 0.7.

The role of magnesium in stabilizing mRNA and non-coding as an activator of enzymes of energy production and consumption is well known. The decrease in the level of magnesium in red blood cell pool does not create conditions for reparation of defects, decreases gelatinase B activity, and leads to accumulation of products of incomplete degradation of the matrix in tissues, which is one of mechanisms of the chronization inflammation.

Conclusions. Our study showed that decreasing the number and intensity of expression of gelatinase – B positive cells in the structures of the endometrium on the background of development of hypomagnesaemia act as the factors of endometrium experimental inflammation chronization.

References