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Research Article

SEX CHROMATIN CONTENT AS THE OBJECTIVE WAY TO ASSESS THE RISK OF ENDOMETRIAL MALIGNANCY WHEN USING SILVER-CONTAINING INTRAUTERINE DEVICES

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Abstract:

Aim. The purpose of this study was to assess the content of sex chromatin in the endometrium of women using silver-containing IUDs for the period of 1 to 7 years.

Materials and methods. The study involved 460 women aged 23-57 years. Scrapings of the uterine mucosa were examined during application or after removal of silver-containing IUDs to study the content of sex chromatin and the peculiarities of the endometrium's mitotic regime at different periods of application of silver-containing IUDs. Scrapings were obtained on days 8-10 or 19-23 (middle stage of proliferation and secretion, respectively) of the menstrual cycle. Sections of the endometrium were processed according to Feulgen and for more accurate identification of figures with mitosis-iron hematoxylin according to Heidengin.

Results. During the study it was found out that the content of sex chromatin in the cells of the endometrial glands did not undergo significant changes, but there was the increase in its content in the endometrium of women who used silver-containing intrauterine devices for up to 12 months.

Keywords: silver-containing IUDs, contraception, sex chromatin, endometrial malignancy, mitotic activity.

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INTRODUCTION:

Family planning issues are central to modern healthcare. Currently, more and more women are trying to postpone the birth of a child at a later date [1,2,3]. Today, the average age of primiparas in the Russian Federation and Greece is 30 years, in France - 33 years, in the USA - about 38 years [4,5]. This is facilitated by the emergence of new reliable and convenient methods of contraception (intrauterine contraceptives, combined oral and subcutaneous implantation contraceptives, transdermal patches), as well as the rapid development of reproductive technologies [6,7,8,9]. Undoubtedly, one of the most convenient, reliable and cost-effective ways to prevent unwanted pregnancy is the intrauterine device [10,11,12].

Scientists around the world are researching the effect of different IUDs on the endometrium [13,14]. There are opinions that long-term wearing of devices can cause hyperplastic processes in the endometrium [15,16]. The content of sex chromatin can be considered as one of the objective criteria for malignancy. Studies by a number of authors indicate that when pathological proliferation occurs and in the process of endometrial malignancy, a natural decrease in the percentage of sex chromatin in the glandular epithelium is observed [17,18,19,20]. The average content of sex chromatin in the epithelium of the normal proliferating endometrium is $33.0 \pm 3.8\%$, with glandular cystic hyperplasia - 17.4%, with cancer of the uterine body - 8.2% [21,22,23].

The content of sex chromatin in the tissue of hyperplastic and malignant endometrium is much lower than in the normal proliferating endometrium, and as the degree of proliferation increases, the percentage of sex chromatin in cells progressively decreases. As for the peculiarities of the content of sex chromatin in the epithelium of the endometrial glands when using silver-containing IUDs, such studies are very limited. At the same time, these data are of not only theoretical but also practical interest, since they can provide information of a prognostic nature.

The purpose of this study was to assess the content of sex chromatin in the endometrium of

women using silver-containing IUDs for the period of 1 to 7 years.

MATERIALS AND METHODS:

The study involved 460 women aged 23-57 years. Depending on the duration of the use of silver-containing IUDs, the examined women were divided into 4 groups: group 1 - women used silver-containing IUDs up to 12 months, group 2 - up to 36 months, group 3 - up to 5 years, group 4 - up to 7 years.

Scrapings of the uterine mucosa were examined during application or after removal of silver-containing IUDs to study the content of sex chromatin and the peculiarities of the endometrium's mitotic regime at different periods of application of silver-containing IUDs. Scrapings were obtained on days 8-10 or 19-23 (middle stage of proliferation and secretion, respectively) of the menstrual cycle. Sections of the endometrium were processed according to Feulgen and for more accurate identification of figures with mitosis-iron hematoxylin according to Heidengin. For the study, preparations were selected in which the endometrium did not have significant pathological changes and its structure corresponded to the day of the menstrual cycle.

The data obtained were compared with the results of similar studies in the control group of women (endometrial scrapings were obtained before the introduction of the IUD), were subjected to statistical processing according to the Fischer-Student method. Statistical processing of the obtained results was performed using the statistical programs Statistica v.6.0. and Microsoft Office Excel 2003.

RESULTS AND DISCUSSION:

As the result of our study, it was found that the average content of sex chromatin in the glandular epithelium of the endometrium of the middle stage of proliferation in the control group of women was $37.1 \pm 1.5\%$, with extreme variants from 22 to 58%, in the middle stage of secretion - $42.0 \pm 2.1\%$ with extreme options from 28 to 65%.

Table 1. The average content of sex chromatin in the glandular epithelium of the endometrium, depending on the duration of the use of silver-containing IUDs.

The duration of use of silver-containing IUDs	Middle stage of proliferation		Middle stage of secretion	
	Number of women	The average content of sex chromatin, %	Number of women	The average content of sex chromatin, %
before using IUDs	43	$37,1 \pm 1,5 \%$	45	$42,0 \pm 2,1 \%$
up to 1 year	48	$50,1 \pm 1,2\%$	45	$55,8 \pm 1,7 \%$
up to 3 years	47	$33,2 \pm 1,3\%$	48	$44,2 \pm 1,4\%$
up to 5 years	45	$36,8 \pm 1,8\%$	47	$40,1 \pm 1,5\%$
up to 7 years	47	$34,5 \pm 1,5\%$	45	$39,4 \pm 1,7\%$

Data on the average content of sex chromatin in the glandular epithelium of the endometrium, depending on the duration of the use of silver-containing IUDs, are presented in the table 1, from which it can be seen that the content of sex chromatin did not undergo significant changes, but increased in the endometrium of women who used silver-containing IUDs for 1 years ($p < 0.05$). The detected percentage increase in sex chromatin content was combined with the decrease in mitotic activity of endometrial gland cells. However, the revealed decrease in the proliferative activity of the endometrium with the use of silver-containing IUDs was transient; with a longer use of contraceptives, the level of sex chromatin in the glandular epithelium was normal.

Thus, despite some fluctuations in the content of sex chromatin in the cells of the glands of the mucous membrane at different periods of use of silver-containing IUDs, its level remained within the female "nuclear sex".

In the control group of patients, on days 8-10 of the menstrual cycle (middle stage of proliferation), the mitotic activity of the glandular epithelium was 48.8 ± 1.5 , the stromal cells were lower - 23.2 ± 1.7 . Among normal mitoses, prophases and metaphases prevailed (in the epithelium, respectively, 41.9% and 33.2%, in the stroma - 44.5% and 35.2%). The similar ratio of metaphases and prophases is typical for normal tissues. Pathological mitoses amounted to $1.7 \pm 0.5\%$ in the epithelium of the glands and $1.6 \pm 0.3\%$ in the stromal cells. Separate forms of mitotic pathology were mainly represented by lagging chromosomes in metakinesis and during divergence; K-mitosis was often encountered.

On days 19-23 of the menstrual cycle (middle stage of secretion), in the control group of women, mitotic activity was 15.8 ± 0.2 , in the stroma - 5.1 ± 0.5 . Prophases and metaphases prevailed, with prophases occurring more often than metaphases. The number of pathological mitoses in this stage of the cycle tended to decrease (in the epithelium $0.48 + 0.02\%$, in the stroma - $0.41 + 0.03\%$), their spectrum was the same as in the proliferation phase.

CONCLUSION:

As the result of the study, it was found that the content of sex chromatin in the cells of the endometrial glands did not undergo significant changes, but there was the increase in its content in the endometrium of women who used silver-containing intrauterine devices for up to 12 months. The detected percentage increase in sex chromatin was combined with the decrease in the mitotic activity of the endometrium.

List of symbols and Abbreviations:
IUDs - intrauterine devices.

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