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Morphological Features Of The Reproductive Organs In Bacterial Vaginosis In Experimental Animals On The Background Of Radionuclides Uranium And Hypoxia.

Topchubaeva T.M., Tuhvatshin R.R.

Kyrgyz-Russian Slavic University im.B.N.Eltsina1 Kyrgyz State Medical Academy im. I.K. Ahunbaeva Department of Pathological Physiology, Bishkek, Kyrgyz Republic

Abstract

Background

The present study provides a detailed investigation on the morphological features pertaining to biocenosis of reproductive organs among experimental animals.

Aim

Aim of the present study involves in assessing the overall modifications in micro flora after subjecting the experimental animals with uranium radionuclides under hyperbaric chamber training condition and for determining hypoxia indicating both quantitative and qualitative modifications.

Experimental Setting and design

The experiments were performed in compliance with the Declaration of Helsinki of the World Association, 2000. All animals were kept under standard vivarium conditions for 30 days. Animals 1 control group (n = 30), the combined daily consumed food and drinking water. Comparison group of animals: group 2 (n = 30), the combined daily consumed food and water containing radionuclides uranium (per 1ml / kg body weight); Group 3 (n = 30) were exposed to hypoxia (2000 meters above sea level) daily for 6 hours per day in the chamber and used with a combined feed of drinking water; Group 4 (n = 30) animals were exposed to hypoxia (2000

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meters above sea level) daily for 6 hours per day in the chamber and a combined feed consumed are also water containing radionuclides uranium (based 1ml / kg body weight).

Methods and Material

When the experimental animals were administered with uranium radionuclides while subjecting to hyperbaric chamber training for determining hypoxia, showed both quantitative and qualitative modifications in the overall microflora composition.

Results and Conclusions

From the experimental assessment, the microbiological vaginal flora in the experimental group of animals differed from the normal composition, as there was a significant predominance in aerobic bacteria, followed by a sharp decrease in lactobacilli, compared to the intact group. The number of secondary follicles in the ovaries and presence/ absence of cogenesis.

Introduction

Women's reproductive health is one of the major social indicators characterizing the societal well-being, and is largely dependent on environmental factors[1,2]. Vaginal Biocoenosis assessment is one of the key aspect initial reacts quantitative and qualitative variations in shifts external and internal environment to the development of bacterial vaginosis (BV). Its incidence varies, according from the available reports, as they contributed from 12 to 48% in inflammatory diseases of the genital organs [3].

After dissolution of the USSR, Kyrgyzstan was completely abandoned. The reports showed uranium tailings which is report from49 to 80 rock dumps containing radioactive elements that are the sources for radiation and acts as a negative effect in the biosphere within these territories [4]. The degradation processes of biosphere geochemical provinces of Kyrgyzstan because of the presence here of uranium radionuclides that accumulate in the body

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over a lifetime, to the harm of the local people's health [5]. Active seismicity mountain Kyrgyzstan, landslide and mudflow danger area where the tailings are an environmental hazard. Radionuclides that fall on the soil moving over the food chain and entering the body is irradiated from the inside. In every link of the food chain (water - soil - plant - animal - people) to create multiple higher concentration of radioactive contamination on the principle of biological amplification. Most of the uranium tailings are placed in mountainous areas, which are located next to residential settlements. The population of these regions are forced to live in conditions of prolonged exposure to low doses of radiation, reproductive health and general have the negative impression [6,7].

The integrity of the surface layer of the vaginal epithelium, which involves a flat multilayered keratinizing epithelium. Cytomorphological analysis can help as an indicator of its state and associated through the female reproductive system [8,9].

Due to numerous environmental factors, there is a considerable reduction in the lactobacilli species in the vaginal region. This could be attributed due to the change in pH, thereby promoting a definitive change as well as development of bacterial vaginosis (BV) and vulvovaginitis. Also depletion of epithelial glycogen eliminates the possibility of the existence of lactobacilli. Colonization resistance of the mucous are reduced according to this background. Destruction of biolayer of the mucosa accompanied by the absence of soluble antimicrobial factors primarily cationic peptides vaginal and cervical secretions [10,11,12].

Given the possibility of release of radionuclides through the reproductive tract and also reproductive system has the interest to study their impact on the morphological aspects. Under the consequence of radionuclides that decrease the activity of vaginal epithelial cells and triggered the development of inflammatory tissue reactions with impaired character ordinary

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microflora. The research is to study the microbiological and morphological changes in the reproductive organs of laboratory rats on the background of uranium radionuclides and hypoxia.

Materials and methods.

Experimental simulation conducted on BW (n = 120) of female white rats which is 6-8 months of age (100-150g weight). Among108 of the samples, 3 ± 0,1gram is the average weight of the animals. Pre experimental procedure was obtained and was performed in reference to the Ethics Committee of Kyrgyz State Medical Academy named after IK Akhunbaev CD. All experimental animals were separated into 4 groups of 30 rats: I-group (intact) were accepted which obtained per/os daily normal tap water (n = 30); II-control animals which received daily per/os water with radionuclides uranium based 10mg / kg body weight (n = 30); III-the control animals, which are raised every day at 2000 meters above sea level in hypoxic pressure chamber for 6 hours per day, 30 days (n = 30); (n = 30) radionuclides uranium hypoxic load pressure chamber are IV-experienced animals treated daily with water.

At present, for the diagnosis of BV often use Amsel criteria, since its detection requires some definitive criteria, of which one of detection in identification of “key” cells in vaginal smears which were stained using Gram staining. [10,13].

Assessment of the vaginal pH for all animals were performed via employing special test strips (range pH 4,0-7,0), as the end-point is represented with change in its coloration (transition interval). Amine test - was considered positive when a fishy smell was observed after applying drops of a 10% - solution of potassium hydroxide (KOH) to the sample of vaginal secretions. The study of bacteria in a well-throughput preparation facilitates in performing a detailed study of their morphology. Therefore, it is crucial for the analysis process in dyeing preparations. Coloring fixed smear was performed by Gram gentian violet followed by applying Lugol iodine

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solution. Staining was carried out with an aqueous solution of fuchsin. Bacterial flora, stained with gentian violet and not discolored by alcohol, was colored purple and reflected gram-positive microbes (staphylococci, streptococci, etc.), bacteria discolored by alcohol were gram-negative (gonococci, trichomonas, etc.). Light microscopy (X600) in preparations primarily evaluated by the total number of microorganisms and their individual morphotypes; state of epithelial cells. Defined as the phenomenon of "key" cells, which are key in the diagnosis of bacterial vaginosis.

Subsequently completion of the experiments the animals were sacrificed according to ethical guidelines [14]. Staining of histological sections of the uterus, fallopian tubes, ovaries and vagina was performed with hematoxylin-eosin.

The resulting material was subjected to the actual processing by the computer the application package 6. Statistic differences authenticity features adjusted using Student's t-test for significant difference recognized at $p < 0,05$.

Results

The starting pH level in the vaginal II - control group was 60% in III-control is 13,3%, IV-experimental observations was 20% by a shift to the alkaline side, in difference to intact group of animals has the acidic environment of the vagina is 100%. Microbiological examination exposed the vagina in experimental animals, polymicrobial composition of microflora. It is been found that in the test group IV-lactobacillus content was reduced by 16.7% when administered radionuclides uranium and training in the pressure chamber, an III-group under the action of the control pressure chamber hypoxic 26.6% in II-control under the action of radionuclides uranium 30 %, compared to the intact group which was 85% of the content of lactobacilli. When administered radionuclides uranium occurred, a significant rise in vaginal Gram-positive bacteria in animals in groups II-46.6%; when training hyperbaric chamber hypoxia animals III-group

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26.6%, the combined effect of the radionuclides uranium and hypoxia IV-group by 23.3% as compared to intact group 10%. Indicators, Gram-negative bacteria were detected in the group II-20%, III-group in 16,7%, IV-group in 13.3% of cases, compared with the intact group 5%, (p> 0,05). Amine test was positive in Group II-y 43,4% of the animals, 30% of III-group, 36.6% in the IV-group related with the intact group, where the test was negative 100%. Study "key" cells revealed the absence of it in intact group of animals 100%, in contrast to the II-test where they were present in 83.3% of cases, in III-controls of 33.3% in the experimental group IV-40 % of animals (p <0,05) indicating the growth of BV in these groups. the combined action of the radionuclides uranium and hypoxia IV-group by 23.3% as compared to intact group 10%. Indicators, Gram-negative bacteria were detected in the group II-20%, III-group in 16,7%, IV-group in 13.3% of cases, compared with the intact group 5%, (p> 0,05). Amine test was positive in Group II-y 43,4% of the animals, 30% of III-group, 36.6% in the IV-group compared with the intact group, where the test was negative 100%. Study "key" cells revealed the absence of it in intact group of animals 100%, in contrast to the II-test where they were present in 83.3% of cases, in III-controls of 33.3% in the experimental group IV-40 % of animals (p <0,05) indicating the growth of BV in these groups. the combined action of the radionuclides uranium and hypoxia IV-group by 23.3% as compared to intact group 10%. Indicators, Gram-negative bacteria were detected in the group II-20%, III-group in 16,7%, IV-group in 13.3% of cases, compared with the intact group 5%, (p> 0,05). Amine test was positive in Group II-y 43, 4% of the animals, 30% of III-group, 36.6% in the IV-group associated with the intact group, where the test was negative 100%. Study "key" cells revealed the absence of it in intact group of animals 100%, in contrast to the II-test where they were present in 83.3% of cases, in III-controls of 33.3% in the experimental group IV-40 % of animals (p <0,05) indicating the advance of BV in these groups. Gram negative bacteria were detected in the group II-20%, III-group in 16,7%, IV-group in 13.3% of cases, compared with the intact group 5%, (p> 0,05). Amine test was positive

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Microscopic examination of histological preparations in animal's I-intact group represented vaginal wall muscle layer with conspicuous connective tissue stroma. Mucous folded, coated with multilayer flat epithelium. The muscular layer of blood vessels visible, mainly capillary type. Normal uterus structure is preserved. Endometrium is covered by columnar epithelium. Fallopian tube structure is preserved. Ovary conventional structure, all the components can be clearly seen.

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On study drug II-control group, gross variations were observed at the same time, in contrast to the control group, revealed certain, the similar type of changes in the blood vessels, regardless of their location - in the ovaries, the uterus, or vaginal wall. All the vessels of the microcirculation (arterioles, capillaries) of the ovary, uterus, and vagina were expanded, full-blooded. In some capillary stasis, sometimes encountered in such vessels picture impregnating walls plasma elements, dystrophy and desquamation in individual endothelial cells.

Perivascular edema observed in studied organs. There are some changes are in the connective tissue structure for organs examined. Present in wall of vagina, collagen fibers are observed for prevalence and the "strengthening" of connective tissue. In the uterus mucosa atrophied often it occurred when the division in the basal and endometrial functional layer is not noticeable (Fig 1).

Theorgan structure of the test animals belonging to the III-control survived. Also, the picture of hemodynamic varies in the stagnation form were more in the microcirculatory level. The walls of vagina mentioned uneven thinning of the epithelium. The capillaries themselves places stasis. uterine myometrium with layers of connective tissue, wherein the elastic type fibers predominate. Stroma sclerosed, mucosal sites were scarce visible lymphoid infiltrates (Figure 2).

In the research of IV th test group of animals in the vaginal tissues, more severe congestion occurs impregnating walls of blood elements and sloughing of endothelial cells. In endothelial cells, discovered the phenomenon of degeneration. Also dystrophy phenomena occur in the smooth muscle cells of vessel walls. In the uterus mucosa atrophied, endometrium division into layers is not always pronounced. Ovaries significantly reducing the amount of follicles as ripening and ripened, some animals were found in the ovaries of dystrophic changes in the epithelium and in some follicles succumbed their process of oogenesis (Figure 3, 4).

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Discussions

There is a dire consequence faced in women's entire morphological feature, who are living near uranium tailings, develop some deleterious impact both qualitatively and quantitativelyin terms of their actual 'adaptive reserves' being affected considerably [15]. Besides there is a considerable modification observed in their vaginal microflora. Vaginal mucus secretion with observed traces of radionuclides among the affected individuals were found to showcase dystrophic changes in their secretary cells, followed by epithelial desquamation, promoting inflammation. Hypoxia could serve to have to positive impact over the reproductive system, to some extent, indicating a protective effect [16] [17].Thus, the state of the vaginal microflora in experimental animals under conditions of hypoxia and radionuclides uranium was determined and further characterized resulting in a significant predominance of aerobic bacteria and also there is a significant reduction in population of lactobacilli that are associated to intact group.

In a Healthy women (asymptomatic) the vaginal microflora usually comprise of numerous species of both aerobic and anaerobic species. Among them, the genus lactobacillus dominate the vaginal microflora [18]. From the study impacting the experimental animals with reduction in the actual lactobacillus content, thus indicating the deleterious effect on administration ofradionuclides (uranium) and training in the pressure chamber, an III-group under the action of the control pressure chamber hypoxic 26.6% in II-control under the action of radionuclides uranium 30 %. This resulting modification due to experimenting under uranium radionuclides and in hyperbaric chamber training condition was identified significantly. The resultant hypoxia caused an increase in the anerobic bacterial species to dominate in the vaginal mucosa [19] [20].

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The results of morpho-histological studies in animals have exposed that delivery of uranium radionuclides with components of the diet (combined feed) into the body of female outbreed albino rats causes morphological variations in the vagina, uterus and ovaries, manifesting decrease uterine wall thickness, the number of secondary follicles and oogenesis ovarian are absence as similar studies observed among other experimental animals when subjected with radionuclides [17][21].

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