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## **STRUCTURAL ORGANIZATION OF BLADDER MUCOSA IN WOMEN WITH EARLY AND LATE MENOPAUSE WITH OVERACTIVE BLADDER SYNDROME**

**Abstract.** *The article describes the results of histological study of structural components of bladder mucosa in women with menopause. The morphological changes in the bladder mucosa in 48 women with different menopause have been studied. It has been revealed that in group of women with "early menopausal bladder" inflammatory and degenerative changes, combined with hemodynamic disorders prevail. In mucosal biopsies of women with late menopause degenerative, metaplastic and sclerotic manifestations prevail.*

**Key words:** *mucosa, bladder, menopause, overactive bladder*

**Introduction.** According to the World Assembly on Ageing, the percentage of older women is higher than the percentage of older men, and in older age groups this trend is even clearer. The implementation of measures aimed at improving the health of older women should be a priority strategy area in all countries [1, 7, 8].

In recent years problems associated with urogenital aging begun to prevail in the symptomatology of menopausal disorders, due to their pronounced negative effect on quality of life in a postmenopausal woman. Diagnosis of imperative urinary incontinence, which is typical for overactive bladder is the greatest and not fully studied problem in this aspect. The latter is found in 50-60% of patients. It is proved that incidence of urinary incontinence in postmenopausal women increases by 30% for every 5 years [1-4].

Despite the significant amount of studies many key aspects of morphogenesis and pathogenesis of the disease, which are associated with regional microcirculation features and the nature of cellular and intracellular changes in the bladder mucosa, are still unclear [6]. This prevents the formation of a rational strategy for therapeutic measures [5]. The removal of structural and functional abnormalities that promote development of pathological process may be one of its main areas.

**Objective:** to study the structural changes, dynamics and degree of their severity in the bladder mucosa of women with various

menopause.

**Materials and methods.** In order to study morphological features of menopausal bladder the biopsy of its wall mucosa in 48 women aged 35-74 years was performed. The women were divided into groups due to the common classification of menopause: 45-51 years - premenopause, 51-52 years - menopause, over 52 years - postmenopause.

Thus, the women with premenopause and menopause were in the group of patients with early menopause of 20 people. 28 patients (over 52 years) were in group with late menopause. The control group consisted of 14 women of reproductive age (35-42 years). The criteria for the inclusion in the study were the following: female gender, age over 35 years, informed consent of the patient.

The bladder examination was carried out with cystoscope Richard Wolf with tube 19,5F and telescope with refraction angle of 30° and 70°. The biopsy sampling was performed with a stiff bent spoon biopsy forceps from the left side wall and triangle. In order to detect the overall structure of histopathological changes and topographical relationships between the stroma and parenchyma, and elements of ICR, the histological sections were stained with hematoxylin and eosin by the Van Gieson's method.

The histological samples required for demonstration were photographed. The image on the computer screen was taken out of the microscope Olympus CX22 using the camcorder

VISION Color CCD Camera and software Inter Video Win DVR.

**Results and discussions.** The characteristic features, which are constantly met in all cases, are hyperemia of venules and veins, stasis of erythrocytes in precapillaries, hemorrhagic impregnation, thrombosis of small veins, inflammatory infiltration preferentially localized in the lamina propria of the mucosa, inflammatory, degenerative and hyperplastic changes of epithelium.

Mucosa of women in the control group have a normal structure and consists of the transitional epithelium and own layer formed by fibrous unformed connective tissue.

Histological changes of the mucosal epithelium in studied group 1 in different areas of the bladder are different. In 7 cases (35%) structural organization of the mucosa structure differs little from the structure of normal mucosa.

The difference is in hemocirculatory disorders accompanied by edema and lymphohistiocytic infiltration of varying intensity. The areas of the surface epithelial desquamation are detected rarely.

In most cases transitional epithelium is sharply thinned to the formation of a single layer of flattened cells or the desquamated on the surface layer with small or deep erosion, which is more often.

Lamina propria of the mucosa is thickened due to the edema, there is a lymphohistiocytic inflammatory infiltrate of varying intensity with impurities of plasma cells, neutrophilic and eosinophilic leukocytes and fibroblasts, with inflammation spreading to the epithelium and submucosa.

Quite often there are focal and diffuse hemorrhage. There is an edema of the lamina propria and submucosa. The microcirculation have the following changes: spasm of the arterioles and the venous dilatation with signs of hemodynamic - stasis, sludge and parietal aggregation of the erythrocytes.

In 5 cases there are areas of squamous metaplasia. In biopsies taken from the nearby cells of squamous metaplasia, there is an urothelium with proliferative changes in the form of simple hyperplasia with increased number of layers in the transitional epithelium, with areas of the urothelium invagination in the lamina propria of the mucosa (Brunn's nests) or

separated from the epithelial layer urothelium as a groups of cells located within the lamina propria of the mucosa (Fig. 1). In 2 cases there is a glandular metaplasia – the transitional epithelium is substituted by the prismatic epithelium with formation of glands. These changes are accompanied by the distinct inflammatory cell infiltration, which is localized not only in the lamina propria, but is also extended to the submucosa and penetrated into the epithelial layer. These changes are combined with the proliferation of the collagen fibers in the lamina propria.

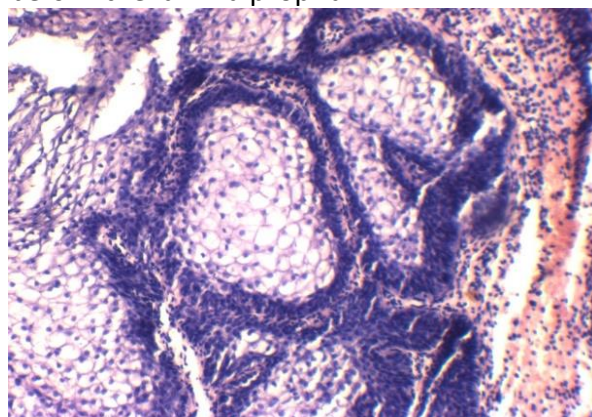


Fig. 1. Squamous metaplasia of the urothelium with the formation of Brunn's nests. Stained with hematoxylin and eosin.  $\times 200$

In one case in a patient with a long history of dysuric disorders there are histological characteristics, which are typical for leukoplakia, that is parakeratosis, acanthosis and squamous metaplasia.

In biopsies of the bladder mucosa in the women of the studied group 2 - with late menopause - there are similar structural changes, which are typical for all cases. However, the frequency of these changes is another. Minimal changes of the structure of the mucosa compared with the intact one are just in 3 cases (10.7%).

Along with the changes described above, there are degenerative changes in the cells in all layers of the transition epithelium, preferably in the form of balloon degeneration. The frequency of destructive changes of the epithelial cover increases. In some cases there are the cell necrobiosis and necrosis of the urothelium cells. Expressed microcirculatory disorders are observed with the prevailed hyperemia of the varicose veins. Arterioles have thick walls that visually reduces their lumens. Quite often there

are hemorrhages of varying length.

In 9 cases (32.1%) the signs of squamous metaplasia are detected. At the simplest form of leukoplakia in the women with the disease duration up to 2 years the acanthotic bands are uniform and located in one direction. In this case the parakeratosis centers on the epithelium surface are represented by several rows of keratinized cells located in the form of a dense plate.

At verrucous leukoplakia (history of 3-6 years) the Malpighian layer has a considerable thickness. Epithelial bands of varying thickness and length are located in different directions. Parakeratotic epithelial cells form thickenings of various shapes, towering above the epithelial lining.

In all the studied cases there is an increased formation of collagen both in the lamina propria of the mucosa and in the underlying tissues. It should be noted that quantitative changes depends directly on the duration of the disease.

In 5 study cases (17.8%) of leukoplakia morphological changes in the bladder mucosa, which are characteristic for squamous metaplasia with leukokeratosis, have been revealed. All the changes are focal and characterized by mainly hyperplastic processes in the transitional epithelium. Actually the hyperplastic changes of the urothelium are manifested in the form of simple hyperplasia with increased number of the cell layers, invagination of the transitional epithelium in the lamina propria of the mucosa, formation of the Brunns' nests, cystic or glandular transformation (Figure 2).

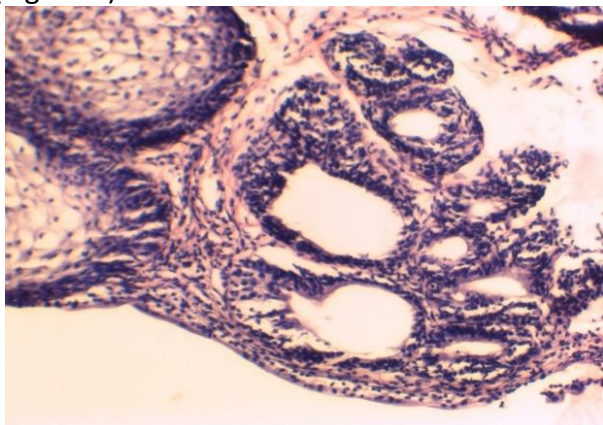


Fig. 2. Glandular and cystic transformation of the urothelium in a patient with leukoplakia of the transitional epithelium. Stained with hematoxylin and eosin.  $\times 200$

**Conclusions.** Histological study of biopsies of bladder mucosa has revealed the full range of its

structural changes. It should be emphasized that while the heterogeneity of histology in each case, these changes are generally stereotyped and vary by frequency of their detection and depth of destruction. In women with "early menopausal bladder" inflammatory and degenerative changes, combined with hemodynamic disorders prevail. In mucosal biopsies of late menopausal women degenerative, metaplastic and sclerotic manifestations prevail.

**Outlooks** are the study of changes in the structural components of the bladder wall in women with early and late menopause at the submicroscopic level.

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