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ABOUT THE MORPHOLOGICAL PECULIARITIES OF THE GLANDS AND LYMPHOID STRUCTURES OF THE URINARY BLADDER IN THE POSTNATAL ONTOGENESIS

Resume. The glands and lymphoid structures of the urinary bladder are characterized by age, regionally, individuality, genitally peculiarities in the postnatal ontogenesis. At all stages of postnatal ontogenesis the quantity and density of glands and lymphoid structures in the lover part of a urinary bladder are more, than in upper and the middle parts. The quantity and morphometric indexes of glands and lymphoid structures in a sphincter more those near a sphincter. In the postnatal ontogenesis, the genital peculiarities of glands and lymphoid structures of organ discovered at teenage, youth and I mature ages. To these structures is characteristic also the age features. At the earliest stages of postnatal ontogenesis, i.e. in the newborns the glands of a urinary bladder have well formalized. The greatest development is noted in I mature age. After those periods – at elderly and senile ages are noted an involution of glands. Lymphoid structures as much as possible develop at early child's age. After this age, there is a morphological regress of a lymphoid tissue. Individually features characterize glands and lymphoid structures of the human urinary bladder. Their broad individual variability at mature, elderly and senile ages is established.

Key words: gland, lymphoid structures, morphology, human urinary bladder

Wall components of tubular and cavitated organs include small glands and lymphoid derivatives, along with internal nerve and veins [11, 13-14]. Information on the normal features of the wall structure of tubular organs allows us to think about the regularities of their pathomorphogenesis [14 - 15]. The results, reflecting the morphological features of the small glands and lymphoid derivatives on the walls of these organs are clinical importance, meeting the requirements of immunomorphology and morphological exocrinology. Macromicroscopic method (Sinelnikov and Hellman methods) is the most effective method for the study of small glands and lymphoid structures. Histological studies allow to determine the morphometric dimensions of the gland and lymphoid structures and their microtopographic, microscopic interactions [1-7, 12]. Postnatal ontogenesis has been carried out to investigate the glands and lymphoid structures of various tubular organs and their morphological regularities have been identified [1, 3, 4, 6-7, 9-10, 12, 16-17]. The results of our research on the glands and lymphoid structures of the urinary bladder wall revealed the unique morphological features of this organ [5, 18, 19]. It is known that the flow of the urinary glands ducts as an "entry gate" for the transfer of out from the urinary bladder into the depths of the wall and the internal environment of the body [11, 14, 15]. This is closely related to the properties of secretion heterogeneity, periodicity and involutility. The structure of the wall elements of the tubular organs is typical to the morphology of glands and lymphoid structures of the urinary bladder. The urinary bladder glands consist of one to six sections. They are histochemically complex alveolar glands with active secretory function. At all ages of postnatal ontogenesis alveolar sections of the glands are found in the mucous membrane of the urinary bladder. The ducts of alveolar parts is join with each other to form the flow of the alveolar section's and general gland ducts. The glands ducts forms the S-shape curvature and width - ampule. This increases the secretory activity in the ducts, creating favorable conditions for reabsorbtion and condensation [5, 21]. The urinary bladder glands are differentiate in localization - single and group, regular and unregularly distributed. In the last stages of postnatal ontogenesis, the glandular areas are not found in the upper parts of these organs. Hereditary programming or local atrophy or involution because of various diseases of the glands may cause these areas [21].

In all ages of postnatal ontogenesis, lymphoid nodules and diffuse lymphoid tissue are found on the wall of the urinary bladder. Lymphoid structures are also characterized by age, regionally,individuality, genitally peculiarities. These structures prevent the microorganisms and pathogenic creatures from leaking into the wall depths of the urinary bladder and eventually into the internal environment. Lymphoid nodules near the glands duct apparat and diffuse lymphoid tissue cells near the alveolar glandulocytes perform immune surveillance, guarding activities. Lymphoid nodules and diffuse lymphoid tissue have the same cellular structure as other peripheral organs of the immune system [14,15]. The lymphoid tissue contains small and medium lymphocytes, reticular cells, lymphoblasts, macrophages, plasmatic cells is determined. The reproductive centers have not mentioned in the lymphoid nodules. This is due to the poor antigen activity of urine in the internal environment. Only, on the elderly and senile ages in the upper part of urinary bladder, lymphoid nodules are not detectable or are episodic.

Another common features of the gland and lymphoid structures in the walls of human urinary bladder is a regionally peculiarities. Regardless of age, the quantity of glands and lymphoid structures increases in the lower part of the bladder [5, 18, 21]. During the same age of postnatal ontogenesis, the quantity of glands in the lower part of the bladder increases by 1.4-1.8 times compared to the upper part.

This feature applies to other dimensions as well. This feature is not accidental. It is associated with the microtopographic association of lymphoid tissue with the gland in the bladder wall and the potential for urogenic infections [15]. This feature is confirmed during the investigated of gland and lymphoid structures of other tubular organs [1, 3-4, 6-7, 9-10, 12, 16-17]. This is due to the location in the lower part of the urinary bladder the internal urethral sphincter, the right and left ureters sphincters. The sphincters of the cavitated organs are autonomous parts and participate in the removal of the need, the physiological discharge of the organ, and are involved in enhancing antireflux activity [2, 8, 14]. It is characterized by thickening of the circular muscle layer, contraction of the organ, increased nerve and vascular, microcirculation, glands and lymphoid tissues density [2, 8]. In the areas of the sphincter of the human urinary bladder, found "glandular ring" and near there are - lymphoid nodules [14]. This is morphological regularity characterized by an excess of the quantity and morphometric parameters of the glands and lymphoid structures in the area of the urinary bladder sphincters, relative to the sphincter trophic area. Thus, in the inner uretral sphincter the alveolar departments in the thickness 1.1-1.6, in the area 1.1-1.3 times increase. Area of alveolar parts in 1.2-1.5, area of general ducts in 1.1-1.5 times more observed. Similar changes are also detected in the area of the ureters sphincters. The right and left ureter sphincters have with the same structure principle.

In postnatal ontogenesis, the involution regularity in glands and lymphoid structures of the urinary bladder is typical. At birth, the urinary bladder already has a well-developed gland and lymphoid structures. Maximal development of the glands are found in 1st period of mature age and lymphoid structures in early childhood period. This is explained by the adaptation to living conditions at the intended age [12, 14, 18, 21]. In 1st period of mature age increase in the quantity of glandulocytes in the alveoli, expansion in the alveolar cavity and retention the secretory mass indicate maximum secretory activity in this period. The 2.4-fold expansion of the general duct gland shows the optimum performance of its transmission. The urinary bladder glands are subjected to age involution starting at an elderly age. Thus, in senile age compared with Ist period maturity age there is a 1.7-fold ($p < 0.05$) reduction in the quantity of alveoli of the glands of the urinary bladder. This is reflected in the reduction of the quantity of glandulocytes, the alveoli and area its cavity, and the increase in the percentage of stroma. This is reflected in the reduction of the quantity of alveols and of glandulocytes, and of area its cavity, and the increase in the percentage of stroma. The percentage of stroma in the alveolar departments in the 1st period of mature age is 14.7%, whereas in the senile age it is 19.6%.

This morphological characteristic of the glands in the wall of urinary bladder also applies to lymphoid structures. Thus, the maximum increase in quantity of lymphoid nodules and in cell of diffuse lymphoid tissue compared with newborns in early childhood is due to the general regularity of the immune system peripheral organs morphogenesis [13]. According to this reguliarity, after an early childhood period of postnatal ontogenesis found the involution of lymphoid tissues of the urinary bladder. In the senile age, lymphoid nodules no are noted in the upper and middle parts of the bladder, is accidentally discovered [21]. İn the senile age the lymphopoietic processes weaker compared with early childhood. This indicates the activation of destruction processes in lymphoid tissue during the last age of postnatal ontogenesis.

In postnatal ontogenesis, along with the quantitative and morphometric indications of the urinary bladder glands and lymphoid apparats, of their structures also have involution peculiarities. One of the involuntary features is the changes made in the duct of the glands during the old age. İn this age the quantity of gland ducts that produce diverticulum, ampule, and S-shaped curvature increases. In the senile age, the glands with ampule shaped ducts make up 45.9%. This is 1.5 times more than Ist mature age. Excess of these expansions in the elderly and senile ages contributes to the compensations function and of to stay longer secretory mass in the background of hyposection [14, 21]. In senile ages, lymphoid structures are also characterized by shape changes. In the 1/3 lower part of the urinary bladder are found triangular lymphoid nodules.

Other morphological regularities of the urinary bladder glands are detected in the genital characteristics. In these cases, the genital difference of glands is not found in newborns, early childhood and senile ages, but noted in reproductive stages of postnatal ontogenesis (adolescent, 1st period of mature age) is detected. Thus, the quantity of alveoli in adolescence increases in girls compared with boys by 1.3-1.5 times, and in 1st period mature age females during 1.4-1.6 time's compared with men. This is explain by the hormonal and the trophic effects of estrogen in the reproductive period [21, 22].

The subsequent regularity of the morphogenesis of the urinary bladder glands and lymphoid tissues is related to individual variability as in other tubular organs [4, 6, 7, 9]. Their broad individual variability at mature, elderly and senile ages is established. Exclusion of the minimum and maximum limits of individual variability of morphometric measurements is less in child's ages than the age of adulthood. If the minimum and maximum quantity of alveoli of the newborn range varies from 7 to 15, this indicator equal to 7-25 in old age. It depends on the pathology of the urinary bladder, the medication intake, the bad habits, and the quality content of the urine in the healthy person and the process of its decomposition.

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