

МЕДИЦИНСКИЕ НАУКИ

THE MACRO-MICROSCOPIC PECULIARITIES OF THE HUMAN URINARY BLADDER GLANDS

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ABSTRACT

Purpose of the investigation is to learn the morphological peculiarities (quantity parameters, age, individual and regional characteristics) of the glands of urinary bladder in the different age stages of the postnatal ontogenesis in the norm. A macro-microscopy method on total preparations of a wall of the bladder 54 received from corpses. Victims from the casual reasons at the age from the period newborn to senile age and we investigated variants of the form of a bladder glands, feature of its change in different sites of a wall of organ (proximal, average, distal thirds), taking into account age. Glands have preliminary been painted 0.05 % by a solution methylene dark blue with Sinelnicov's method. The glands were investigated with the application of stereomicroscopic-binocular microscope MBS-9. Statistical data processing included calculation of arithmetic-mean values, their errors, confidential intervals (excel). In quantity of the parameters of the urinary bladder, glands have individual changeability in the investigation. The boundary of variation of the parameters of the urinary bladder glands is rather wider in the maturity and senile stages. Connected with biological activity of the people in the definite degree, the quantity of the glands does not change in comparison with elderly period in old stage. In the stages of the first maturity and majority, the parameters of the measure and quantity of the urinary bladder glands in the women have difference from men. In this microscopic investigation, there is very important anatomical scientific information about the human urinary bladder glands that in the different stages, their quantity, age, form and regional changeability, proximal-distal gradient as well as other anatomical facts were established.

Keywords: human urinary bladder, gland, postnatal ontogenesis

INTRODUCTION

In the literature there have many information about macro-microscopically anatomy and structure features of the glands of the different tubular and caveated organs [1-6,9]. Books and monographs have been published about the morphological features of the glands [8, 10, 12, 13]. Scientific thoughts that are in the literature about morphology features of the urinary bladder glands carry character of short information mostly. In this aspect, results of the definite investigation are not exact mathematical count [3, 4, 13, 14]. Scientific information about morphological peculiarities of the urinary bladder glands in the

solution of problem will use from as normative criterion in the human in the theoretical (histology, pathological anatomy etc.) and practical medicine (urological etc.). The practical importance of the received data is defined by that bladder glands can be "anatomic base" developments like social problem, other diseases, cystitis, adenomas.

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MATERIAL AND METHODS

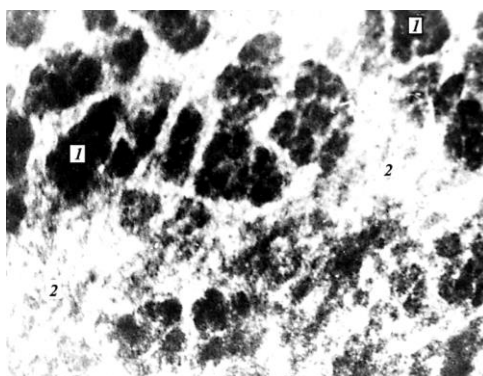


Fig.1. uneven gland arrangement the urinary bladder glands at the woman of 45 years. A middle third. 1 - the alveolar departments; 2 - the mucous membrane. Stained by method of DR Sinelnikov. Incr.x.25

With applying methods of research by a macro-microscopy on total preparations of the urinary bladder walls was received 78 from corpses, victims from the casual reasons (a trauma, an asphyxia, etc.) at the age from the period newborn to senile age. We investigated

the age, variants of the forms, the individuality, geniality, regionally features of glands of a urinary bladder. Regional features of its in different parts – proximal, middle, distal thirds of a wall of organ were investigated. Glands have preliminary been stained

0.05 % by a solution methylene dark blue with Sinelnikov's method and were investigated with the application of stereomicroscopic-binocular microscope MBS-9 (x 16). Statistical data, which was processing included calculation of arithmetic-mean values, their

errors, confidential intervals. When studying micro preparations for biometrics, IBM 486 SX33 computers were used with the help of the Morphologist application package, working in the Windows environment.

RESULTS AND THEIR DISCUSSION

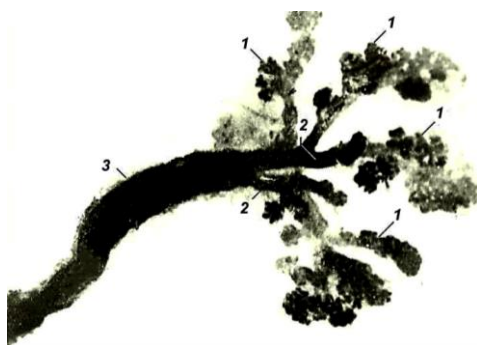


Fig.2. The glands of the urinary bladder at the woman of 22 years. A proximal third of the urinary bladder. 1 - the alveolar departments; 2 - 1st excretory ducts; 3 - a genital excretory duct. Stained by method of DR Sinelnikov. *Incr.x.35*

In investigation age, regional, localization, individual, involution, genital features of the glands in human urinary bladder were established. After coloring of glands methylene dark blue, the last take formed dark - black anatomic formations, well distinguishable against pink on color of a wall of a urinary bladder. The glands have clear contours. They can be concentrated when there are gaps between the glands that are smaller than the alveolar sections or lie unevenly (fig.1, 2). Glands in urinary bladder walls settle down in the form of short faltering quantity's (from 5-8 glands), focused mainly in proximity-distal a direction. They have roundish, oval, ribbon forms. The quantity of the urinary bladder glands in the 1st maturity stage a lot than in the newborn. As the general quantity of the urinary bladder glands in the 1st maturity stage equal $205,4 \pm 9,5$ and in the newborn $103,3 \pm 4,9$ (table). Obviously, the identified features are related "morphological equivalent functions" which is connected to maximum secretory activity of the gland in the 1st maturity stage of postnatal ontogenesis. This

age feature is characteristic of all parts of the urinary bladder wall. According to the authors, the maximum development of the glands of the mucous membranes of the predominant majority of hollow and tubular inner organs also occurs at 22-35 years of age, when their size, quantity and secretory activity are most pronounced [1-6, 10, 12, 14]. After 1st mature age periods at elderly and senile ages an involution of glands is noted. The density of the glands (diagram 1) in different ages of postnatal ontogenesis (the age peculiarities) and in different parts of the urinary bladder (the regionally peculiarities) difference. There are many density of the urinary bladder glands in the newborn from or 1st maturity stage. As the quantity of the glands in 1sm² area of the urinary bladder walls in the 1st maturity stage equal $5,5 \pm 0,5$ and in the newborn $12,6 \pm 0,5$. This is due to the new lifestyle of the newborn. This is because, during this period, the size of the organ is small and begins new living and nutritional conditions.

Table.

The quantity of the glands in different parts of the urinary bladder in the postnatal ontogenesis ($p < 0.05$)

Age	n	The parts of the urinary bladder, the quantity of the glands			
		proximal part	middle part	distal part	organ
Newborn	11	$24,1 \pm 1,4$ 18-32	$36,6 \pm 1,7$ 24-41	$42,2 \pm 1,8$ 29-47	$103,3 \pm 4,9$ 68-117
Baby	12	$28,8 \pm 1,7$ 22-39	$39,4 \pm 2,1$ 28-49	$46,8 \pm 1,8$ 34-52	$115,0 \pm 5,4$ 80-134
Early childhood	10	$32,6 \pm 1,6$ 26-41	$42,1 \pm 1,6$ 35-50	$52,4 \pm 2,2$ 43-60	$127,1 \pm 5,1$ 98-146
1 st childhood	11	$36,6 \pm 2,0$ 27-47	$47,8 \pm 2,1$ 38-54	$57,7 \pm 1,5$ 49-64	$142,1 \pm 5,3$ 107-160
2 nd childhood	11	$39,6 \pm 2,0$ 29-49	$52,2 \pm 2,1$ 38-59	$62,4 \pm 1,7$ 52-69	$154,2 \pm 5,2$ 118-170
Teenager	9	$42,2 \pm 2,0$ 32-49	$56,3 \pm 3,9$ 39-72	$69,9 \pm 2,7$ 56-79	$168,6 \pm 7,4$ 124-187
Youth	9	$48,8 \pm 2,9$ 34-59	$62,2 \pm 4,4$ 42-79	$74,2 \pm 4,9$ 45-87	$185,4 \pm 8,7$ 118-222

1 st maturity	12	52,9±4,7 37-89	68,6± 4,4 46-94	84,4± 5,3 46-104	205,4±9,5 125-273
2 st maturity	12	45,5±4,1 35-80	60,0±4,3 40-87	82,0±4,9 44-98	187,5±9,5 117-252
Old	12	40,0±3,8 23-65	56,7±3,9 29-72	80,0±4,8 35-88	176,7±9,6 89-222
Senile	11	36,0±2,3 20-43	50,0±4,6 24-70	73,2±4,2 38-80	159,2±8,8 84-185

Note:

- 1.n - the number of the observations;
- 2. $X \pm S_x$ – the middle arithmetic;
- 3.min-max – individual variability.

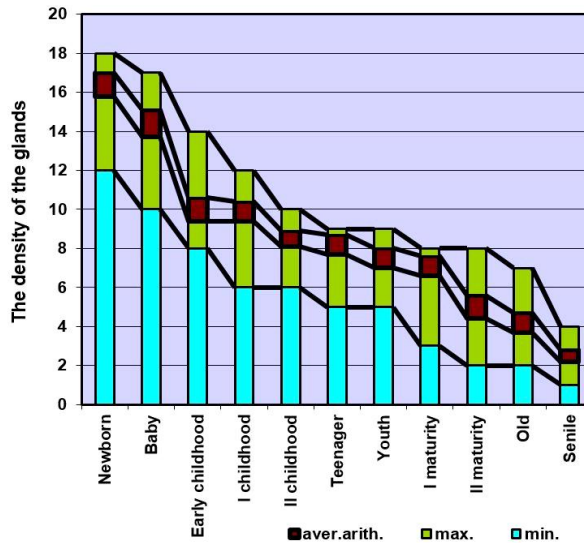


Diagram 1. The density of the glands in proximal part of the urinary bladder in different periods of the postnatal ontogenesis.

The density of glands in the walls of the urinary bladder characterized by regionally features. As, in all periods of postnatal ontogenesis the density of the urinary bladder glands in distal part is more than in proximal (diagram 1, 2). So, in the 1st maturity stage the quantity of the glands in sm² area of the proximal part of the urinary bladder equal 4.1+ 0.5 (2-7) and in distal part – 5,5+ 0,5 (3-8). The density of the urinary

bladder glands in proximal part of the newborn equal 10.0+ 0.4 (9-13) and in distal part – 12.6+ 0.5 (9-14). This is one of the urinary bladder glands regional feature. This is because in the distal part of organ sphincters are located. As you know, in sphincter zones of the tubular organs, nerves, vessels, glands and lymphoid structures are densely located [2, 7, 13, 14].

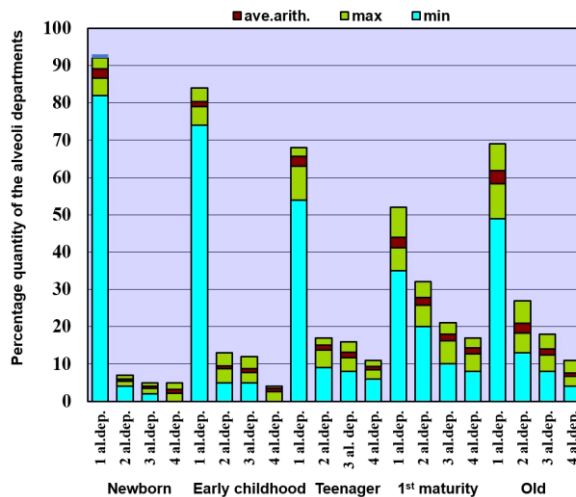


Diagram 2. The density of the glands in distal part of the urinary bladder in different periods of the postnatal ontogenesis.

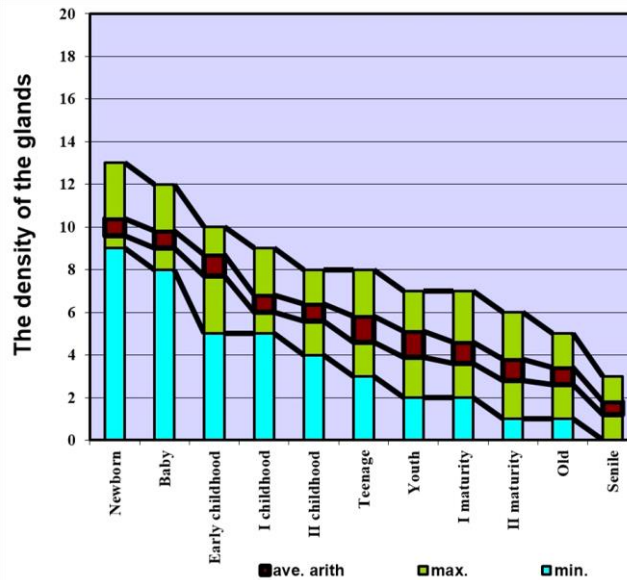


Diagram 3. The percentage quantity of the alveoli departments of the urinary bladder glands in different periods of the postnatal ontogenesis.

The gland has one or several initial secretory divisions – alveoli departments (fig.2). 1st excretory ducts begins from the alveolus. When they are connected, a general excretory duct is formed, which is directed to the integumentary epithelium, where it opens with foramen on the surface of the folds and between the folds. The connected alveoli formed the alveolar departments. Different forms of glands are distinguished depending on the quantity of alveolar departments. The forms of glands in different ages of postnatal ontogenesis are also different. So that, in 1st maturity stage has organized one alveolus department – 42,6 %, three - 17,1 %, four -13,5 % of the glands (diagram 3). This feature of the urinary bladder glands is characteristic feature of tubular organs [5, 6, 10, 12].

Thus the greatest variety of glands on quantity of alveoli departments is that glands mostly form difficult

and typically for 1st period of mature age when glands with three alveoli departments make 17.1 % which is authentic more than during all other periods. The maintenance of glands with four and more alveoli departments at this age, makes 13.5 % (from 8 to 17 % individually). At the same time, at newborn of such glands only 2.7 % (from 0 to 5), in the early childhood – 3.0 % (from 0 to 4), and at the senile age, in 1.9 times is less, in comparison with 1st period of mature age. It is necessary to notice that at people of 1st period of mature age percentage quantity of glands with one initial department (42.6 %) is minimum, that is essential less, in comparison as with newborn (in 2.1 times), and with senile age (in 1.4 times). This structure of the glands of the urinary bladder is typical to the morphology of small glands of tubular inner organs [10, 12].

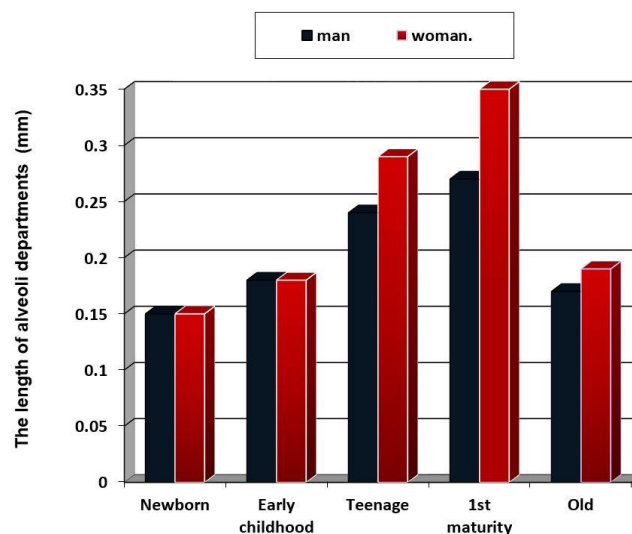


Diagram 4. The length (mm) of the alveoli departments of the urinary bladder glands in different periods of the postnatal ontogenesis.

This feature of the glands of urinary bladder walls in shape is also characterized by regionality, age and individuality features. As general quantity of alveoli and alveoli departments (with three, four and more initial departments) of the glands in the distal part is more than in proximal. The quantity of the parameters of the urinary bladder glands has individual and age changeability. The length and thickness of alveoli and alveoli department in 1st maturity stages of postnatal ontogenesis are maximal. The boundary of variation of the parameters of the urinary bladder glands is rather wider in the maturity and senile stages. Connected with biological activity of the people in the definite degree, the quantity of the glands does not change in comparison with elderly period in old stage.

Other morphological features of the glands of urinary bladder are detected in the genital peculiarities. In the teenager, 1st maturity and youth stages – in reproductive periods of postnatal ontogenesis the parameters of the measure and quantity of the urinary bladder glands in the women have difference from men. Thus, the quantity of alveoli and alveoli departments in teenage period of postnatal ontogenesis in girls 1.3-1.5 times more with boys, and in 1st mature age in females 1.4-1.6 times more with men (diagram 4). This is explaining by hormonal and the trophic effects of estrogens in the reproductive period of postnatal ontogenesis. According to the genital characteristics of the small glands of the walls of the tubular organs [1, 3, 12], in these periods the parameters of the glands in the women more from men.

CONCLUSION

The glands of the human urinary bladder glands are characterized macro-microscopic peculiarities:

1. The glands in the walls of the human urinary bladder in postnatal ontogenesis are characterized with the age features. In the 1st mature period of postnatal ontogenesis, the quantity of the urinary bladder glands, alveoli departments and their length, thickness increase. After 1st mature age periods at elderly and senile ages an involution of glands is noted.

2. The glands of the human urinary bladder in postnatal ontogenesis are characterized with the individual features. The individual minimum and maximum percentages of glands in the urinary bladder gradually increase from the newborn period to senile age.

3. Regional features characterize the glands in the wall of the human urinary bladder. Our studies have shown that the quantity and density of these glands are less in the upper third of the bladder wall than in the middle and lower third of all age groups in postnatal ontogenesis. This concerns the location sphincters in the lower third of the urinary bladder.

4. Genitally features characterize the glands of the human urinary bladder. In reproductive periods of postnatal ontogenesis, the parameters of the alveoli departments of urinary bladder glands in the women are more comparing to men.

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