THE GLANDS DUCTS OF THE HUMAN URINARY BLADDER AND THEIR MORPHOLOGICALY PECULIARITIES

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ABSTRACT

We have studied the peculiarities of ducts of the urinary bladder glands of human with macro-microscopic and micro-anatomical methods on 78 preparations. The urinary bladder were taken from corpses of people of different age (from newborn till to senile period), without a pathology of bodies to device urine-genital and were investigated by macro-microscopic methods the ducts of the glands after elective stained of 0.05% methylene blue by method of D.R. Sinelnikov. The micro preparations incisions of a urinary bladder wall in the thickness 5-7 microns were stained with hematoxylin-eosin, by Van-Gizon, Veygert and Kreyberg methods, selectively carried out CHIC reaction. At the junctions of ducts of the alveoli pats form general glands duct. In the ducts of the glands have close micro-topographical relations with lymphoid structures (lymphoid nodules and diffuse lymph tissue). The macro-microscopy and microanatomical parameters of the ducts of glands of the urinary bladder are characterized with the regional, age, localization, individual and genital features. After in mature age periods at elderly and senile ages an involution of glands duct apparatus was noted. In old and senile ages, the duct apparatus of glands of the urinary bladder forms an S-shaped bends, expansions, a diverticulum’s and ampoules. The structural indicators of the glands ducts apparatus increase from upper part to the lower parts of urinary bladder. In zones spheniccte a urinary bladder the increase the area of a gleam of an excretory ducts of glands observed.

INTRODUCTION

The structure of the glands in the walls of different inner organs, the laws of their morphogenesis have been studied in sufficient details [5-6,8-10]. In the literature, there are a large quantity of works devoted to age, field, regional and individual characteristics of the glands of tubular and hollow organs [1-3, 7]. They also have established the principles of the structure of the excretory ducts of the glandular apparatus. The ducts of the glands of the wall of the bladder and their age, regional and individual characteristics in the literature have not well been understood [4,11-12]. The excretory ducts of the glands located in the thickness of the wall of the inner organs, including the urinary ones, which can be the entrance gate for penetration into the interior of genetic foreign material. The latter are not always washed out during secretion, due to asynchrony of secretion. [8-9].These problems are especially important in elderly people, when urinary incontinence and other dysuric phenomena, cystitis become not only a medical, but also a social problem [4].

Purpose of the investigation

The aim of the investigation is to determine the morphological features of the excretory ducts of the human urinary bladder glands in different age periods of postnatal ontogenesis - from newborn to senile period, without a pathology to device genital.

MATERIAL AND METHODS

On 78 preparations of the bladder wall obtained from the corpses of people of different ages, we have studied the ductal apparatus of the glands, after staining with a 0.05% methylene blue solution by D.R. Sinelnikov,

The investigated material was divided into groups, according to the generally accepted scheme of age periodization. Urinary bladder ducts were examined in three (upper, middle, and lower) parts of the organ. 100% took the total quantity of the glands on the prepares. The percentage of glands with an S-shaped bend and an ampoule of the general excretory duct were calculated for each part of the bladder, calculating the arithmetic mean value. Using the ocular mesh, the area of the

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mounds of the glands excretory ducts was also studied. To obtain micropreparations of the bladder glands, sections with a thickness of 5-7 μm were stained with hematoxylin-eosin, according to van Gieson, Weigert, Kreiberg, selectively the SIR reaction. Morphometric processed data investigation and calculated the arithmetic mean values, their errors. When studying micropreparations for biometrics, IBM 486 SX33 computers were used with the help of the Morphologist application package, working in the Windows environment.

RESEARCH RESULTS AND DISCUSSION

After staining, the glands acquired a dark color and have clear contours. They count from one to seven alveolus departments’. The excretory duct of the first order departs from each department. 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 ducts of the glands have a rectilinear and arcuate direction, expanding towards the mouth of the glands ducts, especially in the elderly and senile age, an ampoule-shaped expansion, S-shaped bends and lateral diverticula (Fig. 1 A, B, C). The ducts of the glands are in close microtopographic relationships with lymphoid formations - lymphoid nodules without reproduction centers and diffuse lymphoid tissue. Lymphoid formations which are performing a protective function and surrounding the excretory ducts (Fig. 1D), and preventing the penetration of microorganisms and foreign antigens through them deep into the walls of the organ. Foreign antigens have not always washed away by secret. This is due to asynchrony and the presence of biorhythms in the secretory process [9].

The glands of the urinary bladder in a man 72 years old. The upper third. View from the integument epithelium. 1-single location of the gland; 2-group arrangement of glands; 3-S-shaped bend of the common excretory duct; 4-mouth of the common excretory duct; 5-intraorgan nerves. By R.D. Sinelnikov metod. Increase 30x.

Fig. 1 B. The gland with several alveolus departments in the walls of the urinary bladder in a 38-year-old woman. The upper third. View from the integument epithelium. 1-alveolus departments; 2- S-shaped bend of the common excretory duct. By R.D. Sinelnikov metod. Increase 35x.

Fig. 1 C. The gland with several alveolus departments in the walls of the urinary bladder in a 22-year-old woman. The upper third. View from the integument epithelium. 1-alveolus departments; 2-1st excretory duct; 3-common excretory duct. By R.D. Sinelnikov metod. Increase 35x.

Fig. 1 D. The alveoli parts and excretory ducts of the glands of the urinary bladder in a woman 75 years old. The micropreparation. The middle third. 1-glandulocyte; 2-contact surface of glandulocytes; 3-excretory ducts in a cross section; 4-stroma of the gland; 5-cavity of alveolus near the apical surfaces of glandulocytes; 6-excretory duct; 7- excretory duct epithelial cell. By van Giesons metod. Increase 450x.

In the mature period of postnatal ontogenesis, the quantity of secretory cells and the area of the alveoli increase, the proximal sections of the ductal apparatus of the glands expand. Obviously, the identified features are “morphological equivalent functions”, i.e. maximum secretory activity of the gland. Therefore, the expansion of its excretory duct (2.5 times, p <0.05) provides optimization of the drainage function of the gland. According to the authors, the maximum development of the glands of the mucous membranes of the predominant majority of hollow and tubular internal organs also occurs at 22-35 years of age, when their size, quantity and secretory activity are most pronounced [8.9]. But the mouth of the generally duct has a maximum area in old age. So according to the study, age-related features characterize the macroscopic and microanatomical parameters of the ducts of the glands of the bladder. The area of the mouth of the excretory duct throughout postnatal ontogenesis is constantly increasing, which is typical for other exocrine glands. This feature is characteristic of all parts of the urinary bladder wall. Thus, the area of the generally ducts of the glands in old age increases compared with newborns, in the upper and middle third of the wall by 4.2 (p <0.05), the distal third by 3.4 (p <0.05), and in general the urinary bladder 3.9 times (p <0.05, diagram 1).
The quantity of the glands with S-shaped bends is rather wider in the old and senile stages. In postnatal ontogenesis, in the lower third of the bladder compared with the upper third of the organ, the area of the mouth of the excretory ducts increases in 1.3-1.5 (p < 0.05), the percentage of glands with an ampoule-shaped duct expansion in 1.4 -1.6 times (p <0.05).

The morphometry parameters of a generally ducts of the urinary bladder glands are characterized with the individual features. The individually minimum and maximum quantity of the generally glands ducts with S-shaped bends, ampoules, and lateral blind diverticulum gradually increases. The boundary of variation of the parameters of the ducts with S-shaped bends, ampoules, and lateral blind diverticula of the urinary bladder glands is rather wider in the old and senile stages.

Table The quantity of glands with an ampoule-shaped duct expansion in different parts of human urinary bladder in postnatal ontogenesis ($X^2\pm S_x$; min-max, in %)

<table>
<thead>
<tr>
<th>Age</th>
<th>n</th>
<th>Upper third</th>
<th>Middle third</th>
<th>Lower third</th>
<th>Urinary bladder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newborn</td>
<td>9</td>
<td>3,20 ±0,3</td>
<td>2,24 ±0,2</td>
<td>3,28 ±0,2</td>
<td>3,30 ±0,2</td>
</tr>
<tr>
<td>Baby</td>
<td>8</td>
<td>2,0 ±0,2</td>
<td>0,0 ±0,2</td>
<td>2,8 ±0,2</td>
<td>2,0 ±0,2</td>
</tr>
<tr>
<td>Early childhood</td>
<td>8</td>
<td>2,5 ±0,2</td>
<td>2,0 ±0,2</td>
<td>2,0 ±0,2</td>
<td>2,0 ±0,2</td>
</tr>
<tr>
<td>I childhood</td>
<td>7</td>
<td>3,4 ±0,4</td>
<td>2,8 ±0,4</td>
<td>2,8 ±0,4</td>
<td>3,4 ±0,4</td>
</tr>
<tr>
<td>II childhood</td>
<td>7</td>
<td>2,8 ±0,4</td>
<td>2,2 ±0,4</td>
<td>2,4 ±0,4</td>
<td>2,8 ±0,4</td>
</tr>
<tr>
<td>Teenager</td>
<td>7</td>
<td>6,5 ±0,8</td>
<td>5,5 ±0,8</td>
<td>4,5 ±0,8</td>
<td>6,5 ±0,8</td>
</tr>
<tr>
<td>Youth</td>
<td>7</td>
<td>6,7 ±0,8</td>
<td>5,7 ±0,8</td>
<td>5,7 ±0,8</td>
<td>5,7 ±0,8</td>
</tr>
<tr>
<td>I maturity</td>
<td>7</td>
<td>2,5 ±0,2</td>
<td>1,9 ±0,2</td>
<td>1,5 ±0,2</td>
<td>1,5 ±0,2</td>
</tr>
<tr>
<td>II maturity</td>
<td>8</td>
<td>28,9 ±2,2</td>
<td>32,0 ±2,4</td>
<td>26,0 ±2,4</td>
<td>28,9 ±2,2</td>
</tr>
<tr>
<td>Old</td>
<td>8</td>
<td>36,2 ±2,3</td>
<td>42,3 ±2,1</td>
<td>27,8 ±2,0</td>
<td>40,1 ±3,7</td>
</tr>
<tr>
<td>Senile</td>
<td>9</td>
<td>35,6 ±2,1</td>
<td>45,7 ±2,9</td>
<td>56,3 ±3,7</td>
<td>45,9 ±2,9</td>
</tr>
</tbody>
</table>

Note:
1. n - the number of the observations;
2. $X^2\pm S_x$ – the arithmetic mean;
3. min-max – individual variability;
4. % - the quantity of glands in preparation.

CONCLUSION
The macro-microscopy and microanatomy parameters of ducts of the human urinary bladder glands in postnatal ontogenesis are characterized with the age, regional, individual features. After in mature age periods and at elderly and senile ages an involution of the ducts of glands in organ was noted. In these age periods of postnatal ontogenesis, the ducts of the urinary bladder glands are characterized by the formation of extensions, S-shaped bends, diverticula and ampoules. The structural indicators of the ducts apparatus of the glands with extensions, S-shaped bends, diverticula and ampoules increase from upper part to the lower parts of organ and in sphincters zones. The individually minimum and maximum the quantity of the generally glands ducts with S-shaped bends and ampoules in urinary bladder in elderly and senile agesmore diverge.

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