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Age and Regional Features of the Glands of the Vaginal Vestibule

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Abstract

Aim: The purpose of the study is to obtain data on the age and regional variability of small glands of the vestibule.

Material and methods: Macromicroscopic and histological methods are used to study the glands of the vaginal vestibule in 72 women of different ages who died from incompatible injuries and asphyxia, without the pathology of the urinary and genital organs. On the total preparations of the vaginal vestibule the glands were stained by the method of Sinelnikov. On microscopic preparations, sections 5-7 μm thick were stained with hematoxylin-eosin and Van Gieson.

Results of the research: The results of the study showed that the glands of the vestibule are completely formed by the time a child is born. Starting from the neonatal period and up to the first period of adulthood, the glandular apparatus actively develops. Beginning from the second period of adulthood to the senile age, involutive changes of glands occur. The presence of a gradient of quantitative-dimensional parameters of glands of the vaginal vestibule, which increase in the anterior-posterior direction, was revealed.

Conclusions: On total preparations small glands of the vestibule are defined as black (dark blue) anatomical formations located on a lighter background of surrounding tissues. Small glands of the vestibule are completely formed by the time of the birth of the child. Beginning with the period of the newborn and up to the first period of adulthood, the glandular apparatus of the vestibular vestibule develops actively. Beginning with the second period of adulthood and until the senile age, involutive changes occur in small glands. The presence of a gradient of the quantitative-size parameters of small glands of the vaginal vestibule, which change in the front-rear direction - from the pubis to the anus.

Keywords: The vaginal vestibule; Small glands; Postnatal ontogenesis; Total preparation of glands

Introduction

Unfortunately enough attention isn't given to multicellular glands of the vaginal vestibule in the scientific literature. There is only one study of macromicroscopic method of small glands of the vestibule in the scientific literature. This study was carried out in the middle of the XX century and had an exclusively descriptive character [1-5]. Thus, from the morphological standpoint the small glands of the vestibule remain completely unexplored. Considering the significant physiological protective role of these glands in maintaining normal vaginal microbiocenosis and regulating sexual behavior [6-11] and the high level of benign and malignant pathology of the vulva [8,12-14], this deficiency requires correction.

Data on age-related structural transformations of small glands of the vestibule and their regional (local) variability throughout the walls of the organ are lacking in the scientific literature.

The aim of the study is to obtain data on the age and regional variability of small glands of the vestibule.

Material and Methods

Macro microscopic and histological methods were used to study the glands of the vaginal vestibule in 72 women of different ages who died from incompatible injuries and asphyxia, without the pathology of the urinary and genital organs. The actual material of the research was recruited in the morgues of the Union of Forensic Medicine and Pathological Anatomy of the Ministry of Health of the Republic of Azerbaijan and the Department of Human Anatomy of the Azerbaijan Medical University.

When working with sectional material, the requirements of the Federal Law of 12.01.1996 No. 8-ФЗ "On Burial and Funeral Affairs" are taken into account.

The material was received in the autumn-winter period, not later than 15 hours after death. On the total preparations of the vaginal vestibule by macro-microscopy, the glands were stained in a 0.5% solution of acetic acid (Scientific and Production Association "Alternativa", Russia) with 0,05% solution of methylene blue ("Samaramedprom" OJSC, Russia) in tap water the method of Sinelnikov) [7]. The stain was carried out at room temperature for 24-36 hours. At the end of staining, total preparations were placed to fix for 24 hours in a saturated solution of ammonium molybdate ("Rare Metals Plant", Russia).

In addition, microanatomy of the glands were studied on microscopic preparations. After the separation of the vestibule from the surrounding structures was fixed in 10% neutral formalin. From the middle of the anterior, middle, posterior third of the organ wall, longitudinal pieces were cut out. Thus, pieces measuring 1.5 × 0.5 cm were obtained. Fixed pieces after alcohol treatment were poured into paraffin.

Sections 5-7 microns thick were stained with hematoxylin-eosin ("Kedi", China) and Van Gieson. In the Van Gieson, iron hematoxylin Weygert and an acidic mixture of picrofuxine ("Thermo Fisher Scientific", Russia) were used.

The resulting micropreparations were photographed under the same conditions and regimes in the light-optical microscope "MicroOptix" (Germany) with the mounted video system of the image "Topica TP1002DS".

While working on the pictures, a specialized vector program "Canvas" for Windows 7 was used. The digital data obtained during the study were subjected to statistical processing. At the same time, general recommendations for medical and biological research were observed.

The average values of the received samples (M), standard errors (m), minimum (min), maximum (max) values of the series are calculated. A comparison was made between the groups (P), sequentially within the group (P0), within the group with the first parameter (P1), within the group with the maximum (P2).

For the preliminary estimation of the difference between the variational series, the t-Student's parametric criterion was used. Further, to compare and determine the reliability of quantitative differences in groups and subgroups, the non-parametric rank U criterion of Wilcoxon (Mann-Whitney) [1].

Results of the Research

On total preparations after staining with methylene blue, the small glands of the vestibule are defined as black (dark blue) anatomical formations located on a lighter (usually light pink) background of surrounding tissues.

In neonatal girls in the vaginal vestibule walls there are on the average 54 ± 1.74 glands (from 41 to 62 individually). The density of the location of the glands (their number on the area of 0.5 sq. cm body wall) at this age is the maximum during postnatal ontogenesis (on average 3.7 ± 0.17).

The length of the initial section of the glands at this age averaged 0.19 ± 0.01 mm, the width on the average - 0.16 ± 0.01 mm, the area of the initial department (on the transverse section of the wall of the vestibule) on the average - 400.2 ± 18.3.

Size-quantitative indicators of small glands of the vestibule from the neonatal period to the first period of adulthood are constantly increasing. In comparison with newborn girls, at the age of 22-35 years the total number of glands increases 2.8 times ($p<0.05$), the length of the initial department - 3.7 times ($p<0.05$), its width - in 3.5 times ($p<0.05$), the area of the initial department (on the cut) - 2.2 times ($p<0.05$).

Compared with the 1st period of adulthood, in the senile period of ontogenesis, the total number of small glands of the vestibule decreases by a factor of 1.7 ($p<0.05$), the density of the gland is 2.4 times ($p<0.01$), the length of the initial section of the gland is 1.6 times ($p<0.05$), width is 1.4 times ($p<0.01$), the area of the initial section on the cut is 1.4 times ($p<0.05$).

The maximum and minimum individual lengths of the initial department of small glands of the vestibule in newborn girls differ 1.3 times, and at the age of 22-35 years - 1.7 times; width of the initial department, respectively, 1.6 and 1.8 times; the diameter of the total excretory duct is 1.4 and 1.9 times, and so on.

In the posterior third of the vestibule wall, compared with the anterior third, the total number of small glands, depending on age, increases 1.6-2.2 times ($p<0.05$), the glandular density is 1.2-2.1 fold, the length and width of the initial section of the glands 1.8-2.4 times ($p<0.05$), the thickness of the initial section 1.2-2.2 times ($p<0.01$), the area of the primary department - in 1.3-1.5 times, the number of initial parts in the initial department - in 1.4-1.8 times ($p <0,05$), the area of the initial part and the area of the cavity of the initial part (on the cut) – 1.2-1.4 times ($p <0.01$).

Discussion of the Received Data

According to our data, the small glands of the vestibule have a structure typical for the glands of the mucous membranes of internal organs [3,9,11]. The analysis showed that the small glands of the vestibule are fully formed by the time the child is born.

Beginning with the neonatal period and up to the first period of adulthood (22-35 years), the glandular apparatus of the vaginal vestibule develops actively. Maximal development of the glandular apparatus of the vestibule is on the 22-35-year-old age, which is typical for glands of the predominant majority of the mucous membranes of the hollow organs of the urinary and genital, respiratory and digestive systems [4]. Beginning with the second period of adulthood and until the senile age, involuntary changes occur in the small glands of the vestibule.

All these signs are the morphological equivalent of reducing the secretory activity of the glandular apparatus [6].

With age, the duct apparatus of the glands undergoes significant changes. The excretory ducts expand substantially. The percentage of glands increases, in the course of the common excretory, an ampoule-like extension is determined.

It is believed that the presence of such extensions is a compensatory mechanism for the accumulation of secretion (in conditions of age-related hypoxecretion of the gland) with possible one-stage elimination of it if necessary. On the other hand, in the area of ampullar expansions, conditions are created for the stagnation of the secret and its infection [4].

The number and size of the glands, their shape are individually variable; the level of variability (the amplitude of the variational series of size indices) predominantly increases during postnatal ontogeny to reproductive age. A significant individual variability of the shape and size of the glands of the mucous membranes of hollow internal organs is one of the patterns of their morphogenesis [4,6].

We first discovered the presence of a gradient in the quantitative-size parameters of small glands of the vestibule, which change (increase) in the anterior-posterior direction - from the pubis to the anus. This pattern is observed throughout the entire period of postnatal ontogeny.

The presence of an anterior-posterior gradient increase in the "glandular massif", reflecting the unidirectional increase in the secretory activity of the glands, can be explained by the high probability of infection of the vestibule (rectal microflora); It is known that the secret of glands possesses bactericidal and bacteriostatic activity [6]. It should be noted that the gradient change in the size-quantitative parameters of the glands of the mucous membranes is typical for other internal organs [2,3,10].

Thus, the analysis made it possible to prove the presence of distinct age and regional structural features of the glandular apparatus of the vaginal vestibule, which is important both from the theoretical and from the applied point of view.

Conclusions

- On total preparations small glands of the vestibule are defined as black (dark blue) anatomical formations located on a lighter (usually light pink) background of surrounding tissues.
- Small glands of the vestibule are completely formed by the time of the birth of the child. Beginning with the period of the newborn and up to the first period of adulthood, the glandular apparatus of the vestibular vestibule develops actively. Beginning with the second period of adulthood and until the senile age, involutive changes occur in small glands.
- The presence of a gradient of the quantitative-size parameters of small glands of the vaginal vestibule, which change (increase) in the front-rear direction - from the pubis to the anus.

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