

PECULIAR FEATURES OF THE GLANDULAR FORMATIONS OF THE PROSTATE GLANDS IN HUMAN FETUSES

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ОСОБЛИВОСТІ БУДОВИ ЗАЛОЗИСТИХ УТВОРЕНЬ ПЕРЕДМІХУРОВОЇ ЗАЛОЗИ У ПЛОДІВ ЛЮДИНИ

Резюме. Упродовж плодового періоду онтогенезу в розвитку залозистих утворень передміхурової залози спостерігаються стадії інтенсивного (середина 5-го, 8-й і 10-й місяці) та сповільненого (з кінця 5-го до початку 8-го місяців) їх формування. У плодів різних вікових груп краще розвинуті залозисті утворення, які відкриваються в передміхурову частину сечівника нижче сім'явипорскувальних проток. Залозисті утворення, що розгалужуються в товщі бічних відділів задньої стінки передміхурової частини сечівника, становлять основну масу і найбільшу чисельність залоз передміхурової залози.

Ключові слова: передміхурова залоза, плід, анатомія, людина.

Separate researches deal with the morphogenesis of the prostate gland (PG) during the prenatal period of human ontogenesis [1-4]. The PG is an optimal organ for a study of interstitial interactions since the parenchyma and stroma of the gland have a diverse embryonal origin.

O.V.Prokopiuk [5] singles out three periods in the PG development: 1) the glandular anlage (8-12 weeks); 2) form-building (up to 25-27 weeks); 3) the period of the initially formed PG (from 28-29 weeks till birth). At the stage of the form-building an increase of the number and sizes of the glands is observed along the periphery of the organ. The processes of the PG morphogenesis are stipulated by stromal-epithelial interactions and define the formation and functioning of the gland at different stages of ontogenesis [6]. However, no sufficient attention has been paid to the specific characteristics of the structure of the PG formations during the human fetal period.

The object of the research. To study the peculiar features of the microscopic anatomy of the PG in fetuses of various age groups.

Material and methods. The study was carried out on 27 series of PG histologic sections of fetuses aged 4-10 months – 81.0-375.0 mm of the parietococcygeal length (PCL) prepared in three planes. The preparations were stained totally with boric carmine, hematoxylin and eosin, selectively – with Bismark brown, Lyon blue and picrofuchsin.

The results of the research and their discussion. It has been established after a microscopic examination of the PG in a fetus of 85.0 mm of PCL that the glandular formations of the organ remind of tubules located densely, predominantly, in the areas of the posterior and lateral walls of the urethra. The anterior group of the PG formations is represented by cellular bands where interrupted lumens are detected. The excretory ducts of the PG glandular formations open predominantly along the course of the lateral walls of the urethra.

At the end of the 4th month of the intrauterine development the length of the excretory ducts of the PG increases intensively, opening predominantly in the region of the posterior wall of the urethra. It should be noted that

less developed glandular formations are to be found within the limits of the PG apex as evidenced by a lesser degree of their ramifications compared to the base of the organ. The glandular germs of the anterior wall of the prostatic part of the urethra (the front group of the PG) are located separately from other glandular elements, having predominantly a horizontal or ascending direction.

The glandular structures of the anterior PG group are distinguished by insignificant sizes in comparison with other groups. Their length throughout the fetal period made up 280-450 μm , only some of them reached 0.9-1.6 mm. It should be noted that in isolated cases (fetuses measuring 280.0, 315.0, 350.0, 358.0 and 365.0 mm PCL) the glandular formations, opening on the anterior wall of the urethra, are better developed in the fetuses of the last month of the development than during the period of their intensive development (the 5th month). Their glandular passages were located almost over the entire thickness of the lower part of the anterior wall of the urethra.

An intensive development of the PG formations occurs in 5-month old fetuses (fig. 1), their total number is the greatest at this stage and makes up 83-102. From the end of the 5th month till the beginning of the 8th month of

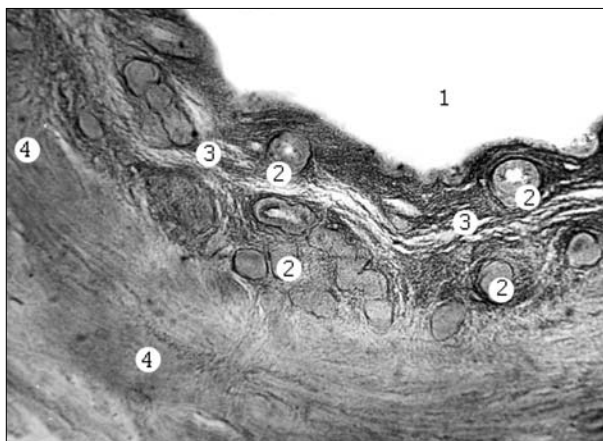


Fig. 1. A horizontal section of the lateral wall of the prostatic part of the lateral wall of the prostatic part of the urethra of a fetus – 145.0 mm of the PCL. A microscopic specimen. Staining with hamatoxylin and eosin. Obj. 8, oc. 10: 1 – the urethral lumen; 2 – glandular formations; 3 – the muscular layer of the urethral wall; 4 – connective tissue fibers.

the intrauterine development a slowing-down of the process of the formation of the glandular elements of the organ is marked. The glandular formations located in the thickness of the lateral walls of the prostatic parts of the urethra are largely represented by glandular passages that arise from the epithelium of the lateral urethral grooves. Some of them take on the form of tubules which open into the prostatic part of the urethra immediately on the lateral walls. Their number varies from 2 to 25. Interestingly that the number of the glandular formations of the lateral walls does not essentially change as the age of a fetus progresses, the signs of their reduction are absent. Throughout the fetal period one can notice enlargements of their dimensions and formations of ramifications that preserve the form of cellular bands without lumens almost all along their length. Insignificant individual variations of their number in fetuses of different age groups are also detected. The difference between their quantity on the right and on the left made up 1-2 in almost 50 % of the cases, in the rest of observations – 3-5 and in one case (a fetus measuring 348 mm PCL) – 6.

The number of glandular formations that open in the depth of both the right and left lateral grooves of the urethra in fetuses of different age groups varies from 1 to 12.

The glandular formations of the lateral walls of the prostatic part of the urethra are structurally similar to the anterior and posterior groups of glands. The proximal areas of the glandular formations, opening on the lateral walls of the urethra, assume the form of straight or laterally curved tubules, whereas their distal portions assume a convoluted form. Some of them make for in an ascending direction, along the major part of their extent without a lumen, giving off a small number of ramifications.

The most numerous ones are the glandular formations that branch off in the thickness of the lateral portions of the anterior wall of the prostatic part of the urethra. At the beginning of the 5th month their number is the highest

(43-51). During further stages of the development the number of glandular formations that open on the posterior wall of the prostatic part of the urethra makes up 35-41, i.e. as the fetus grows no increase of their number is observed.

At the end of the 7th month (fetuses measuring 260-270 mm of the PCL) the total number of the PG formations makes up 65-73. The glandular formations contained in the thickness of the urethral lateral walls are largely represented by glandular passages, arising from the epithelium of the lateral urethral grooves. A diminution of the measurements of the glandular formations, as well as their reduction are observed at this stage. The number of the glandular formations of the urethral wall equals 11-14. A process of transformation of the glandular passages into tubular ones intended to be the excretory ducts of the PG is observed in the fetuses of this age group. The glandular PG passages are lined with the laminated cubical epithelium.

At the end of the fetal period of the development (fetuses measuring 350.0-370.0 mm of the PCL) the number of the PG glandular formations makes up 70-85. The glandular formations that open on the posterior and lateral walls of the prostatic part of the urethra, makes up the major mass and the greatest number of the PG glands, just as at the previous stages. Their number in the thickness of the posterior wall of the urethra constitutes 37-43, in the thickness of the lateral wall – 14-35. 10-15 glandular formations open on the anterior wall of the prostatic part of the urethra. The glandular formations that are to be formed within the limits of the PG apex have largely a horizontal and ascending direction, penetrate into the external muscular layer of the wall, localizing among individual fascicles [fig.2]. The glandular formations of the anterior PG group embrace almost the entire thickness of the lower part of the wall in individual fetuses.

The glands of the posterior group are distributed irregularly differently developed. The glandular formations, opening into the prostatic part of the urethra below the ejaculatory

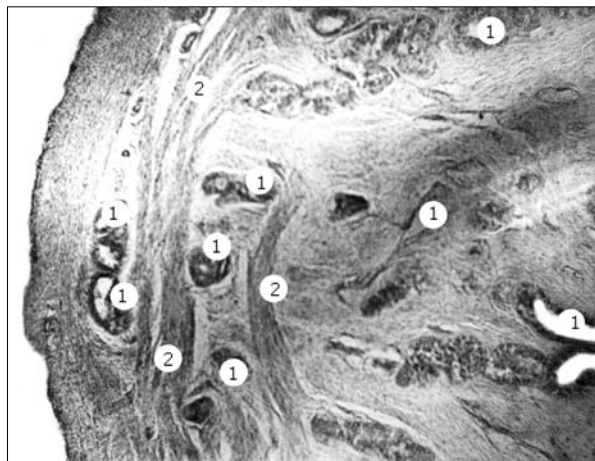


Fig. 2. A horizontal section of the lateral wall of the anterior wall of the prostatic part of the urethra of a fetus – 375.0 mm PCL. An area of the apex of the prostate gland. A microscopic specimen. Staining with hematoxylin and eosin. Obj. 8, oc. 7: 1 – glandular formations of the prostate gland; 2 – smooth muscular fascicles of the anterior wall of the prostatic part of the urethra.

ducts are better developed than those opening above. The glandular formations located in the region of the PG base between the prostatic saccule and the ejaculatory ducts at the back, the prostatic part of the urethra (in front) and the urinary bladder (above) are somewhat isolated. This group of glandular formations is represented by the glandular passages which open into the urethra above the ostia of the ejaculatory ducts.

Conclusions. 1. Stages of an intensive formation (the middle of the 5th, the 8th and 10th month) and a retarded one (from the end of the 5th up to the beginning of the 8th months) are observed in the development of the fetal period of ontogenesis. 2. The glandular formations of the prostate gland opening into the prostatic part of the urethra below the ejaculatory ducts are better developed in fetuses. The glandular formations ramifying in the thickness of the lateral portions of the posterior wall of the prostatic part of the urethra are the most numerous ones.

Prospects of scientific inquiry. It is important to investigate quantitative changes of the glandular formations of the prostatic gland in the fetal period of human ontogenesis.

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ОСОБЕННОСТИ СТРОЕНИЯ ЖЕЛЕЗИСТЫХ СТРУКТУР ПРЕДСТАТЕЛЬНОЙ ЖЕЛЕЗЫ У ПЛОДОВ ЧЕЛОВЕКА

Резюме. В развитии железистых образований предстательной железы в течение плодного периода онтогенеза установлены стадии интенсивного (середина 5-го, 8-й и 10-й месяцы) и замедленного (с конца 5-го до начала 8-го месяца) их формирования. У плодов разных возрастных групп лучше развиты железистые образования, которые открываются в предстательную часть мочеиспускательного канала ниже семяизвергающих протоков. Железистые образования, которые разветвляются в толще боковых отделов задней стенки предстательной части мочеиспускательного канала, составляют основную массу и наибольшую численность желез предстательной железы.

Ключевые слова: предстательная железа, плод, анатомия, человек.

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Abstract. Throughout the fetal period of ontogenesis stages of their intensive (the middle of the 5th, 8th and 10th month) and slowed down (from the end of the 5th up to the beginning of the 8th months) of their formation are observed in the development of glandular formations. The glandular formations opening into the prostatic part of the urethra below the ejaculatory ducts are better developed in fetuses of different age groups. The glandular formations, ramifying in the thickness of the lateral portions of the posterior wall of the prostatic part of the urethra make up the major mass and the largest number of the glands of the prostate gland.

Key words: prostate gland, fetus, anatomy, human.

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