© Khmara T.V., Hulyk R.P.

UDC 611.637+611.617] 018

MICROSCOPIC ANATOMY OF THE PROSTATE GLAND AND URETHRA IN FETUSES AGED 6 MONTHS

T.V.Khmara, R.P.Hulyk

Department of Human Anatomy (Head – Prof. B.G.Makar) of Bukovinian State Medical University, City of Chernivtsi

МІКРОСКОПІЧНА АНАТОМІЯ ПЕРЕДМІХУРОВОЇ ЗАЛОЗИ ТА СЕЧІВНИКА У ПЛОДІВ 6 МІСЯЦІВ

Резюме. Мікроскопічна анатомія передміхурової залози та сечівника вивчена на 17 трупах 6-місячних плодів. Встановлено збільшення кількості залозистих утворень передміхурової залози на початку 6-го місяця і зменшення наприкінці 6-го місяця. Їхні вивідні протоки переважно відкриваються нижче передміхурового мішечка.

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

An early detection and treatment of congenital malformations of the genital organs are among the most important tasks of neonatal and children's andrology [1]. There occur findings in bibliographical sources [2-5], concerning congenital anomalies of the prostate gland (PG) and urethra (atrophy, aplasia and hypoplasia of the gland; valves, diverticula, urethrostenosis, obstructive urethral stricture or urethral duplication, hypertrophy of the seminal colliculus, hypospadiasis, epispadiasis etc.). According to the findings of T.B. Сорокман та ін. [6], hypospadiasis ranks first among congenital malformations of the urinogenital system (38-42 %) in newborn infants of the Chernivtsi region. A considerable extent and a comparatively small diameter of the male urethra create objective difficulties, when treating urethrites [7]. A study of the macromicroscopic structure of the organs is regarded topical and promising from the point of view of substantiating microsurgical technologies.

The object of the research. To study the specific characteristics of the microscopic anatomy of the PG and urethra in fetuses aged 6 months.

Material and methods. *The research has been carried out on 17 series of histologic sections of the PG, urethra and the penis of 6 month old fetuses – 186.0-230.0 mm of the parietococcygeal length (PCL) prepared in three planes. The specimens were stained with boric carmine, hematoxylin and eosin.*

Results of the research and their discussion. Connective tissue fibers and muscular fascicles delimit the PG elements and their ramifications in fetuses 190.0-215.0 mm of the PCL. The majority of the glandular formations open into the prostatic part of the urethra, immediately below the prostatic utricle and distal portions of the ejaculatory ducts. The proximal portions of the glandular passages of the posterior PG group are in the shape of tubular formations with a diameter 50-70 μm lined with the laminated cubic epithelium. The process of cavitary formations and the character of the ramifications of the glandular passages is diverse in the groups of the glands of the PG. The glandular passages that open on the seminal hillock above the ostia of the ejaculatory ducts, have smaller sizes and a smaller number of ramifications than the passages located below the ostia of the ejaculatory ducts. The total number of the glandular formations of PG makes up 63-77. The total number of

glandular elements in the thickness of the urethral posterior wall varies from 34 to 38, in the thickness of the lateral walls – within the limits of 19-24, the number of the glands of the anterior wall of the urethra makes up 10-15.

The prostatic portion of the urethra assumes the form of a "maple leaf" on cross sections in fetuses measuring 205.0-215.0 mm of the PCL (Fig. 1). The lumen of the prostatic portion of the urethra is lined by the stratified transitional epithelium. The muscular layer of the prostatic portion of the urethra is well-marked and consists of two layers: internal longitudinal and external circular. The mucous tunic of the spongy part of the urethra is represented by primarily stratified squamous epithelium (Fig. 2). Longitudinal plicae of the mucous tunic are revealed along the entire length of the spongy portion of the urethra. The transverse folds of the mucous tunic, restricting the urethral lacunes, are revealed in the region of the superior wall of the urethral spongy portion. At a different distance from the lumen of the spongy part of the urethra the urethral glands are situated – simple, unramified, alveolar-tubular. The epithelium of the secretory sections of the urethral glands is reprerented by high prismatic cells. It should be noted that there occurs a gradual thinning of the layers of the muscular tunic and only single fascicles of smooth muscular cells at the point of the transition of the intermediate (membranous) part of the urethra into its spongy part.

The histologic PG sections of fetuses, measuring 216.0-230.0 mm of the PCL reveal longitudinal, circular and spiral-like smooth muscular fibers that together with the connective tissue form its musculoelastic stroma. A denser arrangement of the muscular fibers is observed in the thickness of the anterior wall of the urethra. In the upper and middle portions of the anterior wall of the urethra the muscular fibers are clearly demarcated from the connective tissue layer, whereas in the region of the lower portion of the wall they penetrate into the thickness of the latter in the form of individual muscular fascicles, they are located partially among the glandular elements of the anterior group.

The total number of glandular formations of PG makes up 55-68 in fetuses – 220.0-230.0 mm of the PCL. The majority of them open on the posterior (28-35) and anterior (11-17) walls of the prostatic part of the urethra. The number of the glandular formations that open on the lateral walls of the urethra makes up 11-14. The proximal parts of the glandular formations assume the form of a straight or laterally curved tube, whereas their distal portions in the lateral walls of the urethra have a twisting duct, some of them making their way in an ascending direction, having no lumen along the larger extent of their length, giving off a small number of branches. The glandular formations of the urethral wall have a horizontal or ascending direction and insignificant dimensions. The proximal portions of the glandular formations of the urethral anterior wall are located

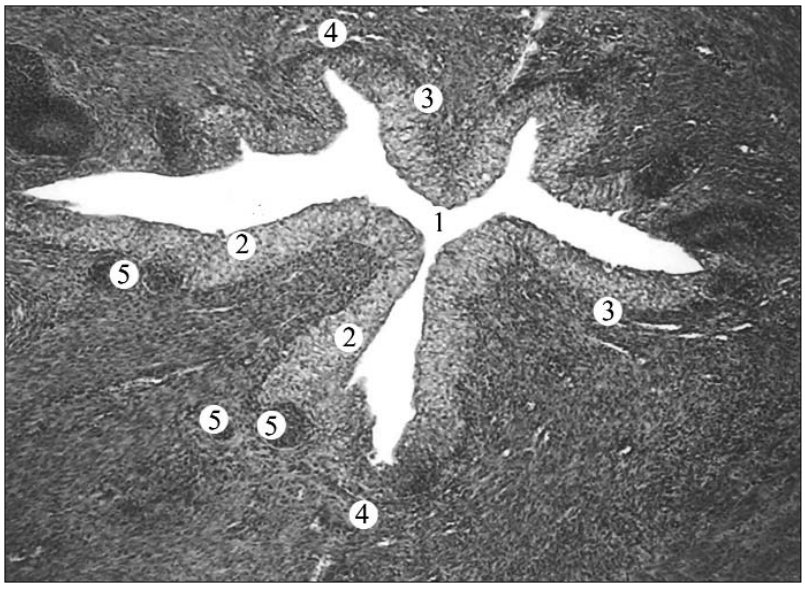

Fig. 1. A cross section of the prostatic part of the urethra of a fetus – 205.0 mm of the PCL. Staining with hematoxylin and eosin. A microscopic specimen. Ob. 3.5, oc. 10: 1 – the urethral lumen; 2 – the mucous tunic; 3 – the internal longitudinal layer of the muscular membrane; 4 – the external circular layer of the muscular coat; 5 – the urethral glands.

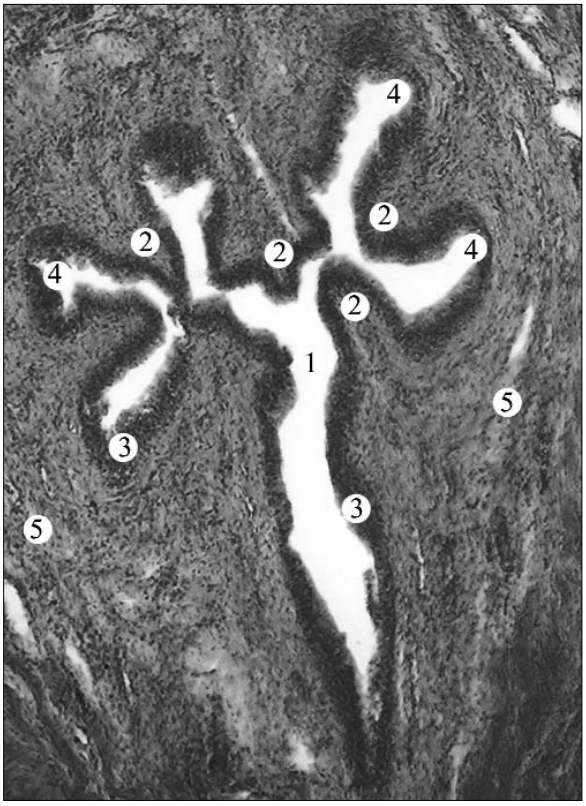

Fig. 2. A longitudinal section of the spongy part of the urethra of a fetus – 210.0 mm of the PCL. Staining with hematoxylin and eosin. A microscopic specimen. Ob. 3.5, oc. 10: 1 – the urethral lumen; 2 – folds of the mucosa; 3 – the mucous tunic; 4 – the urethral lacunes; 5 – the spongiose tissue.

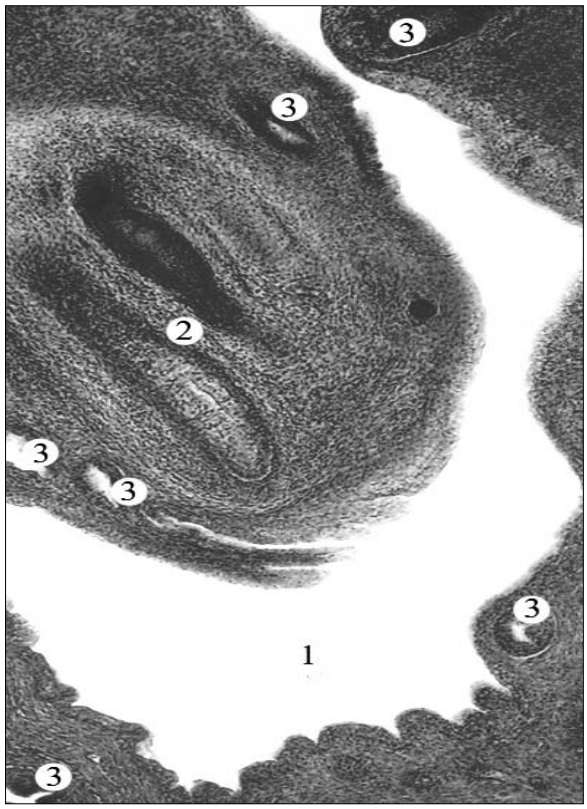

Fig. 3. A coronal section of the prostate gland of a fetus of 230.0 mm of the PCL. Staining with hematoxylin and eosin. A microscopic specimen. Ob. 3.5, oc. 10: 1 – the prostatic part of the urethra; 2 – the prostatic utricle; 3 – the excretory ducts of the glandular formations of the prostate gland.

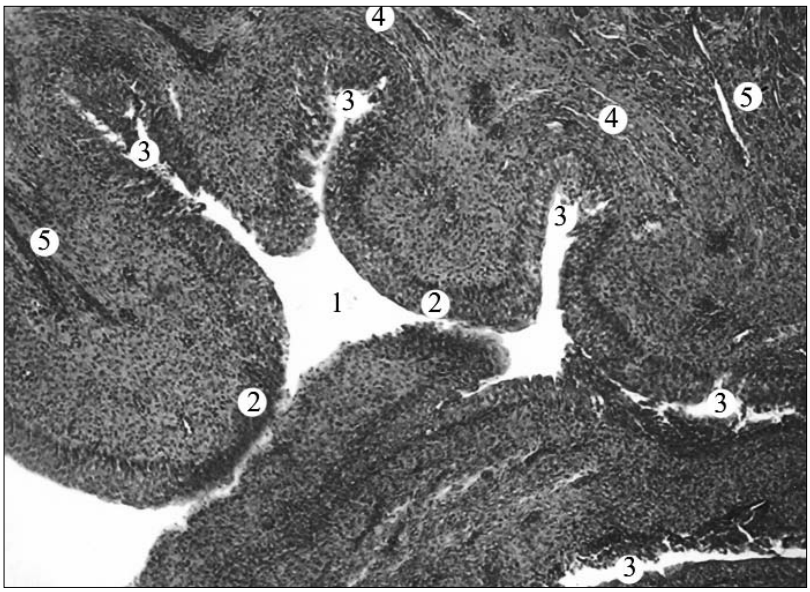

Fig. 4. A coronal section of the prostatic part of the urethra of a fetus – 225.0 mm of the PCL. Staining with hematoxylin and eosin. A microscopic specimen. Ob. 3.5, oc. 10: 1 – the urethral lumen; 2 – the mucous tunic; 3 – the urethral lacunes; 4 – the smooth muscular cells of the circular layer; 5 – the parenchyma of the prostate gland.

immediately under its mucous tunic, as a result the latter forms outpouchings in the form of tori (Fig. 3).

The lumen of the prostatic part of the urethra on histologic sections in the frontal plane is of a semilunar shape. The mucous and muscular coats of the prostatic part of the urethra are well marked. Its mucous tunic is reprerented by the stratified transitional epithelium, the muscular tunic is made up of the internal longitudinal and external circular layers of the smooth muscular cells (Fig. 4).

Conclusions. 1. The largest number of the glandular formations of the prostate gland in 6 month old fetuses is revealed in the thickness of the posterior wall of the urethra (34-38), the lowest (10-15) one – in the thickness of the anterior wall. 2. The wall of the urethra in 6 month old fetuses is represented by the mucous and muscular tunics. The longitudinal and the external circular layers of the smooth muscular cells are traced in the muscular coat.

Outlooks of further research. It is expedient to study the development of the glandular formations and the fibrous-muscular stroma of the prostate gland and the specific features of the structural organization of the urethra in human fetuses of different age groups.

References

1. Ухаль М.І. Сучасний стан та проблеми розвитку андрології як медичної дисципліни / М.І.Ухаль // Урол. – 2000. – Т.4, №3. – С. 74-75. 2. Деревянко Т.И. Редкий и малоизвестный вариант гипоспадии / Т.И.Деревянко, И.М.Деревянко // Урол. и нефрол. – 1998. – № 4. – С. 45-47. 3. Пішак В.П. Ембріогенез чоловічих статевих органів у нормі та патології / Пішак В.П., Хмара Т.В., Козуб М.М. – Чернівці: Медуніверситет, 2006. – 368 с. 4. Файзулин А.К. Оперативное лечение проксимальных форм гипоспадии у детей с использованием бокового кожного лоскута на сосудистой ножке / А.К.Файзулин, С.Л.Коварский // Андрол. и генит. хирургия. – 2002. – № 2. – С. 84-85. 5. Шерстюк О.О. Анатомія сечової та статевої систем, їх аномалії та особливості будови у новонароджених / О.О.Шерстюк, Т.Ф.Дейнега. – Полтава, 2005. – 100 с. 6. Уроджені вади сечостатевої системи в дітей Чернівецької області / Т.В.Сорокман, О.І.Максіян, Г.Б.Боднар, М.О.Соломатіна // Клін. анат. та опер. хірургія. – 2003. – Т. 2, № 1. – С. 19-21. 7. Матюхин А.Н. Особенности макромикроскопической анатомии желез губчатой части мочеиспускательного канала мужчины / А.Н.Матюхин // Рос. морф. ведомости. – 1999. – № 3-4. – С. 117-118.

МИКРОСКОПИЧЕСКАЯ АНАТОМИЯ ПРЕДСТАТЕЛЬНОЙ ЖЕЛЕЗЫ И МОЧЕИСПУСКАТЕЛЬНОГО КАНАЛА У ПЛОДОВ 6 МЕСЯЦЕВ

Резюме. Микроскопическая анатомия предстательной железы и мочеиспускательного канала изучена на 17 трупах плодов 6 месяцев. Установлено увеличение количества железистых образований в начале и уменьшение в конце 6-го месяца. Их выводящие протоки преимущественно открываются ниже предстательной маточки.

Ключевые слова: предстательная железа, мочеиспускательный канал, плод, анатомия.

MICROSCOPIC ANATOMY OF THE PROSTATE GLAND AND URETHRA IN FETUSES AGED 6 MONTHS

Abstract. The microscopic anatomy of the prostate gland and urethra has been studied on 17 corpses of 6-month old fetuses. An increase of the number of glandular formations of the prostate glands has been established at the beginning of the 6th month and a decrease at the end of the 6th month. Their excretory ducts open primarily below the prostatic utricle.

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

Bukovinian State Medical University (Chernivtsi)

Надійшла 27.03.2009 р.
Рецензент – проф. Ю.Т.Ахтемійчук (Чернівці)

© Khmara T.V., Hulyk R.P.