

Morphometric Characteristics of Organometric Parameters of the Prostate Gland of Children in Postnatal Ontogenesis

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Abstract The article presents the results of studying the morphometric parameters of the prostate gland in children in early postnatal ontogenesis according to ultrasound data. On the basis of the data obtained, the growth rates of organometric parameters of the prostate gland of children in postnatal ontogenesis were established. The thickness of the organ from the neonatal period to the second period of childhood increases by 1.81 times, the width by 2.94 times, the length by 1.91 times, and the volume growing by 9.42 times. It was revealed that the highest growth rate of the anatomical parameters of the prostate gland is observed by the end of the second period of childhood: thickness - 25.3%, width - 62.1%, length - 28.97%, and the volume of the organ increases 1.5 times. Thus, the growth and development of morphometric parameters of the prostate gland is uneven and depends on the age characteristics of the organ.

Keywords Prostate gland, Morphometric parameters, Ultrasound examination

1. Introduction

1.1. The Relevance of the Problem

A review of literature sources shows that, despite the achievements in the surgical treatment of prostate diseases, the anatomical justification of sparing surgical interventions remains an important problem today.

The interest of clinicians, morphologists and pathologists in the study of the prostate is due to the widespread prevalence of its pathology, often unsatisfactory results of diagnosis and treatment, the need to study the etiology and pathogenesis of various diseases of the gland in order to provide more qualified medical care [2,4,7,8,10].

It is known that the pathogenesis of the disease often depends on the morphological structure of the organ. Thus, it is proved that the anatomical and topographic location of the prostate and its functions cause the main symptoms of diseases of the organ [9]. They are manifested by pain, dysuric and sexual syndromes. In this regard, prostate pathology acquires not only medical, but also social significance. Since the pathology of the prostate largely depends on the morphology of the organ [5,6,10], it is of undoubted interest to study the structural features of this anatomical unit and its structural components in the age aspect.

Recently, in the world medical practice, one of the main

methods of studying the male reproductive system, including the prostate gland, is ultrasound, which allows you to determine the functional state, shape, anatomical parameters, as well as their anomalies, malformations and pathologies.

Analysis of literature sources [1,3,10,11] indicates that information on ultrasound morphometry of the prostate gland is limited to individual observations of a certain age and, as a rule, obtained simultaneously when examining them for the presence of a particular pathology, as a result, they are based on an insufficient number of observations for statistical reliability of the results, are very average and are given without taking into account indicators of physical development and age variability. At the same time, there is no data in the literature on the age-related ultrasound anatomy of the prostate, the role of age differences in the anatomy of the prostate, topographic-anatomical relationships of its diverse structures remains unresolved. From this point of view, age-related changes in the organ are of interest in terms of adjusting the age norm and taking it into account when assessing pathological processes.

Considering the above, it should be noted that, despite the presence of a number of studies on the anatomy of the prostate gland, they are sketchy and insufficiently studied in the age aspect. The results of the study will make it possible to formulate recommendations for ultrasound doctors on the relationship of anatomical parameters of the prostate gland depending on age.

1.2. The Aim of the Study

The goal of the study was the organometric parameters of

the prostate gland of children in early postnatal ontogenesis according to ultrasound.

2. Materials and Research Methods

Ultrasound examination was conducted on the basis of the Bukhara Regional Children's Hospital and was devoted to the study of ultrasound anatomy of the prostate gland. A survey of 226 children of the city of Bukhara and its districts aged from newborn to 12 years was conducted. For this purpose, the age periodization adopted at the International Symposium on Age Characteristics (Moscow, 1965) was used.

The study was carried out on the SONOACE R3-RUS device with linear (frequency 7.5 MHz) and convexic (frequency 3.5 MHz) sensors.

Mathematical processing was performed directly from the general Excel 7.0 data matrix using the capabilities of the STTGRAPH 5.1 program, the standard deviation and representativeness errors were determined.

3. The Results of the Study

Ultrasound indicators of the prostate gland in children from the newborn period to the second period of childhood are shown in table.

Table 1. Organometric parameters of the prostate gland of children (boys) according to ultrasound

№	Age Параметры	Newborns (1-10 days)	Infants (up to 1 year)	early childhood (1-3 years old)	the first period of childhood (4-7 years old)	the second period of childhood (8-12 years old)
1	Thickness (mm.)	5-11 8,92±0,32	6-12 9,4±0,25*	8-16 10,85±0,5*	10-18 12,85±0,5*	13-23 16,1±0,62*
2	Width (mm.)	3-7 4,8±0,22	3-8 5,15±0,21*	9-16 7,2±0,31*	6-12 8,7±0,34*	11-19 14,1±0,5*
3	Length (mm.)	6-12 9,8±0,32	7-13 10,36±0,2*	9-16 12,0±0,43*	12-20 14,5±0,5*	14-24 18,7±0,62*
4	The volume of the organ (cubic cm.)	0,05-0,42 0,24±0,02	0,07-0,66 0,29±0,03*	0,25-1,1 0,54±0,05*	0,5-1,8 0,89±0,08*	1,05-4,8* 2,26±0,23

* - reliable values ($P < 0.05$) compared to the previous age

As can be seen from the table in children, the parameters of morphometric indicators of the prostate gland increase with age. The results of the study showed that the thickness of the prostate gland in newborns averaged 8.9 ± 0.32 mm (from 5 mm to 11 mm). In infants, the thickness varied between 6-12 mm, on average is equal to 9.4 ± 0.25 mm. In boys of early childhood, it ranges from 8 to 16 mm, on average - 10.85 ± 0.5 mm. In children of the first period of childhood, the average thickness was 12.85 ± 0.5 (from 10 mm to 18 mm). The thickness of the prostate gland in boys of the second period of childhood ranged from 13 mm to 23 mm, on average 16.1 ± 0.62 mm.

It was found that the width of the prostate gland in newborns varied from 3 mm to 7 mm, averaging 4.8 ± 0.22 mm, and in infants it averaged 5.15 ± 0.21 mm (from 3 mm to 8 mm). In children of early childhood, this indicator varied from 6 to 10 mm, on average was equal to 7.2 ± 0.31 mm, and in boys of the first period of childhood it averaged 8.7 ± 0.34 mm (from 28 to 37 mm). The width of the prostate gland in children of the second period of childhood ranges from 11 to 19 mm, on average - 14.1 ± 0.5 mm.

It was revealed that the length of the prostate gland in newborns averaged 9.8 ± 0.32 mm (from 6 mm to 12 mm). In infants, it ranged from 7 to 13 mm, on average it was equal to 10.36 ± 0.25 mm. In early childhood, the length ranges from 9 to 16 mm, on average - 12.0 ± 0.43 . In boys of the first period of childhood, the average length was 14.5 ± 0.5 (from 12 mm to 20 mm). The length of the prostate gland in boys of

the second period of childhood ranged from 14 mm to 24 mm, on average 18.7 ± 0.62 mm.

The volume of the prostate gland in newborn boys varied from 0.05 cm³ to 0.42 cm³, averaging 0.24 ± 0.02 cm³, and in infants it averaged 0.29 ± 0.03 cm³ (from 0.07 cm³ to 0.66 cm³). In boys of early childhood, this indicator varied from 0.25 to 1.1 cm³, on average was equal to 0.54 ± 0.05 cm³, and in children of the first period of childhood it averaged 0.89 ± 0.08 cm³ (from 0.5 to 1.8 cm³). The volume of the prostate gland in boys of the second period of childhood ranges from 1.05 to 4.8 cm³, on average - 2.26 ± 0.23 cm³.

4. Discussion and Conclusions

Based on the data obtained, the growth rates of organometric indicators of the prostate gland of children in postnatal ontogenesis were established. The thickness of the organ from the period of newborn to the second period of childhood increases by 1, 81 times, width - by 2.94 times, length - by 1.91 times, and volume increases by 9.42 times.

It was revealed that the highest growth rate of anatomical parameters of the prostate gland is observed by the end of the second period of childhood: thickness - 25.3%, width - 62.1%, length - 28.97%, and the volume of the organ increases by 1.5 times.

Thus, the growth and development of morphometric indicators of the prostate gland is uneven and depends on the age characteristics of the organ.

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