

Morphology of the bladder in fetuses with kidney pathology in the mother

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Relevance of the topic. The incidence of kidney pathologies in countries around the world is increasing every year. These figures are slightly higher in Central Asian countries. The reason depends on the lifestyle of the population, climate, drinking water and many other factors. This, in turn, leads to an increase in the number of women who undergo pregnancy without kidney pathology. Fetuses with kidney pathology in mothers do not affect the organs of the urinary system, including the morphological development of the bladder. Analysis of morphometric changes during the development of the bladder in fetuses without kidney pathology and mothers with kidney pathology at different stages of gestation.

Purpose of the study. Identification of morphological changes in the bladder in fetuses with kidney pathology in their mothers.

Key words: bladder, kidney pathology, pregnancy, morphometry.

Research object and examination method: For research, the materials of 21 fetuses with kidney pathologies and 20 fetuses without kidney pathologies were collected in Khorezm Regional Bureau of Pathological Anatomy between 2019 and 2023. Fetuses with kidney pathology in the studied mother were divided into immature and mature fetuses according to gestational age, i.e. fetuses up to 26-35 weeks and 36-40 weeks. These were divided into 4 groups: 15-20 weeks, 21-25 weeks, 26-30 weeks and 31-40 weeks of fetuses.

Urine sacs of 21 fetuses with kidney pathology and 20 fetuses without kidney pathology were taken for examination. Changes in the thickness of the muscular, epithelial and serous layers were observed in the morphological structure of the urinary bladder of fetuses whose mothers had kidney pathology and fetuses whose mothers did not have kidney pathology.

For the purpose of fixation, the fragments of the urinary bladder taken for morphological examination were fixed in 12% formalin solution, passed through 96% alcohol and xylene solutions, and paraffin

blocks were prepared. Sections with a thickness of 5-6 microns were cut from the prepared blocks, and histological reparations were prepared in hematoxylin and eosin, according to the Van Gison method. Histometric microscope model Leica cmE has a digital screen. The statistics of the checks were compiled using the Exel-2016 program.

Research results: The size of the urinary bladder of fetuses is different in different periods of the gestation period. When these were compared with the sizes of fetuses whose mothers had kidney pathologies, almost no difference was found. Fetuses were analyzed in groups of 15-20 weeks, 21-25 weeks, 26-30 weeks and 31-40 weeks of gestation. According to the results of the analysis

Table 1.

Comparative analysis of the sizes of the urinary bladder in fetuses without kidney pathology and fetuses with kidney pathology in different gestational periods.

Gestation period		15-20 weeks old	21-25 weeks old	26-30 weeks	31-40 weeks
Fetuses without Kidney pathology in the mother	Urinary Sac (cm)	1,5x1,2 m±0,1 σ=0,2	1,7x1,5 m±0,1 σ=0,2	2,2x1,7 m±0,1 σ=0,5	3,5x2,5 m±0,2 σ=0,3
Fetuses with kidney pathology the mother	Urinary Sac (cm)	1,5x1,2 m±0,1 σ=0,2	1,7x1,5 m±0,1 σ=0,2	2,0x1,7 m±0,1 σ=0,2	2,9x2,2 m±0,2 σ=0,3

It can be seen from the table that during the period from the first trimester to the 21st week of pregnancy, there is no significant difference in the size of the urinary bladder, i.e. in the range of 0.2-0.3 cm. It can be seen that the size of the urinary bladder has doubled in size in the last stages of pregnancy, i.e. in the III trimester, compared to the size in the I trimester. There is almost no difference between the sizes of the urine bag of fetuses with kidney pathologies in their mothers and the sizes of the urine bags of fetuses whose mothers do not have kidney pathologies. A difference of 0.2-0.3 cm is detected only by the last weeks of pregnancy.

It can be seen that the urinary bag consists of three layers in all the studied control and group II fetuses. Depending on the gestational period, the thickness of the layers of the urinary bladder was compared between fetuses with kidney pathology and fetuses without kidney pathology. According to the results of the analysis, the wall of the urinary bladder of fetuses whose mothers did not have kidney pathology increased by 0.350 μm at the 15th week of gestation, and by 1.302 μm at the 39-40th week, i.e. 3.5 times. Fetuses with kidney pathologies in their mothers have a bladder wall size of 0.224-0.272 microns at 15 weeks of age. At 39-40 weeks, it was determined that the size of the wall of the bladder was 1,050-1,204 microns.

When microscopic analysis of the dynamics of the morphological structure of the epithelial layer of the urinary bladder, 3 layers are formed and differentiated from the 15-17 weeks of the fetal gestation period. These are basal layer, intermediate layer, surface layer. In the later stages of pregnancy, the epithelial layer of the urinary bladder is formed up to 5-7 layers and forms folds on the inner surface of the urinary bladder.

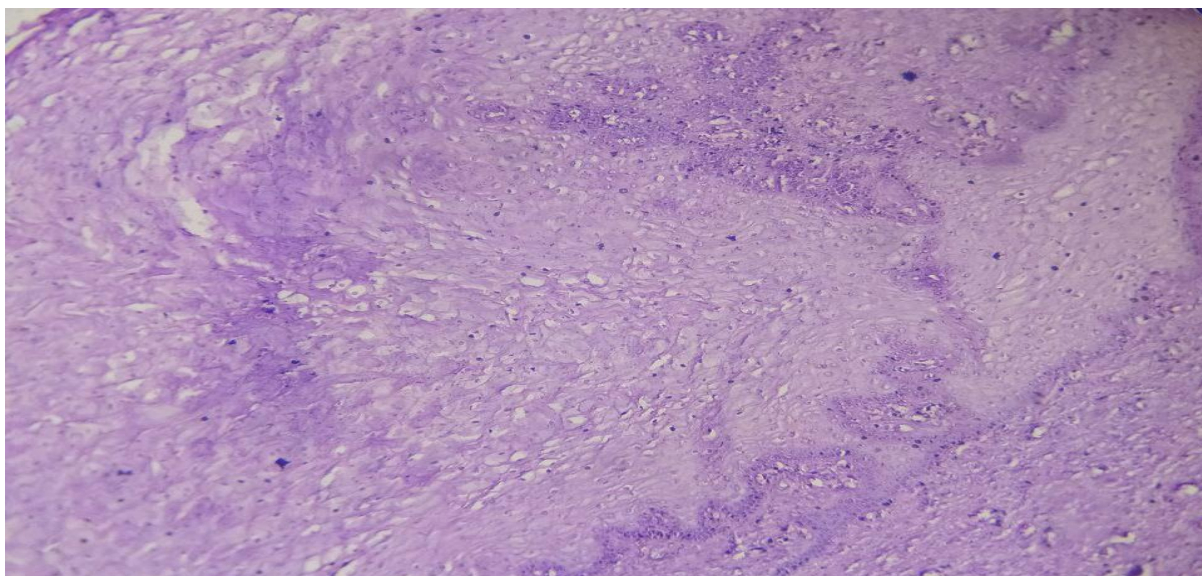


Figure 1. Three-layer microscopic view of the epithelium of the urinary bladder of a 27-week-old fetus. (Leica cmE microscope, 10x/0.25)

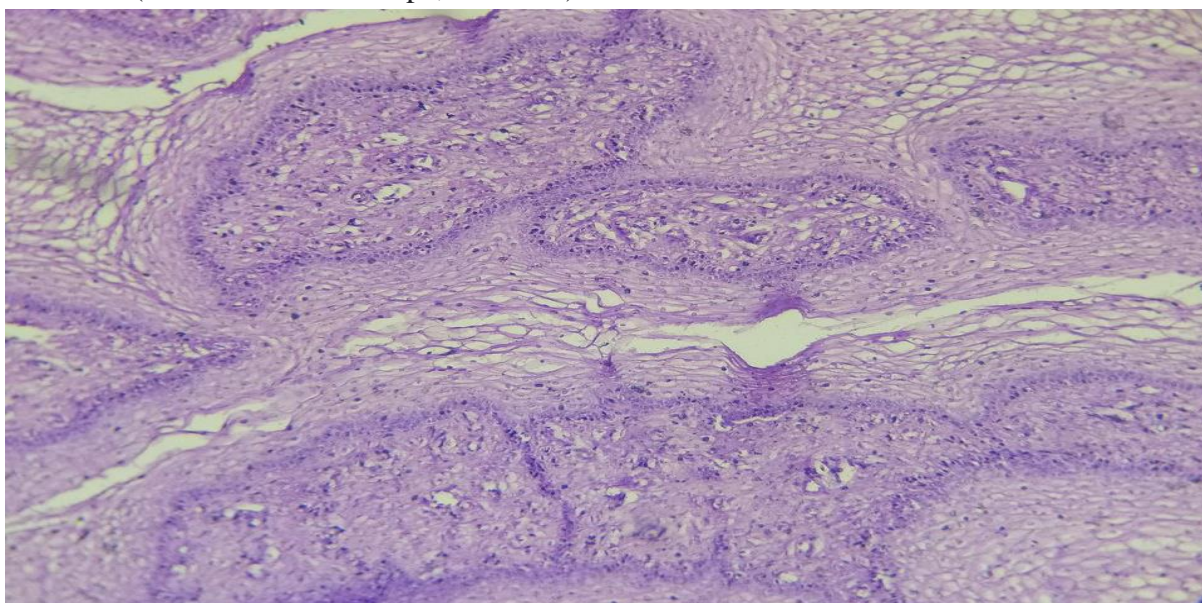


Figure 1. Microscopic view of the basal layer of the bladder epithelium of a 30-week-old fetus. (Leica cmE microscope, 10x/0.25)

Table 2.

Comparative analysis of the thickness of the epithelial layer of the urinary bladder in fetuses without kidney pathologies and fetuses with kidney pathologies in different periods of gestation.

Gestation period		15-20 weeks old	21-25 weeks old	26-30 weeks	31-40 weeks
Fetuses with kidney pathology in the mother	Urinary bladder epithelial thickness (µm)	0,035 m±0,001 σ=0,006	0,040 m±0,001 σ=0,006	0,046 m±0,001 σ=0,006	0,052 m±0,001 σ=0,005

Fetuses with kidney pathology in the mother	Urinary bladder epithelial thickness (µm)	0,027 m±0,001 σ=0,006	0,036 m±0,001 σ=0,006	0,040 m±0,001 σ=0,006	0,047 m±0,001 σ=0,005
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According to the data presented in this table, it can be seen that the thickness of the epithelium of the urinary bladder of the fetuses in the first trimester of the control group and the second group of fetuses has changed to the extent that there is no significant difference in the period up to 21 weeks. Comparing these two groups of fetuses, it can be seen that the thickness of the epithelial layer of the fetuses in mothers with kidney pathologies is slightly smaller, up to 0.08-0.04. In the III trimester of fetal gestation, the thickness of the epithelial layer is seen to be 1.5 times thicker.

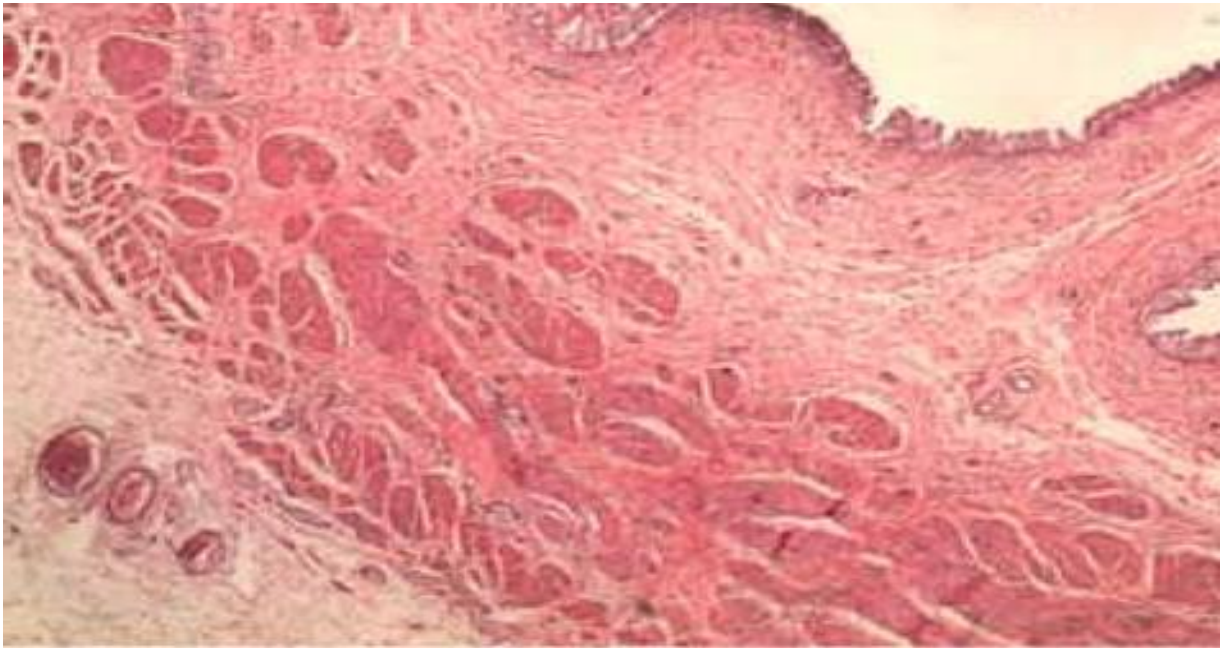


Figure 2. Microscopic view of the muscle layer of the bladder. 26-30 weeks of fetal gestation period. (Leica cmE microscope, 10x/0.25)

During the morphological analysis from the first trimester of pregnancy, it is clearly visible that the inner, middle and outer muscle layers, muscle fibers are oriented longitudinally and circularly. The dimensions of the muscle layers of the bladder were analyzed in different periods of gestation.

Table 3.

Measurements of the muscle layer of the urinary bladder in fetuses without kidney pathology and fetuses with kidney pathology during gestation.

Gestation period		15-20 week old	21-25 week old	26-30 weeks	31-40 weeks
Fetuses with kidney pathology in the mother	Inner long muscle layer size (µm)	0,201 m±0,05	0,270 m±0,05	0,342 m±0,05	0,376 m±0,05
	Medium circular muscle layer size (µm)	0,181 m±0,05	0,262 m±0,05	0,302 m±0,05	0,779 m±0,05
	Outer longitudinal muscle layer (µm)	0,223 m±0,05	0,382 m±0,05	0,370 m±0,05	0,792 m±0,05

Fetuses with kidney pathology in the mother	Inner long muscle layer size (μm)	0,198 m \pm 0,05	0,270 m \pm 0,05	0,340 m \pm 0,05	0,373 m \pm 0,05
	Medium circular muscle layer size (μm)	0,180 m \pm 0,05	0,261 m \pm 0,05	0,398 m \pm 0,05	0,779 m \pm 0,05
	Outer longitudinal muscle layer (μm)	0,223 m \pm 0,05	0,382 m \pm 0,05	0,369 m \pm 0,05	0,790 m \pm 0,05

It can be seen from this table that the muscle layer of the urinary bladder develops in very small sizes depending on the gestation period. When we compared the development of the muscle layer of the urinary bladder in fetuses whose mothers had kidney pathologies, almost no difference was found. The dimensions of the urinary bladder muscle layer in the first trimester of pregnancy, by the third trimester of pregnancy, we see that the internal long muscle layer has increased by 1.5 times, the middle circular muscle layer has increased by 4.0 times, and the external longitudinal muscle layer has increased by 3.5 times. . If we compare the weeks of separate 4 groups, we can see that the internal long muscle layer has increased 1.3 times from the first trimester to 21-25 weeks, 1.7 times to 26-30 weeks, and 1.9 times to 31-40 weeks. The proportions of the middle circular muscle layer have increased by 1.4:1.6:4.3. The proportions of the outer longitudinal muscle layer have increased by 1.7:1.6:3.5 times.

Summary: 1. From the morphological indicators, it can be concluded that during pregnancy, from the 15th week to the 39-40th week, the size of the urinary bladder increases by 2.5 times. At 15-20 weeks of pregnancy, the size of the urinary bladder was 1.5x1.2 cm, and in the third trimester of pregnancy, it was 3.5x2.5 cm.

2. Morphological examinations show that from the 15th week of pregnancy, it was seen that the urinary bladder is made up of three layers: epithelial, muscular and external adventitial layers. The thickness of the epithelium of the urinary bladder of fetuses from the I-trimester is 0.035 (μm) at 15-20 weeks, 0.052 (μm) at 39-40 weeks of gestation. In the III trimester of fetal gestation, the thickness of the epithelial layer is seen to be 1.5 times thicker. It was found that the thickness of the epithelial layer of the urinary bladder in fetuses whose mother had kidney pathology was slightly smaller, up to 0.08-0.04.

3. Fetuses with kidney pathology in their mother and fetuses without kidney pathology in their anamnesis were found to have little morphometrically different sizes of the urinary bladder layers.

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