Morphofunctional immaturity of the tissues in early age contributes to the renal affection, especially if the obstructive uropathy is present, infection or hypoxic state. However, non specific clinical picture, low infirmity of existing methods of diagnosis in early age complicate timely diagnosis of the renal pathology in the early childhood period.

Hypoxia, caused by the heamodynamic and tissue breathing changes is the main pathogenetic factor in the renal function failure in pyelonephritits.

After the diagnosis of pyelonephritis has been established, in the clinical aspect, one of the questions that demands immediate solution is evaluation of the inflammatory process that interrupts the renal parenchyma tissue hypoxia.

Nowadays the least studied are the functional methods that allow us to verify the diagnosis of the presence of the tissue hypoxia in the secondary pyelonephritis and evaluate the result of the performed treatment in order to renew the renal function.

**Aim:**

The aim of the study is to specify the presence of the tissue hypoxia of the renal parenchyma and membrane destruction of the renal epithelium in the early childhood children with pyelonephritis without anatomic congenital urinary tract pathology in the remission period.

**Materials and methods**

65 children in the early childhood period with acute pyelonephritis (PN) in the period of clinical-laboratory remission who did not have any anatomical pathology of the urinary tract (I-PN), referrent group consisted of 40 somatic healthy children (II-control).

Children underwent general clinical examination, which included anamnesis, observation, common clinical and biochemical laboratory examination, ultrasound of internal organs, mixion cystoscopy, excretory infusion urography.

All children undergone whole spectrum of biochemical research. The following markers of the tissue hypoxia had been identified:

- Anticrystalformation possibilities by the Yuriyeva E.O. methodology
- 24-hour salt excretion and uric acid.

The markers of morphofunctional state of cytomembrane or the renal epithelium:

- Calcification probe – the presence of the polar lipids (pl) in the urine;
- Presence of the products of the peroxide oxidation (POL) in the urine

The markers of the functional state of the tubular epithelium – urinalisis tests: protein presence tests, hyperaminoaciduria, Sulkovich probes, Geiness probes.
Markers of the functional state of the connective tissue of the renal parenchyma, including carnitine and glicosamine content presence in the 24-hour urine.

Results:

The study of the anamnesis showed that parents of the children with pyelonephritis have been under the influence of the factory noise and their work had been more connected with the computer work. Among the adverse ante- and postnatal factors of the pyelonephritis manifestation the leading cause was I trimester toxicosis and a low body weight (less than 3 kg) of the neonate. Among the postnatal nonspecific risk factors of the pyelonephritis formation in the early childhood children, the most valuable were early artificial feeding and frequent respiratory infections.

Among the markers of the tissue hypoxia and the cytomembrane stability of the renal epithelium are anticryystalformation urine possibilities tests (ACFT) and the 24-hour salt excretion. In the case of the decrease of the ACFT it is possible to speak about the decrease of the ACFT formation in the renal epithelium cells, meaning the presence of the tissue hypoxia of the renal parenchyma, which leads to the processes of the membrane destruction. In 40% of the investigated children with pyelonephritis ACFT to calcium oxalates was decreased, however taking the average data it did not differ from the control group. ACFT to calcium phosphates and tripelphosphates was decreased in 47.7% and 33.8% of the examined children, that differ statistically by the mean data from the healthy children.

Gained results confirm tissue hypoxia of the renal parenchyma and the stability of the cytomembrane of the renal epithelium approximately in the half of the children with PN in the period of the clinical and laboratory remission, which is confirmed by the decreased anticryystal formation function of the urine to oxalates and phosphates in the majority of the children.

The indexes of the 24 hour oxalate excretion in the examined children with PN by the mean value do not differ significantly in comparison with healthy children, however nearly one third of the sick children had higher numbers of oxalate excretion than healthy children, which indicates the presence of the hypoxic state of the renal parenchyma.

Consequently, significant hypophosphaturia was present in 52.3% of the children with PN and tendency to uraturia decrease in 10.8% of the sick children, which indicates the presence of the renal hypoxia.

Taking the absence of the dysmetabolic nephropathology in the examined children, it is possible to conclude, that indexes of ACFT and 24-hour salt excretion with urine provide the possibility to determine the presence of the tissue hypoxia and membrane stabilizing processes of the renal epithelium of the renal parenchyma.

Indexes if the processes of the membrane destruction of the renal epithelium – presence of the common products of the POL reaction in the urine were significantly higher in 41.5% in the examined children with PN.

Presence of the PL in the 24-hour urine - debris of the membrane cells was present in 46.2% of the examined children with PN, maximal excretion was noticed in 12.4% of the examined children.
In general PL excretion in children with PN was significantly higher from the data of the healthy children, which allows us to assume the presence of the membrane destruction processes, which continues to diagnose in the period of clinical laboratory remission of the PN, which promotes the conditions of the pathology process progression in the renal tissue of these children.

Tubular reabsorption, as partial function of the proximal nephrone department was evaluated by the level of the aminoacid, protein, calcium, reduction sugars - maltose, sacharose, fructose and glucose excretion.

The given indexes show the significantly higher frequency of the excretion of the indexes with the urine of the children with PN in the period of remission of the inflammatory process in comparison with healthy children. This allows us to speak about the presence in children with PN of the tubular epithelium of the renal parenchyma dysfunction, exactly the proximal department of the nephrone and the presence of of the partial renal failure of the tubular type.

The undergone study demonstrates the possibility of the early diagnosis of the partial defection of the renal function on a stage of the clinical and laboratory remission of pyelonephritis.

The marker of the sclerosis of the renal tissue and consequently the early diagnosis of the total chronic renal failure in children are the indexes of the level of creatinine (Cr) and structureal component of the connective tissue – glucoseaminoglicanes (GAG) in the urine.

Average level of the Cr in the urine with PN was significantly lower in the median value and in frequency. Analysis by the frequency of the Cr excretion showed that it was lower in 27,7% of examined children with PN in comparison with 2,5% of the healthy children.

Analysis of the GAG excretion shows, that in all children with PN it was not significantly higher. The elevated level of excretion of glucoseaminoglicans was noticeable in some children with PN in all age groups which proves the absence of the functional possibilities of the glomerular part of the nephrones of the renal tissue according to the indexes data.

**Conclusions**

1. The gained results of the examination of the early children in early childhood period with pyelonephritis demand the search of the methods of the correction of the identified changes according to the presence of the tissue hypoxia and the tubular syndrome and the glomerular dysfunction of the renal parenchyma with the infringement of the partial function of the renal tissue.

2. The study showed that with the aim of the prognosis of the formation and early diagnosis of the defection of the functional state of the kidneys in the children in the early childhood period with pyelonephritis can be used as markers of anticristalformation possibilities of the urine, 24-hour salt excretion, urinalysis test results (proteinuris, aminoaciduria, glucosuria, calciumuria) and the level of creatinine excretion.