Urolithiasis (pediatrics)

This article has been translated from WikiSkripta; ready for the **editor's review**.

Urolithiasis is the presence of small macroscopic stones of anorganic or organic origin in the hollow system of the urinary excretory tract. The removal of organic substances out of the solution begins in the area of the renal papillae. Sometimes the urolithiasis combines with nephrocalcinosis, for example during distal tubular acidosis. **Nephrocalcinosis** is the presence of microscopic calcification in the renal parenchyma outside the hollow system.[1]

Epidemiology

- urolithiasis is very common in adults, but rare in childhood;
- among children, preschoolers are most often affected.[1]

Etiopathogenesis

- depends on the concentraion of "lithogenic" substances in urine (oxalate, urate, cystine);
- the creation of stones is impeded by citrate, magnesium, pyrophosphates;
- predisposing factors: urine outflow disorders (obstruction, urinary tract infection caused by urease-producing bacteria), immobilization, metabolic disorders: hypercalciuria, hyperuricosuria, cystinuria[1]

Calcium nephrolithiasis

- metabolic disorder accompanied by increased excretion of calcium in urine;
- significant hypercalcemia in hyperparathyroidism;
- overdose or intoxication by vitamin D derivatives;
- long-term immobilization (trauma).[1]

Clinical manifestation

- differs from manifestation in adults (classic renal colic);
- often isolated asymptomatic microscopic hematuria;
- infants and small children: fever, abdominal pain, meteorism, nausea, vomiting, eventually loss of appetite, misdiagnosis as abdominal colic;
- older children: pressure or pain in the lumbar region.[1]

Diagnosis

- microscopic non-glomerular hematuria (erythrocytes are not deformed);
- sterile pyuria;
- ultrasound – stones over 2 mm;
- native abdominal X-ray – only stones containing calcium;
- calcium-creatinine index in a single urine sample;
- calcium excretion in urine over 24 hours;
- calcium-phosphate metabolism.[1]

Treatment

- increased fluid intake, physical exercise, metabolic origin → diet, spasmolytics if colic is present;
- depending on etiology:
  - hypercalciuria caused by increased gastrointestinal calcium absorption – limiting of alimentary calcium intake;
  - disorder of calcium reuptake in the tubules – limiting of salt intake, use of hydrochlorothiazide p.o.;
  - urate urolithiasis – alcalization of urine by per-oral administration of hydrogen carbonate;
  - renal tubular acidosis – hydrogen carbonate and citrate.
- smaller stones often pass spontaneously;
- extracorporeal lithotripsy (in total anaesthesia in children up to 3 years);
- endoscopic removal;
- open surgical intervention.[1]

1. LEBL, J – JANDA, J – POHUNEK, P. *Klinická pediatrie.* 1. edition. Galén, 2012. 698 pp. pp. 620-622. ISBN 978-80-7262-772-1.