studies have indicated high diagnostic accuracy of ceVUS compared to VCUG in the detection of VUR, a limited ability for detecting IRR in children compared to VCUG has been suggested as a potential drawback of ceVUS. The aim of our study is to evaluate the prevalence of IRR diagnosed by ceVUS and its association with age, gender and grade of VUR.

We used LOGIQ S8 ultrasound machine equipped with dedicated software for contrast-enhanced studies and harmonic imaging (HI). Standard ultrasound of the urinary tract was followed by bladder catheterisation and instillation of physiological normal saline and the US contrast medium (SonoVue®, Bracco). The diagnostic criterion for IRR is the appearance of contrast microbubbles outside the contours of the duct system or renal calyx and the entry of contrast into the renal parenchyma.

Since March 2006 until January 2020 we performed 8130 ceVUS examinations and found VUR in 2972 children (36,6%). Until December 2012 we did not use contrast specific software and we found VUR in 1013 out of 2977 children (34%) of whom IRR was found in 23 children (2,3%). Since January 2013 we used contrast specific software and HI and found VUR in 1959 out of 5153 children (38%) and IRR in 233 children (11,9%). We detected IRR in 124 male (53,2%) and 109 female patients (46,8%) with age range from 15 days to 82 months. Most common indications for ceVUS were: febrile urinary tract infection (82%), prenatally diagnosed hydronephrosis (14,6%) and neurogenic bladder (2,6%). Unilateral IRR was found in 180 patients (77,3%) and bilateral in 53 patients (22,7%). From all uretero-renal units with IRR (286), VUR was II grade in 8 children (2,8%), III grade in 41 (14,3%), IV grade in 174 (60,8%) and V grade in 63 children (22%).

Our results in the largest so far published series of patients with ceVUS show that using contrast specific software and harmonic imaging intrarenal reflux was found in about 12% of patients with VUR. IRR is found even in children with low grade reflux. Our results emphasize the importance of considering IRR in the future classification of VUR as well as in assessment of prognosis and therapy in each child with VUR.

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TRANSCUTANEOUS TIBIAL NERVE STIMULATION IN CHILDREN AND ADOLESCENTS WITH NEUROGENIC BLADDER AND BOWEL DYSFUNCTION

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Transcutaneous tibial nerve stimulation (TTNS) is a non-invasive neuromodulatory method which is used mostly in children and adults with overactive bladder, nonobstructive urinary retention, functional constipation, fecal incontinence and in chronic pelvic pain syndrome. Experience in treatment of children and adolescents with neurogenic dysfunction is very limited. Aim of this study is to evaluate the success of 3 months home TTNS therapy in patients with neurogenic bladder/bowel dysfunction.

In our institution in 2015 we started the program of non-invasive neuromodulation in treatment of children with different forms of lower urinary tract and bowel dysfunctions. In 75 of children with neurogenic bladder/bowel some form of neuromodulation was performed. In 36 of children some other treatments that could influence bladder/bowel function were performed together with TTNS so they were excluded from this study. We followed 39 patients in whom home treatment with TTNS was performed for 30 minutes every day during 12 weeks. Self-adhesive surface electrode was placed 4-5 cm cranial from medial malleolus. We evaluate treatment success by bladder/bowel symptom questionnaire before and after 12 weeks of therapy.

Out of 39 patients 23 had myelomeningocele, 9 had operation of spinal cord or pelvic tumor, 5 had tethered cord syndrome, 1 patient had spinal cord injury and 1 had transverse myelitis. There were 19 male and 20 female patients with age range from 4 to 21 years, average age 13,03+/- 5,04 years. Eight patients (20%) did not feel any urinary/bowel symptom improvement. Twenty (51,3%) patients had better sensation of bowel fullness, 2 (30,8%) achieved stool continence, 12 (30,8%) had better sensation of bladder fullness, 6 (15,4%) achieved urinary continence and 4 (10,2%) reported voiding with less straining. None of our patients had side effects of TTNS.

Neuromodulation is a new method in patients with bladder/bowel dysfunction. TTNS is least invasive and might be valuable option for patients with neurogenic diseases. Although the method is not as effective as in children with non-neurogenic dysfunctions, most of our patients (80%) had some symptom improvement, mostly related to bowel function. Our data in small group of patients suggest that transcutaneous electrical nerve stimulation might be effective and safe for treating patients with neurogenic disorders with positive effects especially on bowel function. Further larger well-designed randomised controlled trials are needed to make definitive conclusions and evaluate long-term effects.

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ULTRASOUND ASSESSMENT OF KIDNEY LENGTH WITH DUPLEX COLLECTING SYSTEM IN INFANTS

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Objective To determine the ratio of the sizes of kidneys with duplex collecting system (DCS) and healthy kidneys with one collecting system as well as kidneys with single collecting system located on the contralateral side of the kidney with DCS.

Methods The study was conducted on healthy infants, born on time, who were from 30 to 210 days of age. Ultrasonic measurements of kidney lengths were taken on the group of 33 infants with DCS (14 males, 19 females) with 66 kidneys (DCS group) and 948 infants with 1896 healthy kidneys with single collecting system who were the control group (CG). Five of the 33 infants with DCS had bilateral DCS, which is total of 38 kidneys with DCS. The other 28 infants from the DCS group had one kidney with single collecting system, so this group is called the CDCS group.

Results We determined the normal values of kidney lengths of infants CG in relation to age, gender and body side and presented on four different nomograms of kidney length.

The median of the first ultrasound examination of children from the DCS group was 75 days (min 30-max 210 days), children from CG 77.5 days (min 30-max 210 days).

Kidney lengths according to age, gender and side in infants from the DCS group were compared with kidney length from CG and with kidneys from CDCS group as shown in the eight dot graphs.

Of the 38 kidneys from the DCS group, 23 (60%) were above the upper limit of 95% CI for age, gender and side ($\chi^2 = 22.6$; $p < 0.001$).

Of the 28 kidneys from the CDCS group, one (3.6%) was above 95% CI in length, and in the CG of 1896 kidneys, 59 (3.1%) were above 95% CI in length ($\chi^2 = 0.02$; $p = 0.889$). By comparing the CG and the DCS group, the statistically significant difference was obtained ($\chi^2 = 302$; $p < 0.001$) in terms of longer kidney length with DCS.

In the group of infants with DCS there are 20 times more kidneys that are above the upper limit of 95% CI in length for age, gender and side in relation to CG and 17 times more than in CDCS.

Conclusion We found that kidneys with DCS were statistically significantly longer than kidneys with one collecting system positioned contra laterally to kidney with DCS, also longer than kidneys in CG of the same age group of children.

Our research proved that nothing significant happens to the kidney contralateral to the kidney with DCS, which would affect its growth. When a longer than normal kidney is found on ultrasound, it is necessary to analyse it in detail in terms of detecting DCS and possibly associated urinary tract anomalies.

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NEPHROCALCINOSIS, HYPOMAGNESEMIA AND HYPERCALCIURIA IN BROTHER AND SISTER: ARE GENES DESTINY?

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Introduction Nephrocalcinosis is a condition characterized by calcium deposition in the renal parenchyma that can lead to a renal failure. Typically, it is not accompanied by specific symptoms, but lesser number of children might develop a recurrent urinary tract infection (rUTI). Therefore, in children with rUTI nephrocalcinosis should be considered as a possible underlying cause, prompting additional imaging and laboratory diagnostics, and depending on the findings, in some cases even genetic testing.

Case Report We report the case of an eleven-year-old girl and her seven-year-old brother with nephrocalcinosis. The girl initially presented at the age of four with recurrent urinary tract infections and bilateral nephrocalcinosis detected by renal ultrasound. During the further evaluation hypercalciuria, hypomagnesaemia, hypermagnesiuria, hyperparathyroidism, hyperuricemia, decreased glomerular filtration and bilateral optic neuropathy were detected. Since hereditary disease was suspected, her younger brother underwent a renal ultrasound at the age of 4 months with the similar finding of bilateral nephrocalcinosis. Moreover, laboratory testing indicated the presence of same abnormalities as in his sister, but in the absence of other clinical symptoms. Finally, targeted gene sequencing in both siblings (Blueprint Nephrolithiasis panel

with 35 genes) identified in CLDN16 gene a novel heterozygous frameshift variant c.332_333del, p.(Thr111Lysfs*15) previously not described, as well as heterozygous missense variant c.358T>C, p.(Cys120Arg) previously described in one person. Both variants are classified by in silico methods as pathogenic, while sequencing data strongly suggests that they are on different parenteral alleles (in trans position).

Discussion Pathogenic variants of the CLDN16 gene cause renal hypomagnesaemia, an autosomal recessive tubulopathy also known as familial hypomagnesaemia with hypercalciuria and nephrocalcinosis (FHHNC). This disease is characterized by excessive loss of magnesium and calcium in the urine, polyuria, polydipsia, bilateral nephrocalcinosis and progressive chronic renal failure. It can also affect the eye and present with symptoms such as strabismus, nystagmus, hyperopia, myopia and astigmatism. Biochemical findings characteristic of the disease include hyperuricemia, hypermagnesiuria, hypercalciuria, hypocitraturia, hematuria and leukocyturia, often without bacteriuria. The onset of the disease is usually in the childhood or adolescence. Magnesium citrate as a replacement therapy in combination with thiazide diuretics is most commonly used for treatment, although in the advanced stage of the disease kidney transplantation remains the only viable option. In the presented case of siblings, despite the same complex heterozygous variants previously undescribed in the literature, there are marked differences in clinical phenotype, demonstrating a significant role of other, external factors in the development of the disease. Nevertheless, in all patients with nephrocalcinosis, it is important to consider genetic testing in order to confirm underlying monogenic diseases, determine the risk in other family members, select the most appropriate treatment options and predict the possible course.

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CONGENITAL CYTOMEGALOVIRUS INFECTION OR GENETIC SYNDROME? A TWO-CASE-REPORT COMPARISON

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Congenital cytomegalovirus infection (cCMV) is the most common congenital viral infection; however, a poor rate of awareness is reported worldwide. Congenital cytomegalovirus' most frequent and severe expression is represented by neuro-audiological impairment. We report two cases of late diagnosed cCMV associated with severe neuro-radiological alterations.

Case-1: a 14-month-old infant presented with left upper limb weakness and tendon hyperreflexia. Slight dysmorphic features (frontal bossing and low-set ears) were observed. Brain magnetic resonance imaging revealed cortical dysplasia and wallerian degeneration of right-corticospinal tract.

CVM-DNA detection on Guthrie-card resulted positive and no anomalies were found at whole-exome-sequencing.

Case-2: a 3-month-old infant presented with focal epilepsy, developmental delay and dysphagia. Audiological assessment revealed left severe hearing loss. At brain magnetic resonance imaging fronto-temporal polymicrogyria was found. CVM-