Early Detection of Urinary Tract Anomaly - Prevention of Kidney Failure in Children (Case Report)

Rozina Stojkovska

General Hospital, Pediatric department-Kumanovo, Republic of Macedonia

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Correspondence:
Rozina Stojkovska, MD
General Hospital, Pediatric department, Kumanovo, Republic of Macedonia
Tel.: +389 31 420250; Fax: +389 31 420250
E-mail: rozi.stojkovska@t-home.mk; rozinastojkovska@yahoo.com

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Abstract

One of the numerous reasons for chronic kidney insufficiency among children is congenital anomaly of the urinary tract. Such anomalies are detected in the antenatal stage with echo sonography, but most of them are detected after birth, too. Some of them are placid and there is no need to operate on them, but some of them are serious, so, unless detected on time, they may lead to progressive decline of the kidney parenchyma. This refers to the obstructive anomalies that are mostly correctible through surgery.

In our case, we would like to point out to the need of an echo sonography examination of the urinary tract (UT) among every child in the breastfeeding period, because the clinical manifestations and diseases in general are unusual at this age, but also to highlight the great significance of early detection and timely surgery.

Introduction

The anomalies of the urinary system cover 30 percent of all congenital anomalies. They are the reason for the emergence of chronic kidney insufficiency among 50 percent of such cases among children (1). The most frequent of the anomalies that appear in the ureters is ureter duplex, which can be complete or partial. When two separate ureteral buds emerge from the Wolfian duct, a complete duplication occurs, whereas when an early abnormal separation takes place with one of the ureteral buds, a partial duplication occurs (2). Clinical examinations based on excretory urographies, made due to the different urinary tract (UT) symptomatology, indicate that the frequency of the duplication of the ureters is 1.8%-4.2% (3). Both the left and the right sides are equally affected. The unilateral duplication is three to six times more frequent. The frequency of this anomaly is 1:150 and it is three times more usual among female children. It is inherited in an auto somatic and dominant way (3). According to the Meyer-Weiger rule, in the case of a complete ureter duplex, the ureter of the lower calices opens in the bladder laterocranially, whereas the upper ones open mediocaudally.

The intravesical part of the ureter of the lower calices is shortened and prone to vesicoureteral reflux (VUR). It appears among 70% of the children suffering from this anomaly (2, 3).

The aim of the study is to present a case of ureter and pyelon duplex in a female child diagnosed as early as in the neonatal period, the progress of the disease in years, its removal through surgery and the current health condition of the child, who is six years old now.
Case Report

A 10-day-old female newborn (gemellus) was hospitalized on our ward in 2002 due to high temperature. In addition to the high leukocytosis in the blood and a positive C-reactive protein (CRP), the urine findings (proteinuria, leukocyturia and microhematuria) indicated a urinary infection. An echo sonography of the urinary tract was performed, after which an anomaly on the right part of the urinary system was diagnosed (Fig. 1).

The microbiological urine findings showed the existence of *E. coli*. Having eliminated the infection with intravenous antibiotic therapy with antibiogram, the newborn was directed to the children’s ward for more through examinations in order to specify the type of the anomaly and the functionality of the kidney (Fig. 2).

Micturating Cystourethrogram (MCUG) - No signs of passive or active reflux (Fig. 3).

The nephrology ward suggested more frequent controls of the urine and an echo sonography every six months. The urinary infection reappeared when the baby was seven months old, accompanied with high temperature. A contrast cystosonography was carried out then with Levovist, which indicated a VUR (Fig. 4).

The baby received ¼ of 50 mg Nitrofurantoin for two months. During the first year urine culture and ordinary urine were being monitored on a monthly basis. A family examination was done on the twin brother, the mother and the father, but no UT anomalies were found.

The child had normal weight, height and psychosomatic development in the first year. Its birth weight was 2,400 g. Its weight at the age of one was 8,200 g. Its birth length was 48 cm, whereas its length at the age of one was 78 cm. The scope of its head was 47 cm. The child was coming to regular checkups at our ward in the second, third and fourth year of age.

Ordinary urine was checked every month, indicating a larger number of proteinuria in the sediment, columnar epithelium and leukocytosis ranging from 15-25. The urine culture was taken every two or three months and it was mostly sterile, but *Escherichia coli* were found twice in the amount higher than 50,000 in mm³.

An echo sonography was performed every six months. The blood test showed signs of moderate anaemia (the Hb values ranged between 100-110 g/L, Er between 3.0-3.9 x 10¹²/L and Fe in the serum was between 5.4-7 μmol/L). The urea level in the blood was 2-7 μmol/L and that of the creatine 9-80 μmol/L.

The height and weight were satisfactory given the child’s age. The child weighed 14 kg at the age of four and was 108 cm high.

At the age of four she was sent to the neurology ward due to severe pains in the right lumbal region, high temperature and Dg: Pyelonephritis ac., Pyelon et
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Discussion

In our case, due to high temperature (suspected neonatal infection) the urine was examined, too, along with a series of basic laboratory examinations. The pathological results of the urine were conducive to echo sonography of the UT, so we diagnosed an infection of the urinary tract with anomaly in the right canalicular system as early as in the 20th day of the child’s life.

The clinical manifestations of the UT anomalies are unusual for early children. Pyrexia, vomitus, urer duplex l. dex., Urethridonefrosis in the urine. A surgery was proposed then due to the dysfunctional upper part of the right kidney and the possibility for a more serious damage and reappearance of infections. Three months later a surgery (resection polus superior renis dex.) was carried out at the Child Surgery Clinic and the diagnosis was ureter et pyelon duplex, stenosis prevezicalis ureteris renis dex.cum ureterohydronephrosis consecutive gr. III (Fig. 5).

The child is perfectly all right and has had no problems whatsoever for two years now. It is six-years old now, weighs 19.5 kg and is 118 cm high.

Fig. 3: Tc99 – Dynamic scintigraphy-diethylenetriamine pentacetic acid (DTPA), total glomerular filtration rate (GFR) 74 mL/min, renographic curved line (RRG) normal and L/R 60/40%.

Fig. 4: Contrast cystosonography was carried out with Levovist.

Fig. 5: After the surgery the echo sonography findings indicated Status post partial right nephrectomy and the rest of the kidney is normal. The distal part of the tied ureter, which is expanded, was detected in the small pelvis.
dysuria, enuresis, haemathuria, failure to gain weight, abdominal mass, dehydration, anaemia, acidosis, and similar symptoms indicate the need for urological investigations (4-6). Although most of them are performed at the Skopje Children Diseases Clinic, we still need to emphasize that every physician is obliged to carry out an echo sonography, as well, of the sick child if the urine samples are pathological.

The frequency of the progressive kidney diseases that result in a chronic kidney insufficiency are assessed to appear among 1.5-3 children of a million of the total population of children older than 16 years (7, 8). The key reason for this is the congenital malformations of the kidneys and the urinary system (50%).

In conclusion, echo sonography of the urinary tract should be introduced as a regular examination of every child in the early breastfeeding period, because the timely detection, monitoring and surgery of the large number of anomalies in the urinary system will reduce the number of infants suffering from a chronic kidney insufficiency.

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References


