Nonobstructive Dilation of Urinary Tract and Later Development of Obstruction: Report of One Case

Shih-Yu Chen¹,², Yu-Tsun Su¹,², Chan-Yao Wu¹,²*

¹Department of Pediatrics, E-DA Hospital, Kaohsiung County, Taiwan
²I-Shou University, Kaohsiung County, Taiwan

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1. Introduction
Cases of nonobstructive dilation of the urinary tract that become obstructive at a later time are rare.¹ Dilation of the urinary tract is not only the most common anomaly diagnosed at pediatric clinics, but it is also the one that is most likely to resolve spontaneously. Hydronephrosis, dilation of the urinary tract, is usually caused by an obstruction. That obstruction may not be found at the time of initial evaluation or during follow-up,² for which diuretic renography is commonly used.³,⁴ We report a case of hydronephrosis in which nonobstruction-related urinary tract dilation subsequently became a complete obstruction of the ureterovesical junction in a boy approximately 2.5 years old. The obstructing segment was resected and ureteroneocystostomy was performed. Postoperative recovery was uneventful.

2. Case Report
Our case was a 2.5-year-old boy who visited our clinic because of abdominal mass. Although he had no history of antenatal hydronephrosis, he had had a previous urinary tract infection that had been treated at another hospital 1.5 years prior to the present visit. At the previous hospital, abdominal sonography showed right mild hydronephrosis (Figure 1). However, voiding cystoureterography showed no vesicoureteral reflux. The anomaly appeared to resolve gradually and the boy discontinued follow-up.

One and a half years later, when the boy was brought to the pediatric clinic at our hospital, we noticed a visible mass over the right lower quadrant. The white blood cell count was 5.4 × 10⁹/L, hemoglobin was 105 g/L, and the platelet count was 248 × 10⁹/L. Serum concentrations of creatinine were 62 μmol/L. Urinalysis was normal. Sonography
revealed severe right hydroureteronephrosis and thinness of the renal cortex (Figure 2). A technetium-99m diethylenetriaminepentaacetic acid diuretic renal scan showed a slow progressive rise in tracer activity over the right kidney. The child did not respond to diuretic furosemide. The glomerular filtration rate of the left kidney was 81.0 mL/min and that of the right kidney was 10.8 mL/min (Figure 3). Based on these findings, we suspected an obstruction of the right collecting system accompanied by a decrease in renal fractional function.

The patient was admitted to our hospital and underwent surgical intervention. Cystoscopy revealed no ureteral orifice at the right hemitrigone. During the surgery, we found complete obstruction of the right ureterovesical junction with an abnormally dilated ureter. Right ureteroplasty and ureteronecystostomy were performed. No complications occurred during the immediate postoperative period. After 1 year, a follow-up abdominal sonographic examination revealed improvement in hydronephrosis. Recovery remained uneventful.

3. Discussion

In this report, we describe the case of a 2.5-year-old boy who had been previously diagnosed with nonobstructive hydronephrosis, but 1.5 years later was found by our clinic to have obstruction at the ureterovesical junction.

Hydronephrosis is defined as an enlargement of the capacity of the collecting system of the kidney, calices and pelvis. Hydronephrosis is associated with varying degrees of obstruction, ranging from complete obstruction to partial to nonobstruction. Koff and Campbell5 followed neonates with unilateral hydronephrosis suggestive of ureteropelvic junction obstruction, and they found that only 7% of these patients had progression of hydronephrosis or deterioration of function requiring pyeloplasty. Karnak and Woo6 reported that 87% of conservatively managed cases had spontaneous resolution of hydronephrosis and/or favorable prognosis. Generally, most cases of pre-existing hydronephrosis are mild and often regress or disappear spontaneously.5-7
Currently, the postnatal evaluation and management of hydronephrosis depends on the determination of the presence or absence of obstruction. However, current techniques cannot reliably diagnose obstruction without including an observation period. The diuretic renogram, a physiological study that assesses the kidney's ability to respond to a diuretic-induced volume challenge, is a renal scan primarily used to differentiate nonobstructive hydronephrosis from obstructive hydronephrosis. Homsy et al showed that ongoing physiological changes in a large proportion of children, particularly neonates and infants, reduce the validity of obstructive patterns determined by a one-time diuretic renal scan. This makes it difficult to distinguish between obstructive and nonobstructive hydronephrosis.

Flashner et al observed a group of patients who initially had nonobstructive hydronephrosis but who subsequently developed obstruction. Follow-up averaged 12 months, but deterioration was noted as much as 33 months later. These observations led to the recommendation that careful follow-up, for a period yet to be determined, is desirable in such patients until a new diagnostic modality is developed for the preselection of kidneys at risk of deterioration. The following questions can be asked: How do we know which cases of hydronephrosis will deteriorate and which will stabilize or improve? What is the optimal follow-up time for patients with hydronephrosis? Pediatric nephrologists will need to await the development of tests that are able to identify at-risk kidneys.

Conservative management of the hydronephrotic kidney is the most common mode of treating asymptomatic hydronephrosis that does not lead to any permanent deterioration of kidney function. Further research into the pathophysiology of partial obstruction, the prevention of subsequent obstruction, and the development of new more sensitive diagnostic techniques capable of sensing early renal damage are urgently needed and ongoing.

References