Congenital hydronephrosis in a 2-year-old boy

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ABSTRACT

Hydronephrosis is enlargement of renal collecting system including renal calyces with or without ureters. It is the most common prenatal anomaly and accounts for about 30–50% prenatal ultrasonography anomalies. Urinary tract dilation occurs in 1/100 pregnancies (1%) and causes significant uropathy in 1/500 (0.2%) cases. Antenatal hydronephrosis means dilation of the fetal renal collecting system that could be detected on prenatal ultrasonography and the prevalence is between 0.5% and 4%. Outcome depends on the underlying etiology. The index case was prenatally discovered at a gestational age of 6 months and postnatal assessment revealed a Grade V hydronephrosis with the absence of excretion or function on the right side.

Key words: *Congenital, Hydronephrosis, Kidney function*

Antenatal hydronephrosis is dilatation of the renal pelvis with or without dilatation of the renal calyces and is identified in 1–3% of all pregnancies. It is the most common prenatal anomaly and constitutes 30–50% of prenatal ultrasound anomalies [1-4]. Antenatal hydronephrosis may develop secondary to transient dilation of the collecting system, upper or lower urinary tract obstructive uropathy, and non-obstructive processes such as vesicoureteral reflux (VUR), megaureters, and prune belly syndrome. The most common causes are transient hydronephrosis, ureteropelvic junction obstruction (UPJO), and VUR.

Transient hydronephrosis is seen in 41–88% of cases and may be related to a transient narrowing of the ureteropelvic junction. UPJO is the leading cause (40%) of hydronephrosis. VUR is the second most common diagnosis [5-7]. Other less common causes include megaureter, multicystic dysplastic kidney, ureterocele, posterior urethral valves, ectopic ureter, prune belly syndrome, urachal cyst, duplex collecting system, and urethral atresia. Causes of bilateral hydronephrosis are posterior urethral valve (2–9%), VUR, urethral aplasia, prune belly syndrome, megaureter, and polycystic kidney disease [8,9]. Complete resolution may occur in 88% of patients with mild antenatal hydronephrosis *in utero* or during neonatal period while 30% of patients with moderate or severe antenatal hydronephrosis persisting in the third trimester may require surgery during postnatal life [10,11].

CASE REPORT

Master A.O. was a 2-year-old boy who presented with progressive painless abdominal swelling since birth. He first presented at the children emergency room at 15 months of life with the same complaint. His mother had an uneventful antenatal period which was supervised by physician at a general hospital. The patient's mother had an abdominopelvic ultrasonography at 6 months of gestation which revealed fetal abdominal swelling. At birth, the patient's mother noticed a distended abdomen in her newborn baby. At birth, the patients mother noticed a distended abdomen in her newborn baby which was associated with facial puffiness that regressed by the end of the day. There was no associated fever, cough, weight loss, vomiting, hematuria, and dysuria. Urinary frequency was within normal limits.

From birth to 6 months of postnatal life was exclusive breastfeeding which was stopped at the age of 1 year. He ate family-based meals supported with cereals and milk. Immunization history was adequate for his age and normal developmental milestones were within normal limits. He was the youngest of the four children.

On physical examination, respiratory rate was 28/min and pulse rate was 88 bpm, with good volume. The abdomen was grossly distended (Fig. 1) and ascites was present. Other systemic examination was normal. On investigations, plain abdominal X-ray revealed bilateral hydronephrosis which was more on the right side. Electrolytes, urea and creatinine, full blood count, and urinalysis revealed normal findings. Intravenous urogram revealed a non-excreting right kidney (Grade V hydronephrosis) and a well outlined and excreting hydronephrotic left kidney (Fig. 2).

On account of the above clinical features and results of investigations, a diagnosis of non-functioning right kidney

secondary to right multicystic dysplastic kidney disease was made. He was admitted and given pre-operative care which included intravenous fluids, antibiotics, low residue diet, and bowel preparation. Intraoperative findings were grossly distended abdomen, hydronephrotic right kidney (4.4 kg, huge multicystic right kidney with distorted anatomy which measured 40 cm by 30 cm by 15 cm), as shown in Fig. 3, left kidney, and other intra-abdominal viscera appeared normal. Right nephroureterectomy took place successfully. The surgical specimen removed was sent for histology and the histology report suggested congenital hydronephrosis. His post-operative care was uneventful and he was discharged after 9 days with an advice to continue follow-up and monitoring. He is presently doing well and attends the pediatric surgical outpatient clinic according to his follow-up plan.

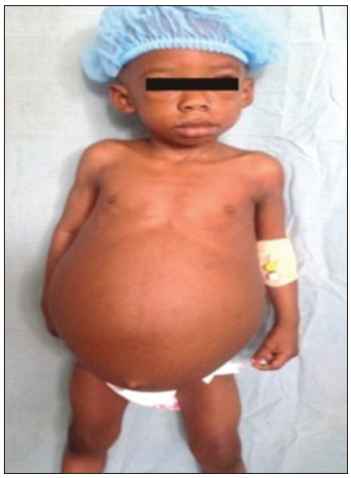

Figure 1: Showing grossly distended abdomen

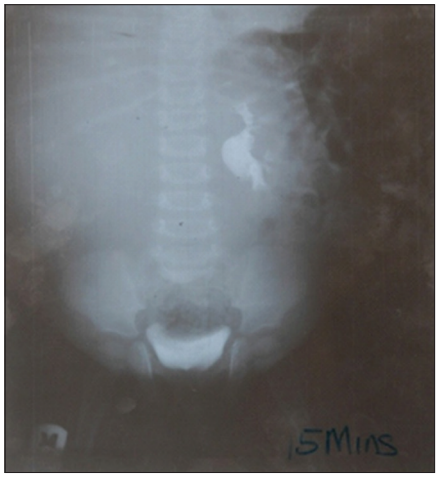

Figure 2: None excreting right kidney and excreting but hydronephrotic left kidney

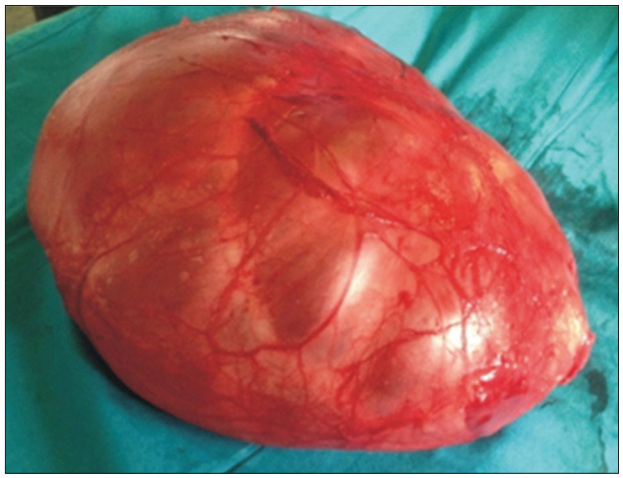

Figure 3: Showing multicystic right kidney (nephrectomy specimen)

DISCUSSION

Antenatal hydronephrosis is dilatation of the renal pelvis with or without dilatation of the renal calyces and is identified in 1–3% of all pregnancies and is one of the most common birth defects detected [1]. The widespread use of ultrasonography during pregnancy has resulted in a higher detection rate for antenatal hydronephrosis, and the prevalence of 0.5–4% of all pregnancies has been reported by some authors [12]. The majority of cases recover spontaneously, but approximately 40% requires post-natal follow-up and in half of these cases, medical or surgical intervention is needed to prevent significant renal damage. In 48% of cases of antenatal hydronephrosis, no specific etiology could be identified. Physiologic changes are seen in 15%, whereas ureteropelvic and ureterovesical junction obstructions account for 11% of the cases. About 9% have unilateral or bilateral megaloureters, 2% of cases have multicystic dysplastic kidney, and 1% have ureterocele and posterior urethral valves [1,2,13,14].

It is important to characterize fetal hydronephrosis by its severity, laterality, and its association with ureteric dilatation, renal parenchymal changes, and abnormalities of bladder size, thickness, and emptying. PUJ obstruction is by far the most common cause of antenatal hydronephrosis and is associated with varying degrees of fetal renal pelvic dilatation. Fetal intervention includes ultrasound every 4 weeks after the initial diagnosis. Other more invasive diagnostic procedures to assess the overall status of the fetus are amniocentesis, per umbilical blood sampling, and chorionic villous sampling [15,16]. Consequences of hydronephrosis include urinary tract infection, pyelonephritis which results to renal scarring in 10% of patients, hypertension, loss of renal function, and end-stage renal disease [8-11].

The initial assessment of a neonate with prenatally identified hydronephrosis would consist of confirmatory postnatal ultrasound usually 2–3 days after delivery. Some authors recommend prophylactic antibiotics to all infants with prenatally detected hydronephrosis while others give prophylactic antibiotics when pelvicalyceal dilatation is severe [17]. The goal of management is to detect those cases which would impact the health of the infant and require antenatal, postnatal evaluation and possible intervention to minimize adverse outcomes as highlighted above. Antenatal care involves counseling, plan for the best choice, and type of delivery and shunting where indicated and if facilities for shunting were available. However, the index case did not receive any antenatal intervention for the congenital hydronephrosis. Postnatal evaluation includes physical examination and the use of radiologic and laboratory studies to determine the laterality and

cause of hydronephrosis, the functional state of the kidneys, and general condition of the patient [18-20].

CONCLUSION

Antenatal hydronephrosis is the dilation of the fetal renal collecting system that could be detected on prenatal ultrasonography and its prevalence is between 0.5–4%. The index patient was diagnosed at the gestational age of six months. The outcome of treatment depends on the underlying aetiology.

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