# Management of antenatally diagnosed hydronephrosis in a child presenting later with urinary tract infections: A case report

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## ABSTRACT

Preservation of renal function remains the main goal of follow-up of a child with antenatal hydronephrosis. The question remains as to how long we need to follow these children. Even after several decades, the indications and timing of surgery in a newborn with hydronephrosis are still debated. Herewith, we report the case of a 9-year-old male child who was diagnosed to have hydronephrosis on antenatal scans and was managed conservatively postnatally who presented after 9 years with recurrent urinary tract infections.

**Key words:** *Antenatal diagnosis, Conservative treatment, Ureteropelvic junction obstruction*

The postnatal management of a child with unilateral hydronephrosis detected on a prenatal scan remains controversial even today. Over the past few decades, there has been a gradual shift away from early surgical intervention. Several publications have clearly indicated that the dilated pelvicalyceal system (PCS) was not always associated with the obstruction and a significant percentage of these children improved or resolved with time [1-3]. Unfortunately, even after several decades, the indications and timing of surgery in a newborn with hydronephrosis are still debated, and there exist several disagreements over the right test to determine obstruction accurately or to rightly predict as to which kidney would benefit from a surgical intervention [1].

In one of the study, Chertin *et al*. [4] attempted to define predictive factors for surgery in children with antenatally diagnosed hydronephrosis secondary to ureteropelvic junction (UPJ) obstruction and found that Society for Fetal Urology (SFU) Grade 3–4 of postnatal hydronephrosis ($p<0.0001$) and relative renal function (RRF) <40% ($p<0.0001$) were the only significant independent risk factors for surgery. Here, we report the case of a 9-year-old male child who was diagnosed to have hydronephrosis on antenatal scans and was managed conservatively, presented 9 years later with urinary tract infections (UTIs).

## CASE REPORT

A 9-year-old male child presented to the pediatric urological services with a history of recurrent febrile UTI of 6 months duration. This child was diagnosed to have left-sided hydronephrosis on antenatal scans. Postnatal ultrasonography done at 1 month after birth, 1 year, and 2 years showed a dilated PCS, and the radionuclide isotope scans showed RRF of >40% at 1 year and 2 years after birth (Table 1 and Fig. 1a-d). The treating pediatric surgeon put the child on conservative treatment including prophylactic oral antibiotics. After 2 years, the parents discontinued the follow-up as the child was doing fine and had no complaints.

Later on, after 9 years, the parents came with the chief complaint of recurrent febrile UTI for 6 months. On clinical examination, the child was afebrile and had tenderness in the left loin. All the vitals were within the normal range.

Serum creatinine was 0.6 mg%, blood urea was 24 mg%, and blood hemoglobin was 12.5 g%. Urine examination showed plenty of pus cells and urine culture grew *Escherichia coli* sensitive to most antibiotics. Ultrasonography revealed a dilated left PCS with an anteroposterior diameter of pelvis being 25 mm. The calyces appeared clubbed and the parenchymal thickness was 7 mm at the upper and lower poles. Contrast computed tomography revealed a gross hydronephrosis on the left side with obstruction at UPJ, normal excretion of contrast into the dilated PCS, and non-opacification of ureter even at 20 min (Fig. 2a and b). Radionuclide diethylenetriaminepentazacetic acid (DTPA) scan revealed a grossly dilated left kidney, with adequate function and obstructed drainage. The RRF was 35% (Fig. 2c and d).

In view of the history of recurrent UTI, thinning of renal parenchymal at the poles and clubbed calyces, the child was offered a pyeloplasty. The child underwent open Anderson-Hynes pyeloplasty and the post-operative period was

**Table 1: Ultrasonography and RRF over a period of time**

| Parameters | At birth | At 1 year of age | At 2 years of age | At 9 years of age |
|---|---|---|---|---|
| AP diameter (mm) of the renal pelvis | 15 | 20 | 22 | 25 |
| Calyceal changes (SFU grade) | 2 | 3 | 3 | 4 |
| RRF % | - | 47 | 45 | 35 |

**SFU: Society for Fetal Urology, RRF: Relative renal function**

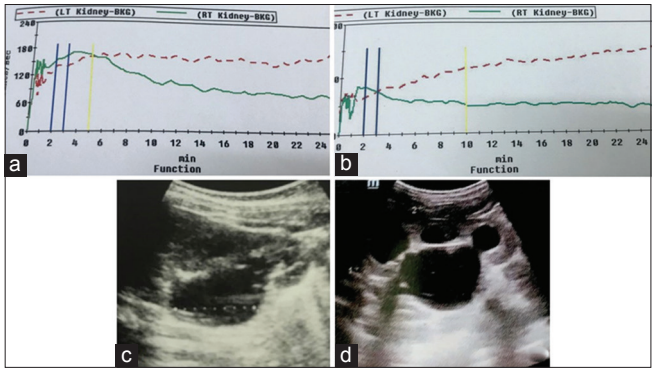


**Figure 1: (a) Diethylenetriaminepentaacetic acid (DTPA) scan done at the age of 1 year shows obstruction of the left kidney, (b) ultrasonography done at the age of 1 year shows AP diameter of 20 mm, (c) DTPA scan done at the age of 2 years shows persistent obstruction of the left kidney, and (d) ultrasonography done at the age of 2 years shows AP diameter of 22 mm and Society for Fetal Urology Grade 3 hydronephrosis**

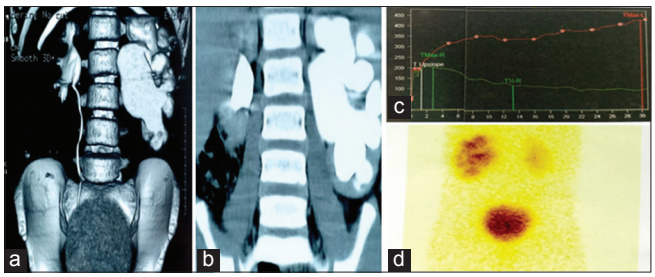


**Figure 2: (a) Computed tomography (CT) 3D reconstruction shows a dilated pelvicalyceal system, (b) CT shows a functioning left kidney with thinned out renal parenchyma, (c and d) diethylenetriaminepentaacetic acid scan shows obstructed left kidney**

uneventful (Fig. 3a-d). A repeat DTPA scan done at 12 weeks showed an adequately emptying UPJ.

## DISCUSSION

The majority of the cases of fetal hydronephrosis secondary to UPJ obstruction are managed by non-operative observation, and surgery is reserved to only those children with deteriorating renal function or clinical symptoms [4-6]. The natural history of fetal hydronephrosis, the optimal time for surgery, the ability to define which kidney will benefit from surgical intervention, and which children will have deterioration in renal function while on surveillance are still matters of controversy [4]. One attempt has been done by Chertin *et al*. [4] to define the predictive factors for surgery in children with antenatally diagnosed hydronephrosis secondary to UPJ obstruction. They retrospectively evaluated 343 children (260 males and 83 females) with antenatal diagnosis of hydronephrosis and who were followed conservatively. According

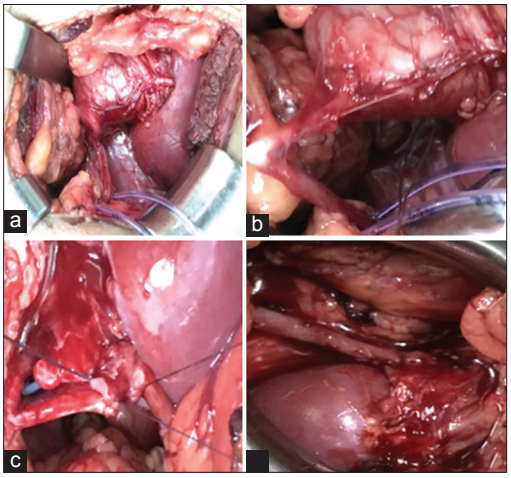


**Figure 3: (a and b) Dilated pelvis with the ureter, (c) Anderson-Hynes pyeloplasty in progress, and (d) Anderson-Hynes pyeloplasty completed**

to the SFU classification, 20 had Grade 1, 118 Grade 2, 147 Grade 3, and the remaining 58 children had Grade 4 postnatal hydronephrosis. RRF on radionuclide scans revealed 235 children with RRF >40%, 68 with RRF between 30% and 40%, and 40 patients with RRF <30%. Renal function deterioration >5% was the main indication for surgery. Surgical correction was needed in 179 children (52.2%) during the course of conservative management. The average age at surgery was 10.6 months. Of those, 50% underwent surgery during the first 2 years of life and the majority of the remaining patients underwent surgery between the 2 and 4 years of age; only two patients required surgery later on. Hence, it was found that SFU Grade 3–4 of postnatal hydronephrosis ($p<0.0001$) and RRF <40% ($p<0.0001$) were the only significant independent risk factors for surgery.

The main goal in the treatment of children with UPJ obstruction is the improvement/maintenance of renal function following surgery. Chertin *et al.* [7] had clearly demonstrated that prenatal diagnosis of hydronephrosis with close follow-up of these children after delivery was much superior in terms of renal function preservation compared to children whose diagnosis of UPJ obstruction was made based on clinical symptoms.

The most crucial point in the non-operative management of children with antenatal UPJ obstruction is to distinguish between children in whom renal function will be maintained and those in whom it will deteriorate. According to the Campbell urology and the European Association of Urology (EAU) guidelines 2018, micturating cystourethrogram is mandatory in a child with antenatally diagnosed hydroureteronephrosis but was not done in this case. Chertin *et al.* [4] have recommended performing ultrasonography and radionuclide studies every 3–6 months during the first 2 years of life. If renal function and SFU grade

of hydronephrosis are stable, the children can be followed by ultrasonography alone, every 6 months for another 2 years. Such a policy would avoid unnecessary parental anxiety and similarly reduce the additional cost of follow-up in the selected children. The child in our report did not follow-up after the initial 2 years; hence, changes which could have been identified in relation to SFU grade of hydronephrosis were missed. What is unique in this child was that the renal function assessed at birth, 1 year, and 2 years of age showed good RRF. The child remained asymptomatic for about 9 years. The child presented with symptoms of recurrent UTI 9 years later.

Contrary to previous publications, current data show that >50% of children with an antenatal diagnosis of hydronephrosis secondary to UPJ obstruction require surgical correction while on a conservative protocol [4]. According to the EAU guidelines [4], SFU Grade 3–4 postnatal hydronephrosis and RRF <40% are significant independent predictive factors for surgery at the age of 1 or 2, but in the present case, the treating pediatric surgeon had put the child on conservative treatment including antibiotics, probably based on good renal function. The recommendations for the exact length of post-operative follow-up are still to be defined.

## CONCLUSION

The postnatal management of a child with unilateral hydronephrosis detected on a prenatal scan remains controversial. Current data show that >50% of children with an antenatal diagnosis of hydronephrosis secondary to UPJ obstruction require surgical correction. Hence, children need to be followed up for a long duration, so as to treat them when necessary.

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