

Original Research Article

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Nephroureterectomy versus pyeloplasty for giant hydronephrosis in children with upper urinary tract obstruction; perspectives from a tertiary health facility in Southern Nigeria

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ABSTRACT

Background: Unrecognized or neglected cases of obstructed upper urinary tract in children can cause marked dilatation and structural damage to the ureters and kidney/s. In our region, many of such unrecognized obstructions result in giant hydronephrosis with resultant poor outcomes of pyeloplasty. We present our perspective of such giant hydronephrosis and make a case for straight nephroureterectomy rather than pyeloplasty which has been our standard treatment.

Methods: This is a review of cases of congenital upper urinary tract obstruction with giant hydronephrosis seen in children in our practice between March 2008 and February 2017. Case notes of patients who were managed within the period were retrieved to extract relevant data. Data obtained included the biodata, presenting features, dimension of renal pelvis and ureter at imaging and intraoperatively, treatment offered, outcome as at one-year follow-up. Results were subjected to simple statistical analysis.

Results: There were 39 patients and they comprised 22 (56.4%) males and 17 (43.6%) females. Their age range was 3 to 14 years with a mean of 7 years. The most consistent clinical feature was abdominal distension. Five (12.8%) patients had abnormality of renal function preoperatively. The obstruction was unilateral in 30 (76.9%) cases and bilateral in 9 (23.1%) cases giving a total of 48 obstructions. All the patients were operated on. Complications encountered were mostly related to patients in whom we performed pyeloplasty. There were three mortalities related to sepsis and end stage renal disease.

Conclusions: Upper urinary tract obstruction is often recognized late in our practice. Abdominal swelling is a common presenting feature of upper urinary tract obstruction in our practice. It appears that in unilateral cases, nephroureterectomy is a safer and more effective treatment option than pyeloplasty in such late cases with giant hydronephrosis. There is need for a well-designed prospective study to evaluate the option of nephroureterectomy in these cases.

Keywords: Upper Urinary Tract, Obstruction, Hydronephrosis, Pyeloplasty, Nephroureterectomy

INTRODUCTION

Obstruction of the upper urinary tract in children is a recognized urological problem with a potential to cause structural damage to the kidney/s which may result in

chronic renal disease. The causes are variable, comprising congenital and acquired causes. The congenital causes are more prominent in children and their deleterious effects can become remarkable even in the intrauterine life.¹ Pelviureteric junction obstruction (PUJO) and

vesicoureteric junction obstruction (VUJO) are among the commonest obstructive congenital causes encountered.² Non-obstructive congenital causes of upper urinary dilatation (vesicoureteric reflux) are also well known but do not cause the kind of giant hydronephrosis seen with PUJO and VUJO.³ With quality obstetric and paediatric services, these conditions are diagnosed prenatally or soon after birth.^{4,5} The standard treatments for these conditions are forms of pyeloplasty or ureteric reimplantation which could be open or laparoscopic. However, in our region, early postnatal diagnosis is uncommon, and prenatal diagnosis is rare. Unlike acute upper urinary tract obstruction which produces dramatic symptoms and patients tend to present early, PUJO and VUJO cause chronic obstruction and are usually asymptomatic initially, particularly if unilateral.^{6,7} Consequently, many of our patients present very late when the resulting hydronephrosis is big enough to cause noticeable abdominal distension. The paediatric urologist, in this circumstance, is met with hydronephrosis not fitting into the picture of what is common in literature.¹ The presentation, challenges and outcome of treatment of these giant hydronephrosis make our experiences peculiar. We compare the outcome of pyeloplasties with that of nephroureterectomies in this situation.

METHODS

This is an analytical review of cases of congenital upper urinary tract obstruction with giant hydroneureteronephrosis seen in children in our practice between March 2008 and February 2017. We defined giant hydronephrosis as a case where the renal pelvis distended down to the iliac crest or ureter up to transverse diameter of the transverse colon.

Inclusion criteria

- Giant hydroneureteronephrosis,
- Congenital cause,
- Obstruction above the level of urinary bladder.

Exclusion criteria

- Age less than one year,
- Age of 18 years and above,
- Acquired cause,
- Non-obstructive causes of hydronephrosis,
- Obstructions at or below the level of the urinary bladder,
- Incomplete records,
- Loss to follow up.

A proforma was designed to obtain the following data: biodata, presenting features, treatment offered, dimension of renal pelvis and ureter at imaging and intraoperatively. The outcome after an average follow-up period of one year was recorded. Patients who had pyeloplasty were categorized separate from patients who had

nephroureterectomy either primarily or following failed pyeloplasty. The parameters used to assess outcome were anastomotic integrity, tract patency, status of hydronephrosis, and renal function. Successful pyeloplasty was defined as a repair in which there is normal urinary flow across the anastomosis (without leakage), resolution or reduction of the hydronephrosis, and normal or improving renal function. Failed urethroplasty was defined as where there is urine leakage or stenosis with persisting or worsening hydronephrosis and deteriorating renal function. Results were subjected to simple statistical analysis.

RESULTS

There were 56 patients with upper urinary tract dilatation but thirty-nine of them met the inclusion criteria and comprised 22 (56.4%) males and 17 (43.6%) females. Their age range was 3 to 14 years with a mean of 7 years. The most consistent clinical feature was abdominal distension (Table 1).

Table 1: Presenting features of patients with giant hydronephrosis.

Clinical feature	Patients	Percentage
Abdominal distension	39	100
Abdominal mass	39	100
Abdominal pain	32	82
Poor weight gain	12	30.8
Recurrent fever	5	12.8
Abnormal renal function test	4	10.3
Anaemia	6	15.4

The obstruction was unilateral in 30 (76.9%) cases and bilateral in 9 (23.1%) cases giving a total of 48 obstructions. These obstructions were located at the pelviureteric junction in 38 (78.2%) cases, and at the vesicoureteric junction in 10(20.8%) cases. The pathologies seen at surgery are shown in Table 2.

Table 2: Distribution of patients according to structural anomaly in the urinary system.

Pathology	Patients	Percentage
Unilateral giant hydroneureteronephrosis (GHUN) + normal contralateral kidney	28	72
Unilateral GHUN + Absent contralateral kidney	1	2.6
Unilateral GHUN + Dysplastic contralateral kidney	1	2.6
Bilateral GHUN	9	23

All the patients were operated, some had more than one surgery as part of multistage procedures or following complications (Table 3).

Table 3: Surgical procedures carried out on the patients.

Surgical Treatment	No of surgeries (67)	Percentage
Pyeloplasty	15	22.4
Pyeloplasty + Cutaneous calycostomy/ureterostomy	17	25.4
Ureteric reimplantation	6	8.9
Nephroureterectomy	29	43.3

A total of 32 pyeloplasties were performed and of these, 13 developed complications requiring a review, giving a success rate of 56.3% (Table 4).

Table 4: Incidence of complications between patients who had pyeloplasty and those who had nephroureterectomy ($p = 0.02$).

Complications	Pyeloplasty	Nephroureterectomy
Failed closure of ureterostomy	3	-
Anastomotic leakage	3	-
Distal stump leakage	-	2
Anastomotic stenosis/ recurrent hydronephrosis	5	-
Impaired renal function	2	4
Mortality	2	1

Nephroureterectomy was performed in 10 of the obstructions, and also for patients with failed pyeloplasty. A total of 29 nephroureterectomies were performed, and of these, 6 had complications, giving a success rate of 79.3%. This is significantly different from the success rate of nephroureterectomy ($p = 0.02$). There were 3 mortalities, 2 were from sepsis and 1 from end stage renal disease.

DISCUSSION

Congenital upper urinary tract obstruction is a common urological problem seen worldwide. Being a major contributor among the causes of obstructive nephropathy in children, it assumes particular importance in paediatric surgery. In our practice the picture is more complex as a significant number of them do not present or are not diagnosed until upper urinary tract enlarges sufficiently to cause obvious abdominal distension and the renal cortex is thinned markedly. The grade 4 hydronephrosis of both the Society for Fetal Urology (SFU), and the ONEN grading system do not capture the scenario where

the renal pelvis and ureters are distended so grossly that they cause abdominal distension.⁹ These late cases do not fit into the picture for PUJO and VUJO standard treatment, and management cannot be easily matched by what has been described by authors in other climes.^{10,11}

Whereas laparoscopic and robotic techniques of pyeloplasty and endopyelotomy are common options in advanced countries, the open pyeloplasty remains our first choice treatment for straight forward PUJO in children.^{12,13} Parameters from scintigraphy, diuresis renography and ultrasonography, like differential renal function, calyceal dilatation and calyceal dilatation/parenchymal thickness ratio have been shown to guide management and assess outcome.^{14,15} These assessment tools are more useful for cases seen early and in whom upper urinary tract damage can be minimised.¹⁶⁻¹⁸ Detailed preoperative evaluation of children diagnosed early is able to predict those that will require surgery and give guidance to management.¹⁹

In the present series late presentation and limited diagnostic tools made this impossible and may have contributed to the high complication rates we encountered. In our patients, upper urinary tract has been so distended and distorted that those parameters are not of significant value in the management. The majority of our patients had unilateral obstruction. This is in keeping with findings by other reporters.^{20,21} This made it easier for the option of nephroureterectomy to be considered. In two of these patients however, milder hydronephrosis occurred on the contralateral side, apparently due to impingement of the dilated ureter on the lower part of the normal ureter. In these two situations, the contralateral hydronephrosis resolved with treatment of the primary (giant) hydronephrosis. Bilateral obstructions were less common and they had pyeloplasty first on the better side, and then nephroureterectomy on the side with giant hydronephrosis. Pyeloplasty was the commonest surgery performed and many had a cutaneous ureterostomy (or calycostomy) to protect the anastomosis. Outcome was considered successful in 56.3% of cases of pyeloplasty. This success rate of pyeloplasty in this group of our patients is low compared to over 85% reported in advanced countries.^{22,23}

Complications led to reoperation necessitating nephroureterectomy in nine patients. An additional ten patients had nephroureterectomy as the first treatment offered. From this study, the complications following nephroureterectomy was significantly less compared with those following pyeloplasty ($p = 0.02$). In conclusion, upper urinary tract obstructions and dilatation in children are often recognized late in our practice. Abdominal swelling is a common presenting feature of upper urinary tract obstruction in our practice. The massive dilatation and tortuosity of the upper urinary tract in these cases make pyeloplasty more technically demanding and be associated with high incidence of complications. It appears that nephroureterectomy is a safer and more

effective treatment option for giant hydronephrosis particularly where it is unilateral, and the contralateral kidney is normal.

We note the limitations of this study as a retrospective analytical study. Many of the patients who could have been included in this study were excluded due to insufficient data. This might have affected the final result of this study. However, it highlights the need for a well-designed prospective study to compare the outcomes of treatment of giant hydronephrosis using pyeloplasty or nephroureterectomy.

CONCLUSION

Upper urinary tract obstruction is often recognized late in our practice. Abdominal swelling is a common presenting feature of upper urinary tract obstruction in our practice. It appears that in unilateral cases, nephroureterectomy is a safer and more effective treatment option than pyeloplasty in such late cases with giant hydronephrosis. There is need for a well-designed prospective study to evaluate the option of nephroureterectomy in these cases.

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