

Chronic Renal Failure due to Obstructive Uropathy in Children

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Obstructive uropathy is an important cause of chronic renal failure (CRF) in children, and is both preventable and reversible to some extent. We conducted a prospective study of all new paediatric cases of CRF between 1991-2000 to find out the contribution of obstructive uropathy to childhood CRF. There were 25 (22 male & 3 females) cases of obstructive uropathy out of a total of 135 patients, with a mean age of 4.5 years. The commonest cause was posterior urethral valves (68%), followed by urolithiasis (20%), bladder neck obstruction (8%) and post-traumatic strictures (4%). Posterior urethral valves accounted for 77.3% of the obstructive uropathy in male children. Early detection is possible using antenatal screening, renography and ultrasonography, allowing therapeutic interventions before renal failure sets in.

Key words: Obstructive uropathy, renal failure, chronic, children

CRF is an important cause of childhood mortality and morbidity, placing a tremendous burden on the health care facilities in any society. Congenital urological malformations are the commonest cause of childhood CRF^{1, 2, 3} with congenital obstructive uropathy accounting for about half of these cases⁴. Common causes of obstructive uropathy include posterior urethral valves (PUV), urethral atresia, multicystic dysplastic kidneys and urolithiasis⁵. Early detection can prevent the onset of renal failure in most cases of obstructive uropathy. Furthermore, some degree of reversal of renal failure is possible if the obstruction in the urinary passages is removed.

Early diagnosis is possible by renography and antenatal screening especially in familial cases of obstructive uropathy allowing prenatal intervention^{6,7,8}. Unfortunately, we still see many children with advanced renal damage due to obstructive uropathy, which could have been prevented if early diagnosis and intervention had been possible.

A prospective analysis of all new pediatric cases of CRF was performed at our hospital over a ten years period. The contribution of obstructive uropathy to the condition was studied, focusing on individual causes and the sex distribution, with the objective of formulating recommendations for surveillance and prevention of this form of childhood CRF.

Study Design

Aims and objectives

1. To outline different causes of obstructive uropathy resulting in CRF.
2. To find gender related differences in types of obstructive uropathy.

Inclusion Criteria

1. Children from 3 months to 18 years of age.
2. All patients with persistent elevation of serum creatinine above normal or GFR <30 ml/min/1.73m² for at least three months.
3. Patients with some type of obstruction in urinary tract as an underlying cause of CRF.

Exclusion Criteria

1. Patients less than 3 months or more than 18 years of age.
2. Patients in whom the underlying cause of CRF could not be established.

Materials & Methods

This was a prospective observational study conducted in the Department of Paediatrics, King Edward Medical College & Mayo Hospital, Lahore, over a period of ten years (1991-2000). All the patients presenting with CRF were investigated in a quest to find the underlying cause. Those patients were included who had some form of obstruction in their urinary tract as the primary etiology leading to CRF. Out of a total of 135 established cases of CRF, who were studied, 25 were found to have obstructive uropathy.

Results

In our study obstructive uropathy constituted 18.5% (25) of total patients of CRF (135) admitted in the ward. Mean age at the time of diagnosis was 4.5 years. Five different types of obstructive uropathies were discovered in these patients (Graph-1). The commonest type of obstructive uropathy was PUV (17, 68%) followed by renal stones (4, 16%), bladder neck obstruction (2, 8%), bladder stones (1, 4%) and post-traumatic strictures (1, 4%).

Out of a total of 25 patients, 22 (88%) were males and only 3(12%) were females. 77.3% (17) of male patients had PUV leading to CRF. All the females (3, 100%) had renal stones causing obstructive uropathy, while only 1(4.5%) patient amongst the male children suffered from it. Results are summarized in Table-1

Discussion

Obstructive uropathy is a common cause of CRF in children, responsible for 33-52% of overall cases of CRF in different studies^{3,9}. The burden on health care resources is also tremendous. In USA, 16.5% of all paediatric renal transplants were due to obstructive uropathy¹⁰. The common congenital causes reported in literature include

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PUV, urethral atresia, prune belly syndrome and magacystis⁸, while the acquired causes include stones and strictures. Most of these causes are reversible if detected in time. Advances in antenatal screening (by detection of beta2-microglobulin in fetal serum) and neonatal surveillance (F+0 renograms in neonates and infants younger than 6 months) have made early detection and intervention possible^{6,7,8}, improving long-term renal outcome. Unfortunately, we continue to see children with obstructive uropathy presenting in end stage renal disease, needing renal replacement therapy. In our study of 135 children with CRF, 25 (18.5%) patients had obstructive uropathy, the majority of these were males with PUV (17, 68%), while renal and bladder stones, bladder neck obstruction and strictures accounted for the rest. The mean age of these children was 4.5 years (range 1-10 years). Our figures were consistent with internationally reported data

in that the PUV were the leading cause and that the majority of cases of obstructive uropathy were males¹. If recognized at a timely stage, complications of obstructive uropathy like hydronephrosis with progressive renal damage and urinary ascites may be prevented¹¹.

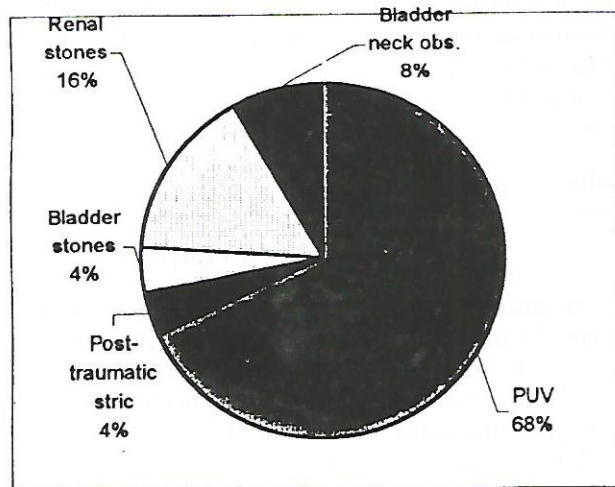
We recommend antenatal screening for beta2-microglobulin to detect obstructive uropathy⁷, ultrasonography and routine renography with first urinary tract infection in children¹².

Conclusion

Obstructive uropathy is a common and important cause of CRF in males. PUV is the commonest type of obstruction to urinary flow. If diagnosed and treated in time, the damage to kidneys can be completely prevented.

Table 1: Correlation of types of obstructive uropathy with gender

Gender	Types of obstructive uropathy										Total n=25	%
	PUV	%	Bladder Neck Obst	%	Renal Stone	%	Bladder stones	%	Post traumatic stricture	%		
Female	0	0	0	0	3	100	0	0	0	0	3	12
Male	17	77.3	2	9.1	1	4.5	1	4.5	1	4.5	22	88



Graph 1: Distribution of different types of obstructive uropathy

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