

Primary vesicoureteric reflux in Nepalese children

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Abstract

Background: Vesicoureteric reflux (VUR) is a common urinary tract abnormality observed in children with urinary tract infection and children with VUR are at risk of reflux nephropathy and renal parenchymal damage. In Nepal, till date there are no published series of VUR in children.

Aims and Objectives: To study the incidence of VUR in Nepalese children with Urinary tract infection (UTI), to analyze the age and sex wise distribution and clinical course of children with VUR together with the rate of spontaneous resolution of VUR in children

Methodology: A retrospective hospital based study conducted at Department of Paediatrics Patan Hospital from June 2002 to December 2005. Hospital record files of all the children undergoing micturating cystourethrography (MCUG) as part of UTI work up were traced and the files of children with positive VUR were separated and analyzed.

Results: Over the 3 and a half years study period total 145 micturating cystourethrograph were done in children with UTI, out of which 35(24%) were positive for VUR. Among the children with VUR, the most common age group was between two to twelve months and the male female ratio was 1.2:1. More than 60% had bilateral VUR and bilateral grade II VUR was the most common finding. Renal scan (DMSA) was done in only 5 cases and out of those two showed renal scarring. Eight cases underwent repeat MCUG after 1-1 ½ years and spontaneous resolution of VUR was seen in 5 (62.5%) cases. Six cases were lost in follow up, 5 cases went for surgical intervention.

Conclusion: The incidence of VUR in children with UTI in our part is almost comparable to western data. Children with VUR need regular and long term follow-up.

Key words: Vesicoureteric reflux (VUR), Micturating cystourethrography (MCUG), Reflux nephropathy, Nepalese children, Patan Hospital

Vesicoureteric reflux is a common urinary tract abnormality observed in children with urinary tract infection. One to two percent of apparently healthy children have VUR and it is observed in 30-40% of the children with UTI¹. Primary VUR is a maturational abnormality of the vesicoureteral junction which usually resolves spontaneously by the age of 4-5 years². Younger children are more likely to have VUR and VUR in younger children are more likely to resolve spontaneously. Children with VUR are at risk of reflux nephropathy and renal parenchymal damage, which can potentially lead to hypertension and end stage renal failure. Children less than 2 years are at increased risk of renal scarring³. There is a direct relation of grade of reflux and the incidence of nephropathy. The rate of spontaneous resolution is higher in lower grades^{4,5} and unilateral reflux⁵. VUR is best identified and graded by micturating cystourethrography (MCUG).

Though primary VUR is a common problem in children there are great disagreements regarding the best form of treatment for children with VUR and regarding the best way to investigate children with UTI. As a result of systematic review of published literature and observations made on

patients with VUR with no UTI, questions have been raised against the current management of VUR in children⁶. In Nepal till date there has been no study on primary VUR in children. The main objectives of this study was to find out the incidence of VUR in children with UTI in our country, to study the age and sex wise distribution, clinical course and rate of spontaneous resolution of VUR in our population.

Materials & Methods

A retrospective hospital based study was conducted at Department of Paediatrics Patan Hospital from June 2002 to December 2005. The hospital record files of all the children undergoing micturating cystourethrography (MCUG) were traced with the help of x-ray record book in the department of radiology. MCUGs done for purposes other than urinary tract infection workup were excluded. The files of children with positive VUR were separated and analyzed.

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We in our hospital do MCUG in all children below 5 years with an episode of documented definite culture positive UTI or with negative urine culture (on antibiotics) with positive urine microscopy and / or urine dip-stick positive for leukocyte esterase and nitrite along with evidence of pyelonephritis on ultrasound. We also get cases referred from outside hospitals with recurrent UTIs for work up. Patan Hospital is the only hospital in Nepal where MCUG is done routinely as part of UTI workup in young children.

Results

Over the 3 and a half years study period total 145 MCUGs were done in children with UTI, out of which 35 (24%) were positive for VUR. Among the children with VUR, the most common age group was between two to twelve months followed by less than 2 months. (Fig. 1)

There were 54.3% males and 45.7% females, the male female ratio being 1.2:1. Except for the age group of 1-2 years the number of male and females were not significantly different. (Fig. 2)

Abdominal ultrasonography (USG) was done in all the cases and only 54.2% cases revealed some abnormality while the rest were reported normal. The most common abnormalities reported were increased echogenesity of the kidneys and hydronephrosis (17% each). Kidney size disparity was observed in 14.3% cases. Renal scan (DMSA) was done in only 5 cases and out of those two showed renal scaring.

More than 60% had bilateral VUR and bilateral grade II VUR was the most common finding followed by unilateral grade III VUR. Five cases had bilateral VUR of different grades on either side. (Fig. 3)

Twenty-four cases (68.6%) are in regular follow up; the duration of follow- ups varying between < 6months to > 2years. Five cases went for surgical intervention while six cases were lost in follow up. Of the 6 cases that were lost in follow up, 2 babies

were from an orphanage and got adopted by foreign citizens and left the country. Among the patients on regular follow-ups, 6 cases are followed up for more than 1 year and 3 cases are followed up for more than 2 years.

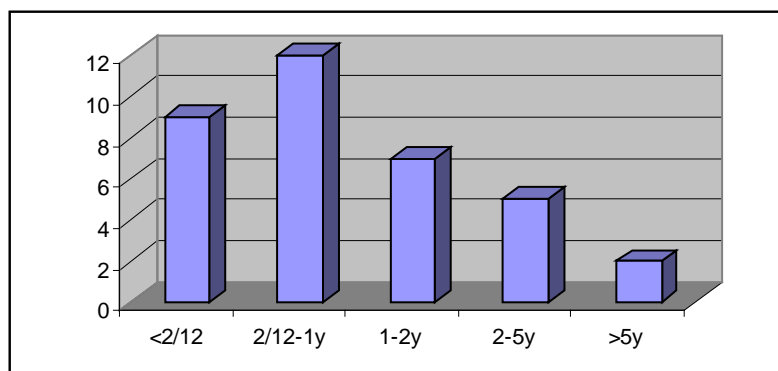
When we followed the growth pattern of these children 31.4% were growing below the 5th percentile while another 11.4% were growing just at the fifth percentile of their age appropriate values for weight.

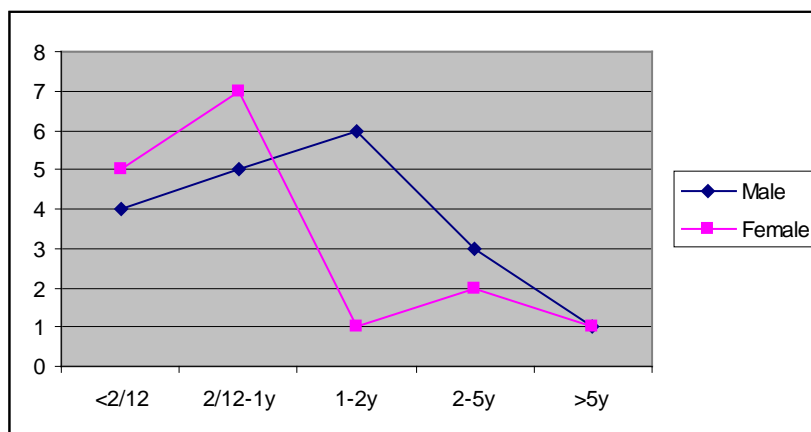
Seven (20%) of the children had slightly elevated creatinine for their age on at least one occasion and all of them were less than one year old infants while one 8year old girl with persistently high creatinine had chronic renal failure and hypertension.

Almost one third of the cases (32.3%) had one episode of breakthrough UTI on cotrimoxazole prophylaxis. Three of the children had more than one UTI on prophylaxis. There were total 53 episodes of culture positive UTIs in 35 children. The most common organism isolated was E coli (67.9%) followed by Klebsiella (13.2%), Enterobacter (11.3%), Proteus (3.7%) and *B* haemolytic Streptococcus (3.7%).

Eight cases underwent repeat MCUG after 1-1 ½ years and spontaneous resolution of VUR was seen in 5 out of 8 (62.5%) cases. Of those 5cases 2 had consecutive 2 negative MCUGs. All children who showed spontaneous resolution were 2 years and less. Three children underwent ureteric reimplantation, out of which one lost in follow up post surgery, while another showed persistence of VUR post surgery. One child underwent cystoscopic injection of sclerosing agent at Delhi, India, which failed to correct VUR. We have no information about the outcome of the case referred for surgical intervention to another hospital (Kanti Children Hospital). The remaining regular follow up cases have not had repeat MCUG as they are not due for one yet.

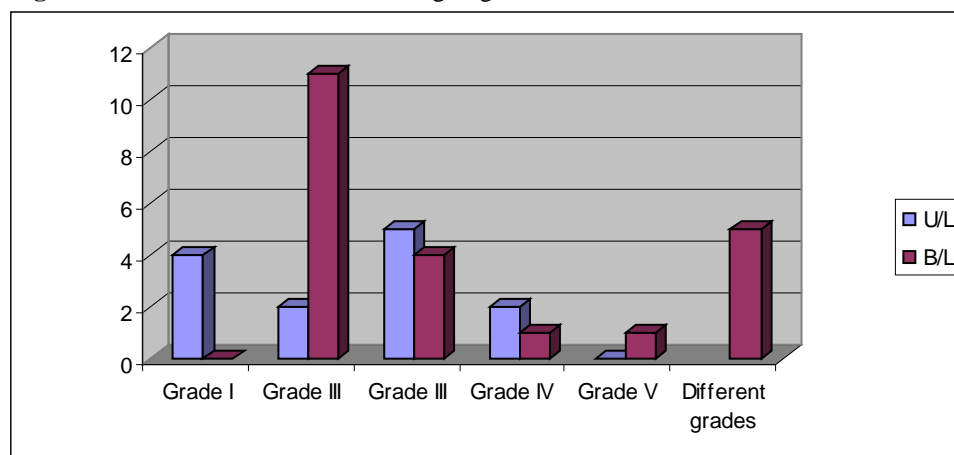
Fig 1: Age wise distribution of children with VUR





ig 2: Age and sex wise distribution of children with VUR

Fig 3: Distribution of children according to grades of VUR



Discussion

VUR is the most commonly observed abnormality in children with UTI and it is seen in almost one third of the children with UTI^{1,3}. We in our study found VUR in 24% of children with UTI. In our study we found highest number of cases in the age group of 2 month to 2 years. Though VUR is reported more commonly in females with UTI except for the neonatal age group, we did not find significant sex difference in our study group. There was slight male predominance (male female ratio of 1.2:1) unlike the reported picture. However two studies, one in Sri Lanka (male female ratio 1.6:1)⁷ and the other in India (male female ratio of 3:1)³ also has reported male preponderance of primary VUR in children.

Thirty two percent of the children in our study group had breakthrough UTI on cotrimoxazole prophylaxis, which is almost double the rate, observed in another study where nitrofurantoin was used as the primary agent⁷. In one another study 12 out of 30 (40%) children showed break through UTI on prophylaxis⁴.

Hypertension and chronic renal failure are the recognized long-term consequences of VUR. Reflux nephropathy is a major cause of severe hypertension in children and young adults¹. In our study, with a short follow up period, hypertension was detected in 2 out of 35 (5.7%) children and one child had features of chronic renal failure. In one Indian study, hypertension was observed in 10% and elevated creatinine observed in 6.6% patients⁴.

Thirty one percent of our children were growing below the 5th percentile for the age appropriate values for weight. It has been observed that socioeconomic status, breakthrough UTI and renal function play a role in somatic growth in these children⁴. In an Indian study 10% children showed persistent growth retardation with associated breakthrough infection, hypertension and multiple renal scars⁴.

Out of those who underwent repeat MCUG, spontaneous resolution was seen in 62.5% cases and all children who showed spontaneous

resolution were 2 years and younger. Studies have shown resolution of non-dilating or low grade VUR in up to 80% of young children by 5 years and resolution of severe VUR in children up to 50-73% at 10 years⁵.

In our series repeat MCUG were done at or after 12-18 months of the first MCUG. At present a wide variation exists regarding the frequency of obtaining MCUGs after diagnosing VUR⁸. It is said that repeat MCUG is needed only every 2-3 years unless the clinical course is complicated⁹.

With the available data till date, it has been observed that low grade VUR are likely to resolve spontaneously and children with low grade VUR have very little risk of recurrent UTI. Questions have been raised as to whether follow up MCUG should be performed at all in mild VUR cases⁸ and whether these children need antibiotic prophylaxis²? The rate of resolution of VUR did not differ significantly in groups with or without antibiotic prophylaxis². As long term antibiotic prophylaxis in children with VUR has failed to show any beneficial effect more recently an even bigger question is raised whether we need to detect VUR at all¹⁰?

Conclusion

This is the only study till date on primary VUR in children in Nepal and we found the incidence of VUR in children with UTI in our part is almost comparable to western data.

Children with VUR need regular and long term follow-up to study their natural courses. The timing of repeat MCUG needs to be worked upon as per the newer recommendations.

In a developing country like ours, given the financial and technical constrains in managing children with severe hypertension and CRF, till further data and strong evidences available regarding the need for MCUG, and for antibiotic prophylaxis in low grade VUR, we should continue the present practice of performing MCUG as part

of UTI workup in young children and antibiotic prophylaxis in children with VUR.

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