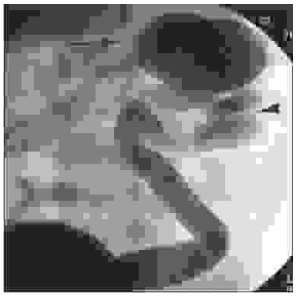
ORIGINAL PROF-1189

VESICO-URETERIC REFLUX IN CHILDREN;
DIAGNOSTIC ROLE OF MICTURATING CYSTO-URETHROGRAPHY.



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ABSTRACT… Objective: To evaluate the results of micturating cystourethrography (MCUG) in cases of vesico-ureteric reflux (VUR) in children. **Design:** A prospective study. **Place and duration of study:** The study included total number of 30 patients at CMH Multan and Panu Akil from 2001-2005. **Subjects and methods:** All the thirty patients less than twelve years of age, suspected of vesico-ureteric reflux, were subjected to MCUG examination to assess the lower urinary tract. Ultrasonography (USG) of urinary tract was also performed on all patients. The severity of reflux was graded before referral for further medical or surgical management. **Results:** Majority of patients (63.33%) presented with recurrent urinary tract infection (UTI). Renal scarring was detected in 86.66% on USG and all of them had grade IV and V reflux. Grading of reflux on MCUG revealed 33% grade 1 and II reflux and 66.7% as grade III to V reflux. A total of 76.66% patients had primary reflux with female preponderance. **Conclusion:** MCUG was found to be 100% sensitive in diagnosis of VUR when properly performed. Strong clinical suspicion of VUR in patients of UTI, must be subjected to MCUG for early diagnosis and appropriate management.

Key words: vesicoureteric reflux, micturating cystourethrogram. ultrasonography.

INTRODUCTION

Vesico-ureteric reflux (VUR) refers to the retrograde flow of urine from the bladder into upper urinary tract[1]. It may be congenital or acquired. Vesico-ureteric reflux in children is usually primary, which is due to congenital weakness or attenuation of the ureterotrigonal complex and short intervesical ureter. As the child grows, the reflux usually disappears because an increase in submucosal ureteric length improves the competence of the ureterovesical flap valve. Reflux predisposes the kidney to ascending infections which in they gradually lead to renal insufficiency, end stage renal disease, rennin mediated hypertension and decreased somatic growth. About 70% of children presenting with UTI were found to have vesico-ureteric reflux and all children who had vesico-ureteric reflux presented with UTI[2]. Diagnosis of VUR is done radiologically by performing MCUG study. Once diagnosis is established the primary aim of treatment remains prevention of renal injury, pyleonephriris and other complications of the reflux. Elimination of reflux conditions to minimize the renal complications is the main stay of surgical treatment. Medical therapy is based on the conclusion that primary reflux usually resolved with the passage of time and

chemoprophylaxis is given to keep the urine sterile during the process of spontaneous resolution[3]. Now a days, better understanding of the VUR has led to the standardization of the treatment. Recent trends in management of VUR have dramatically improved the expectancy and quality of life in children especially those living in the developed countries. This study was designed to evaluate the diagnostic accuracy of MCUG in VUR[4].

PATIENTS AND METHODS

This prospective study was carried out at CMH Multan and Pano Aqil over a period of four years (2001-2005). Patients less than 12 years of age and suspected of VUR were included in study upon whom MCUG and USG were performed to assess lower and upper urinary tract respectively. Patients not having VUR on MCUG were excluded from study and remaining 30 patients included. Detailed history, clinical examination and laboratory tests (including blood urea, creatinine, urine routine examination and culture) were performed in all cases. USG and MCUG were carried out to assess complete urinary system. Intravenous urography (1VU) was also done in some cases based on USG findings. After MCUG diagnosis of primary and secondary reflux was made on the basis of international classification system for reflux[3,4].

MCUG TECHNIQUE

Miclurating cysto-urcthrography is a definitive method of assessing the lower urinary tract, but it may reveal upper tract detail as well, if VUR is present[27]. An X-ray table with over head tube allows free access to the child by the parent, radiologist and assistant. Dilute contrast medium (Urographin 76%) is introduced through a 6 or 8 size catheter (or feeding tube). The bladder may be filled either by gravity using inverted contrast bottle at a fixed height above the table top, or by a slow injection, using a 50ml syringe[5,6]. Sedation is rarely necessary but a patient should always accompany the child. In boys urethra must be demonstrated and this is best achieved during voiding in oblique position. The bladder must be visualized when full as well as during and after micturation. VUR is best seen in oblique views during micturation. Vesicoureteric junction, ureters and pelvicalyces are seen opacified depending on the grade of reflux. VUR is the main indication of MCUG. Others include bladder abnormalities and urethral abnormalities in boys[24]. An MCUG is indicated in all children under the age of one year with a UTI. It is also indicated in hematuria, renal failure of undetermined cause, small kidney, ureteric dilatation and thick bladder wall on USG. MCUG is contraindicated for follow up of VUR. instead radionuclide cystogram can be carried out.which is also useful as a screening test for girls with UTI due to less radiation dose[7,8,25,26].

RESULTS

Thirty patients who revealed VUR on MCUG were included in study and many others were excluded. All patients were less than 12 years of age with median age of 4.25 years and majority (43.33%) of them were 4-6 years of age (Table I).

Table-I. Age and sex distribution of patients at the time of presentation (n=30)

	Male %	Female %	Patients
< 1 year	1 (11%)	2 (9.5%)	3 (10.00%)
1-3 years	2 (22%)	5 (24%)	7 (33.3%)
4-6 years	4 (44%)	9 (43%)	13 (43.33%)
7-9 years	1 (11%)	4 (19%)	5 (16.67%)
> 10 years	1 (11%)	1 (5%)	2 (6.67%)
Total	9 (30%)	21 (70%)	30 (100%)

Male to female ratio was 1:2.3. Nineteen (63.33) patients presented with recurrent UTI (Table II). Areas of renal scarring were detected in 86.66 % of children and all of them having grade IV and V reflux. Among them 14(46.66%) patients had bilateral and 12 (40%) patients had unilateral scarring. Primary reflux was diagnosed in 23 (76.66%) of the patients and among them 20 (91.3%) were girls and 3 (8.7%) boys, with female to male ratio of 7:1. Seven (23.33%) patients, who had secondary reflux, were male and among them 6 (85.71%) had posterior

urethral valves and remaining 1 (14.39%) had ectopic ureter. Routine voiding cystogram (MCUG) was performed in all cases for diagnosis. Grades of reflux are shown in (Table-Ill). Twenty-six patients (86.67%) had grade IV and V reflux. Among them 43.3% had unilateral and 56.7% had bilateral reflux. Among them 20% patients had bladder neck obstruction due to posterior urethral valves.

Table-II. Clinical presentation of patients with VUR.

Clinical presentation	Patients
Recurrent UTI	19 (63.33%)
Voiding dysfunction	07 (23.33%)
Straining	04 (13.33%)
Bilateral renal scarring	14 (46.66%)
Unilateral renal scarring	12 (40.00%)
Smaller for age	27 (90.00%)
Hypertension	05 (16.66%)
Deranged renal function	07 (23.33%)
Primary reflux	23 (76.66%)
Secondary reflux	07 (23.33%)
Posterior urethral valve	06 (85.71%)
Ectopic ureter	01 (14.39%)

Table-III. Grades of VUR on MCUG

Grade	Patients	%
I.	02	6.67%
II.	01	3.33%
III.	01	3.33%
IV.	14	46.67%
V.	12	40.00%
Total	30	100%

DISCUSSION

The overall incidence of vesico-ureteric reflux in normal children ranges from 1% to 18.5% as reported by Panzironi[5] and Kollerman[6] respectively. Reflux is found in up to 70% of the infants who present with urinary tract infection[4,9,10]. Siblings of the patients are at higher risk of having reflux than normal population. The mean age at the time of presentation in our study was 4.25 years and among them 80% was below 6 years of age. The mean age recorded by Ranslay[9] was 4.1 years, which is almost consistent in our study. Male to female ratio was 1:2:3 and the percentages of female patients were 70% in our study Shopfner[10,11] and Burger[12] also reported higher percentage of female patients in their studies. As many as 63.33% patients reported with recurrent UTI.23.33% with voiding dysfunction and 13.3% were diagnosed during screening for asymptomatic siblings in our study. Greenfield[13,14] reported 12% of the patients diagnosed on screening of asymptomatic siblings in his study whereas Noe[15] has observed 30-36% of VUR on screening in his study.

The reflux may be primary or secondary. In primary reflux there is congenital anomaly of the ureterovesical junction[15,16]. The secondary reflux is due to anatomical or functional causes. Posterior urethral valves are associated with reflux in half of the affected cases[4,13,14]. Primary reflux in our study was far more common (76.66%) than the secondary reflux which is in accordance with the study conducted by Belman[15]. The posterior urethral valve was the commonest cause of secondary reflux (85.71%) in our study that is also reported by Heneberry and Steven[14]. Reflux was present in half of the patients having posterior urethral valves. Vesico-ureteric reflux predisposes an individual to ascending infection which leads to renal scarring, end stage renal disease; rennin mediated hypertension and decreased somatic growth during pregnancy[4,7,17,18]. The primary objectives of treatment are prevention of pylonephritis and other complications of reflux[19]. The current international classification system[3,4,20] classifies the reflux in five grades (Grade- I-V) based on appearance of contrast in the ureter and upper collecting system during standard MCUG[27]. Majority of the patients

in our study were having grade-IV-V reflux (86.67%) which is contrary to the study conducted by Greenfield[11] who reported 86% of patients with grade I, II and III reflux. Among the 86.67% of patients having evidence of renal scarring, all of them had grade IV and V reflux and among them 46.66% had bilateral renal scarring. Skoog[19] observed 75% of scars with grade IV and V reflux, which shows direct relationship between grade of reflux and nephropathy. The severity of scarring is more worse (11.6%), which is attributed to delay in diagnosis, as reported by Smellie[18] in his study. Majority of our patients reported late or there was delay in evaluation of UTI, which is also not uncommon in underdeveloped countries[16,20]. The main indications for surgery are severe reflux (grade IV, V), reflux associated with congenital abnormalities, failure of renal growth , presence of new renal scar or deterioration of renal function on serial ultrasound or scan, non-compliance with medical treatment, and persistence of reflux[21,22,23].

CONCLUSION

VUR is common in children and must always be suspected in those presenting with UTI. MCUG is a sensitive and simple radiological procedure which can give an early and definitive diagnosis. Once diagnosis is established a watchful waiting for resolution of primary reflux in grade I-1I1 and keeping the urinary tract free of infection is the mainstay of the management. Surgical treatment is recommended for higher grades of reflux (IV-V), and secondary reflux. There is a dire need to improve the understanding and significance of UTI in medical profession involved at primary health care level to detect VUR by requesting MCUG at an early stage to prevent renal damage.

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