

Value of Cystourethroscopy in the Assessment of Children with Recurrent Urinary Tract Infections and/or Enuresis

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Summary. Forty-one children aged 6–14 years consecutively referred for recurrent urinary tract infections (RUTI) and/or enuresis constituted the study group. Cystourethroscopy (CUS) was carried out in 40 children and pathologic findings were revealed in 70% of children with RUTI in the absence of vesico-ureteral reflux (VUR). However, only in 4 patients did CUS influence treatment. Based on these data we conclude that routine CUS is not justified in the evaluation of this group of children unless anatomical infravesical lesions are suspected. VUR was proven in 44% of children with RUTI. In 86% of these ureters abnormal ureteric orifices were demonstrated. We therefore find CUS to be valuable in the assessment of children with both RUTI and VUR, because this examination is helpful in selecting patients who might need operation for severe VUR. CUS was not of therapeutic benefit to children with enuresis. Five patients with macroscopic haematuria during urinary tract infection were not managed differently following CUS.

Key words: Children, Cystourethroscopy, Recurrent urinary tract infections, Vesico-ureteral reflux.

Introduction

In adults CUS is a well-established and important examination in the evaluation of the lower urinary tract, while its value in children with urological problems is doubtful. Some authors routinely perform CUS in the work-up in children presenting with RUTI [4], others only use it in selected cases [12]. Several studies, however, have failed to identify any justification for routine use of CUS in children with urological disorders [3, 9, 14].

Table 1. The classification of VUR in 16 children with RUTI [8]. The results represent the ipsilateral kidney- and ureter units

VUR	Unilateral number	Bilateral number
Grade 1	3	2
Grade 2	5	5
Grade 3	0	1
Grade 4	2	4
Grade 5	0	0
Total	10	12

The purpose of the present study was to elucidate whether CUS changed the management of children with RUTI and/or enuresis.

Materials and Methods

The material included 41 children consecutively referred for RUTI combined with urinary incontinence (36 children) or primary enuresis (5 children) during the period November 1st, 1981 to February 28th, 1983. The median age was 9 years (range 6–14 years) and only three patients were boys (7%). One patient with enuresis was excluded as he did not have CUS performed. The children with RUTI were classified according to whether or not VUR was demonstrated. Twenty had RUTI in the absence of VUR, while 16 children had RUTI and VUR. VUR was graded as currently recommended (Table 1) [8]. For prognostic reasons two groups were formed, i.e. \leq grade 2 VUR (9 children) and $>$ grade 2 VUR (7 children) [8]. In the first group two children proved to have renal scarring (22%), while 6 children (86%) in the other group had renal scars. Five children had enuresis in the absence of RUTI and five had macroscopic hematuria during a period of urinary infection.

A careful history was obtained followed by a general physical examination, routine blood chemistry, spontaneous uroflowmetry, residual urine determination by ultrasound, urine culture, intravenous urography and voiding cystourethrography. During admission to hospital further urodynamic studies were carried out, i.e. carbon dioxide cystometry and pressure-flow-emg study, as well as CUS in general anesthesia. Also the external urethral meatus was calibrated.

Table 2. Abnormal x-ray findings in 20 children with RUTI in the absence of VUR

	Number
Unilateral chronic pyelonephritis	2
Partial duplication of the kidney and ureter	1
Aberrant vessel to the right kidney	1
Chronic pyelonephritis of the right kidney (earlier reimplantation of the right ureter)	1
Dilatation of the proximal urethra	1

Table 3. Endoscopic findings in 20 children with RUTI in the absence of VUR (4 children had 2 positive findings)

Endoscopic findings	Number
Normal	6
Trabeculation	10
Inflammation	1
Trigonitis	1
Abnormal ureteric orifices	2
Distal urethral stenosis	2
Nefrogenous adenoma (vesica)	1
Cystitis cystica	1

Table 4. Endoscopic findings in 16 children with RUTI and VUR

Endoscopic findings		VUR	
		≤ grade 2 Number	> grade 2 Number
Ureteric orifices	abnormal	13	6
	normal	2	1
Trabeculation		4	2
Duplication of the kidney and ureter (2 ureteric orifices)		1	0

Results

In the group as a whole meatal calibration revealed a median size of Ch. 20 (range 13–28). No difference was found between the group with and without VUR. No complications were noted in relation to anesthesia or endoscopy.

RUTI Without VUR

Abnormal x-ray findings in 20 children with RUTI in the absence of VUR are shown in Table 2, while endoscopic findings are listed in Table 3. Abnormal findings at CUS were demonstrated in 14 children, but in only four of these did the examination yield important diagnostic information which influenced therapy. Two children had distal urethral

stenosis, which was not proven in spontaneous uroflowmetry, while voiding cystography demonstrated signs of infravesical obstruction in one of the children. One of these children had an Otis internal urethrotomy, the other had a urethral dilatation. Cystitis cystica was found in one child resulting in long-term antibiotic administration. Finally one child had a papillomatous tumor resected classified as a nephrogenous adenoma. Although the urine was sterile the bladder mucosa was inflamed in two children. Trabeculation was found in 10 children, but statistical analysis revealed no association with uninhibited detrusor contractions (UDC)/nor detrusor-external sphincter dyssynergia (DSD).

Two children previously had surgery for VUR. The VUR was absent and at endoscopy the ureteric orifices appeared normal with a long submucosal tunnel.

Two children had abnormal ureteric orifices. One had an open laterally located orifice and ipsilateral chronic pyelonephritis, possibly reflecting previous VUR. The other child had an orifice situated at the upper border of a minor diverticulum.

RUTI and VUR

Sixteen (44%) children had both RUTI and VUR. The reflux was unilateral in 10 children and bilateral in six, i.e. theoretically 22 abnormal ureteric orifices might be demonstrated (Table 4). However three of these orifices were quite normal, while the rest were typical reflux orifices, i.e. open, located laterally and with a short intramural tunnel. In six children trabeculation was proved, but no association to UDC or DSD was shown.

Enuresis

In one child CUS was not performed and in the remaining four it was normal. One child had unilateral VUR, grade I, while another had unilateral duplication of the kidney and ureter.

Hematuria

Five children had a history of macroscopic hematuria during an episode of infection. All had non-specific urinary infection. In two children VUR and renal scarring was found.

Discussion

In the evaluation of diagnostic and therapeutic procedures risks as well as benefits have to be carefully analyzed. Especially in small boys CUS may be technically difficult to perform and damage to the urethral mucosa might result. Two studies on urethral strictures in children demonstrated

16% and 20%, associations to CUS [6, 10]. The potential anaesthetic morbidity, estimated to be 1/1000, has to be considered [1, 13].

Only in four patients with RUTI in the absence of VUR did CUS have any therapeutic consequence. Two of these patients were treated for distal urethral stenosis, a disease entity whose prevalence, diagnosis and treatment is debatable [7]. One child had transurethral resection of a benign bladder tumor, while the fourth was treated prophylactically with antibiotics, because of cystitis cystica, which is considered to be a response of the bladder mucosa to recurrent infections [2]. Based on these experiences we agree with several authors [3, 9, 14] that CUS is not indicated as a routine examination in the assessment of children with RUTI, who do not also have VUR. If infravesical obstruction in suspected [5] CUS is recommended [3, 9].

As might be expected VUR was proven in almost half of children with RUTI and in cases with more than grade 2 VUR renal scarring was shown in about 90% [8]. In accordance with the study of Dunn et al. [3] abnormal ureteric orifices were found in most patients of this group. As in other studies it is concluded that CUS is valuable in the assessment of patients with RUTI and VUR, because inspection of the ureteral orifices in moderate and severe reflux might contribute to the selection of patients probably in need of future ureteral reimplantation [3, 11, 14]. Furthermore some authors recommend CUS as regards trabeculation, which might be associated with DSD [11]. However, in the present study we did not find such association. Concerning the minor group of children with primary enuresis CUS had no consequences as might be inferred from the literature [3, 9, 14].

No specific bladder lesions were revealed in the group with macroscopic hematuria coincidental with urinary infection. In general CUS is recommended if hematuria and infection is associated with abnormal findings at intravenous urography [3, 9, 14, 15].

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