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## The predictive value of a repeat micturating cystourethrogram for remnant leaflets after primary endoscopic ablation of posterior urethral valves

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Urethral ratio

**Abstract** *Objective:* We routinely perform a cystourethroscopy 3 months after initial ablation of posterior urethral valves. The aim of this study was to determine the predictive value of the urethral appearance on preoperative micturating cystourethrogram (MCUG) for further valve resection at check cystoscopy.

*Patients and methods:* We retrospectively reviewed 31 consecutive boys (aged 4–18 months) who underwent check cystoscopy and repeat MCUG between 2006 and 2008.

*Results:* Repeat MCUG suggested remnant valves in 10, but no residual leaflets were identified cystoscopically in 4. In 20 boys, the valves appeared completely ablated on MCUG but valve leaflets received further resection in 10. One study was undiagnostic. Residual valves were resected in 83% (5/6) where valves and urethral dilatation were noted on MCUG. Where MCUG suggested either valves or persistent dilatation alone, further resection occurred in 40% (4/10). Remnant leaflets were also present in half of those (7/14) in whom the repeat MCUG had shown complete ablation and resolved/reduced posterior urethral dilatation.

*Conclusions:* The positive predictive value of valve leaflets and/or posterior urethral dilatation on repeat MCUG for subsequent resection of valve remnants was 56%; the negative predictive value was 50%. We found repeat MCUG alone imprecise in excluding residual valve tissue and recommend check cystoscopy in all.

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## Introduction

Posterior urethral valves (PUV) are the most common cause of congenital bladder outflow obstruction in boys. The definitive treatment of choice is endoscopic valve ablation [1]. Ensuring adequate decompression of the urinary tract without risking urethral stricture formation is important [2]. In our institution, we perform a check cystoscopy 3 months after primary valve ablation in all patients. The clinical significance of valve remnants can be difficult to determine and is based on a number of parameters including functional observation, endoscopic appearance, ultrasound and fluoroscopic imaging [3]. The aim of this study was to determine the predictive value of valve leaflets and/or posterior urethral dilation on a repeat micturating cystourethrogram (MCUG) for further valve resection at check cystoscopy.

## Materials and methods

We retrospectively reviewed all boys with PUV who underwent check cystoscopy and preoperative MCUG between November 2006 and November 2008 in a tertiary paediatric urology centre. The diagnostic and repeat MCUGs were assessed by consultant paediatric radiologists, including for the presence of valves or valve remnants and the degree of posterior urethral dilatation. Furthermore, the urethral ratio (UR) was determined by dividing the posterior urethral diameter by the anterior urethral diameter, as described by Bani Hani et al. [4]. The data collected from the primary valve ablation and check cystoscopy included a detailed description of the PUV, method and site of ablation, and the operating surgeon.

Data were expressed numerically with a median where appropriate. The positive and negative predictive values (PPV and NPV) for subsequent remnant valve ablation were calculated for the MCUG findings of residual valves and/or posterior urethral dilatation. Potential bias in the surgical judgment of the significance of remnant leaflets on endoscopy, and any effect of the method of primary PUV ablation on the predictive value of repeat MCUGs for valve remnants, was explored using apparent 'false positive' and 'false negative' repeat MCUGs and expressed as a percentage with 95% confidence intervals, as tabulated in the Geigy Scientific Tables for small samples and extreme proportions [5].

## Results

During the study period, 31 consecutive patients underwent check cystoscopy with a preoperative repeat MCUG at a median age of 5 months (range 4–18 months), 3–12 months after primary valve resection (median 5 months). Primary valve ablation had been performed endoscopically using an 11-F paediatric cold knife resectoscope (Storz) in 21 boys, point electrocautery via a 3-F ureteric catheter with metal stylet passed through a 9.5-F paediatric cystoscope (Storz) in nine, and in one patient the primary ablation had been performed in another institution.

At check cystoscopy (9.5-F paediatric cystoscope; Storz), valve remnants necessitating further ablation were identified in 16 boys, while in the remainder no significant

leaflets were seen. Where the primary ablation had been performed using a cold knife, 10 (48%) had a secondary ablation compared to 6 (67%) of those initially ablated by point electrocautery. Secondary ablation was performed using an 11-F paediatric cold knife resectoscope (Storz) in all but one (point electrocautery via a 3-F ureteric catheter with metal stylet passed through a 9.5-F paediatric cystoscope; Storz): at the 5, 7 and 12 o'clock positions in five patients, at 5 and 7 o'clock in eight, at 12 o'clock in two and at the 7 o'clock position only in one.

The repeat MCUG, performed 2–12 months after primary valve ablation (median 3 months), demonstrated residual valves in 10, no valve remnants in 20, and one study was undiagnostic (this patient was excluded from further analysis). Table 1 compares the visualization of valve remnants on repeat MCUG to subsequent ablation of valve leaflets at check cystoscopy. Of note, no remnant leaflets were seen in four boys in whom the repeat MCUG had suggested residual valves. In the 20 patients the valves appeared completely ablated on MCUG, but 10 received a further resection. Hence, the demonstration of valve remnants on MCUG positively predicted further valve ablation in 60%. Conversely, the NPV of their absence on MCUG was 50%.

On the repeat MCUG, the degree of posterior urethral dilatation was described as persistent in 12, reduced in 8 and resolved in 10 (Table 2). At subsequent endoscopy no residual leaflets were found in four boys with persistent posterior urethral dilatation. Interestingly, a further ablation was carried out in eight patients with reduced/resolved posterior urethral dilatation. Persistent posterior urethral dilatation on MCUG forecast residual valve ablation in 66%, while reduced or no dilatation anticipated the lack of remnant leaflets in 55%.

Combining the MCUG finding of persistent urethral dilatation with demonstration of valve remnants more accurately foretells further valve resection (PPV 83%, NPV 75%). Persistent posterior urethral dilatation without demonstration of valves on MCUG, however, points to further ablation in only 50%. Most importantly, 50% of patients, in whom no valves were shown and the posterior urethra was less or non-dilated on repeat MCUG, were deemed to require further valve resection at endoscopy. To summarise, the PPV of residual valves with persistent posterior urethral dilatation on MCUG for further valve resection was 83%. The PPV of either valves or persistent

**Table 1** The demonstration of valves on repeat MCUG is related to ablation of valve remnants at subsequent check cystoscopy.

Repeat MCUG	Check cystoscopy	
	Valve ablation (n)	No ablation (n)
Valve remnants visualized (n)		
yes	10	4
no	20	10
undiagnostic	1	1

One study was undiagnostic and this patient was excluded from further analysis.

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