Spectrum of Micturating Cystourethrogram Revisited: A Pictorial Assay

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Abstract

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Micturating Cystourethrography (MCU) is a useful technique to evaluate the abnormalities of urinary tract. With advent of newer imaging techniques, conventional radiography is largely being abandoned; however cystourethrography is still a preferred imaging technique for assessment of urinary bladder, urethra and VUR especially in children. We present a spectrum of abnormalities on MCU studies affecting urethra, urinary bladder and ureter seen over a period of three years in radiology department of our teaching hospital.

Keywords: Cystourethrogram, Cystourethrography

Introduction

Micturating cystourethrography (MCU), also known as Voiding cystourethrography (VCUG), is a fluoroscopic study of the lower urinary tract mainly to assess the urinary bladder, urethra, postoperative anatomy and micturition to assess bladder and urethral abnormalities, including vesicoureteric reflux (VUR) with very low radiation exposure if done properly.¹ With radiological advancements the newer techniques like voiding urosonography,² nonionising photoacoustic cystography³ and CT cystography for bladder trauma⁴ may soon supersede MCU. However, at present MCU remains mainstay in assessment of these structures, particularly in children.⁴ MCU is commonly indicated for following abnormalities⁵:

Vesicoureteric reflux (VUR) including follow up evaluation of VUR.⁶

Study of the urethra during micturition for strictures, posterior urethral valves or urethral trauma.

Abnormalities of the bladder like diverticulum, foreign bodies and fistulas, bladder outlet obstruction, post traumatic bladder rupture, neurologic bladder.

Stress incontinence.

Congenital anomalies of genitourinary tract.

It is also important to stress that acute urinary tract infection is a contraindication for this study.⁷ Most of the recommendations are for an interval of at least 3 to 6 weeks after a UTI before performing MCU.

Methods

More than 100 MCUs were done in last three years at our hospital. These studies were retrospectively retrieved and reviewed by 3 experienced radiologists. The images depicting key abnormalities were selected and annotated to prepare this pictorial assay. Literature was systematically reviewed using standard search engines to understand the key radiographic abnormalities on MCU studies, various indications and methods of MCU study (Figures 1-10).

Conclusion

Knowledge of imaging spectrum for MCU studies helps in identifying the uncommon abnormal appearances and hence proper management of the pathologies.

References

- 1. Leibovic SJ., Lebowitz RL. Reducing patient dose in voiding cystourethrography. Urol Radiol 1980; 2: 103-107.
- 2. Darge K. Voiding urosonography with US contrast agent for the diagnosis of vesicoureteric reflux in children: an update. Pediatr Radiol 2010; 40: 956-962.
- 3. Kim C., Jeon M., Wang LV. Nonionizing photoacoustic cystography in vivo. Opt Lett 2011; 36: 3599-3601.
- 4. Ishak C., Kanth N. Bladder trauma: multidetector computed tomography cystography. Emerg Radiol 2011; 18: 321-327.
- 5. Jequier S., Jequier JC. Reliability of voiding cystourethrography to detect reflux. AJR Am J Roentgenol 1989; 153: 807-810.
- 6. Lebowitz RL. The detection and characterization of vesicoureteral reflux in the child. J Urol 1992; 148: 1640-1642.
- 7. Shaikh N., Craig JC., Rovers MM. Identification of children and adolescents at risk for renal scarring after a first urinary tract infection: a meta-analysis with individual patient data. JAMA Pediatr 2014; 168: 893-900.



Figure 1: MCU study of a male child demonstrates left sided uretrocele (arrows b and d), with Grade IV VUR (arrows a and c).



Figure 2: MCU study of adult male demonstrates left sided direct inguinal hernia containing urinary bladder (arrow b). Arrow 'a' demonstrates neck of hernia sac.



Figure 3: MCU study of a female child demonstrates corkscrew urethra (arrow a).



Figure 4: MCU study of an adult female shows urinary bladder descent and herniation consistent with cystocele and bladder diverticulae (arrow a).



Figure 5: MCU study of a female child demonstrates right sided grade V VUR with sided duplex system (arrow a) and left sided grade IV VUR (arrow b).



Figure 6: MCU study of a female child demonstrates ectopic insertion of left ureter into the proximal urethra (arrow a) with vesicoureteric reflux on left.



Figure 7: MCU study of a male child demonstrates small out-pouching at the bladder dome and extravasation of contrast through umbilicus suggesting patent urachus (arrow a).



Figure 8: MCU study of adult male demonstrates show luminal attenuation with subtle wall irregularity involving prostatic urethra suggesting stricture (arrow a) with contrast intravasation into seminal vesicles (arrow b).



Figure 9: MCU study of a male child demonstrates a cleft like filling defect at bulbomembranous junction (arrow a) suggestive of posterior urethral valve, with prominent proximal urethra (arrow b) and presence of bladder diverticulae (arrow c).



Figure 10: MCU study of adult male demonstrates proximal urethral diverticulum (arrow a) and multiple bladder diverticulae (arrow b).