

Ureteral diverticulosis

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ABSTRACT

Ureteric pseudo-diverticulosis is an uncommon urological finding, with fewer than 150 cases reported in the literature. These are usually seen as incidental findings on retrograde pyelography. We report a case of ureteric pseudo-diverticulosis that was incidentally detected on performing ureteroscopy for an upper ureteric stone.

Keywords: diverticulosis, pseudodiverticulosis, ureteral diverticulum

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INTRODUCTION

The finding of ureteric diverticula is uncommon, and is usually seen as incidental findings on retrograde pyelography. We report the case of a 68-year-old man who underwent ureteroscopy for an upper ureteric stone and was found to have multiple diverticula on retrograde pyelography.

CASE REPORT

A 68-year-old Chinese man with a known history of thoraco-abdominal aortic aneurysm on conservative management was incidentally found to have a 5 mm × 4 mm left upper ureteric stone with mild hydronephrosis on computed tomography (CT) imaging of his abdomen. The patient had no urinary symptoms. On CT imaging, scarring was also noted over the left mid-portion and lower pole of the kidney. The CT image did not reveal any ureteric diverticula. The patient's serum creatinine was 103 μmol/L. After three weeks, the upper ureteric stone was still present, and the patient was thus scheduled for extra-corporeal shockwave lithotripsy (ESWL). Even after two sessions of ESWL, the stone did not fragment. He was then scheduled for a left ureteroscopy and holmium laser lithotripsy.

Intraoperatively, the retrograde pyelogram (Fig. 1) revealed multiple left upper and lower ureteric diverticula. A 5-mm stone was found in a wide-necked upper ureteric diverticulum during ureteroscopy. It was fragmented using a holmium laser and its fragments removed with a basket. The ureteral mucosa appeared normal on ureteroscopy. Cystoscopy of the bladder was unremarkable. A double

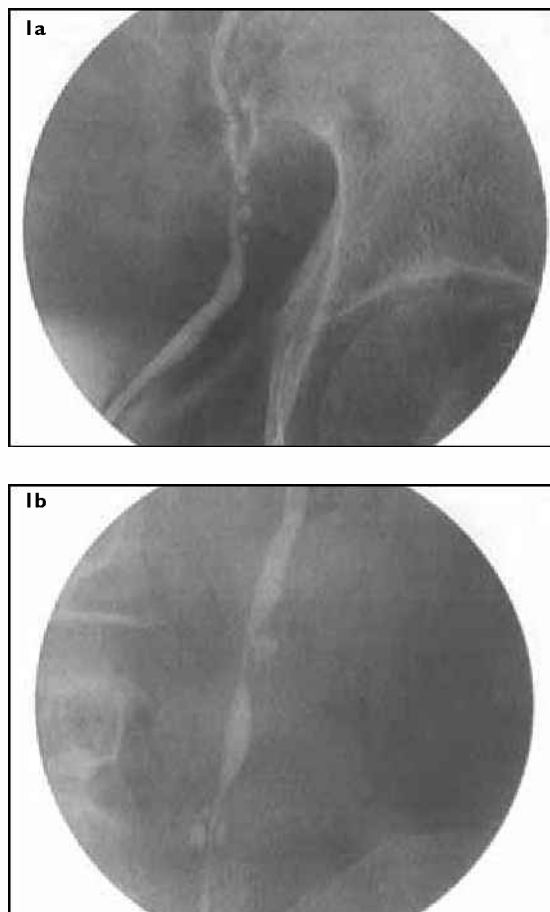


Fig. 1 Retrograde urography images show (a) multiple lower ureteric diverticula and (b) upper ureteric diverticula.

J stent was inserted after the lithotripsy. The procedure was uneventful.

DISCUSSION

Ureteral diverticula were first classified by Culp into two categories: congenital and acquired.⁽¹⁾ Congenital ureteric diverticula occur as a result of an aberrant development of the ureteric bud before it reaches the metanephrogenic tissue. They are characterised as single, dilated, blind-ending branches of a bifid ureter. A congenital ureteric diverticula is made up of an outpouching of all layers from a normal ureteric wall. They are often more than 0.5 cm in diameter. Patients with congenital ureteric diverticula can either be asymptomatic or can present with recurrent urinary tract infection. Acquired (false) ureteric diverticula are

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mucosal protrusions through a defect in the ureteric wall. These are usually related to traumatic instrumentation, surgery or rupture by stone with obstruction. They are found singly and are larger than pseudo-ureteric diverticula, as described by Culp.⁽¹⁾

Holly and Sumcad first described the entity of pseudo-diverticulosis in 1957.⁽²⁾ They reported four cases of patients with multiple diverticula-like irregularities of the ureters. Pathologic studies by Lester and Kyaw described a 'ureteritis' associated with diverticula.⁽³⁾ Cochran et al later described this entity further both in gross specimen and microscopically. Cochran et al showed that ureteric diverticula were neither true nor false based on Culp's classification, but were instead outpouchings that protruded into the lamina propria but not the muscularis, and they are best described as "partial diverticula."⁽⁴⁾

Ureteral pseudodiverticula are multiple in 91% of cases and are generally less than 5 mm in diameter.⁽⁵⁾ These occur in both the ureters in 75% of cases, and about 85% are found in the upper and middle third of the ureter.⁽⁶⁾ The aetiology of multiple ureteral pseudodiverticula is not known. One theory suggests that they are mucosal outpouchings that originate through weak spots in the ureteric wall where the arteries perforate the muscle layer, similar to the aetiology in colonic diverticula. Another theory suggests that they are a result of downstream obstruction. Ureteric inflammation has also been implicated, as described by Wasserman et al in a study of 200 post-mortem ureters,⁽⁷⁾ where it was hypothesised that ureteral pseudodiverticula developed from benign epithelial changes leading to small intramural crypts as a response to focal subclinical inflammation. Local urine stasis is then believed to sustain the focal inflammatory process. Ureteral pseudodiverticulosis can also be caused by tumour metastases, as reported by Wasserman et al.⁽⁸⁾

Most patients with ureteral pseudodiverticulum are asymptomatic, and the finding of ureteral pseudodiverticulum is incidentally picked up on imaging. Treatment is symptom-driven for those who present with symptoms, e.g. pain or haematuria. There have been isolated case reports of ureteral pseudodiverticulum associated with absorbable suture clips after laparoscopic pyeloplasty,⁽⁹⁾ and due to the

perforation of a ureteral diverticulum.⁽¹⁰⁾ Radiologically, patients with ureteral pseudo-diverticulosis often have an unremarkable intravenous urogram. Retrograde pyelography is the investigation of choice, as it reveals both the presence and quantity of the diverticula.

There have also been reports of uroepithelial malignancy in patients with ureteric diverticula. Wasserman et al have reported that 26% of their patients with pseudo-ureteric diverticula had associated bladder tumour. The latency of identification of these diverticula to the development of tumour was found to be 2–10 years in duration.⁽⁵⁾ In another series by Wasserman in 1991, an even higher rate of uroepithelial malignancy (46%, 17 out of 37) in patients with pseudo-ureteral diverticula was found.⁽¹¹⁾ However, this study had its own confounding factors, i.e. male patients with a high degree of alcohol and tobacco abuse/exposure.⁽¹¹⁾ Further studies are required to confirm this association. It is thus advisable to follow up on these patients with periodic (semi-annual) urine cytology. Cystoscopy and upper urinary tract evaluation should also be considered as clinically indicated.

REFERENCES

1. Culp OS. Ureteral diverticulum: classification of the literature and report of an authentic case. *J Urol* 1947; 58:309-21.
2. Holly LE 2nd, Sumcad B. Diverticular ureteral changes: a report of four cases. *Am J Roentgenol Radium Ther Nucl Med* 1957; 78:1053-60.
3. Lester PD, Kyaw MM. Ureteral diverticulosis. Roentgenologic manifestation of ureteritis. *Radiology* 1973; 106:77-80.
4. Cochran ST, Waisman J, Barbaric ZL. Radiologic and microscopic findings in multiple ureteral diverticula. *Radiology* 1980; 137:631-6.
5. Wasserman NF, La Pointe S, Posalaky IP. Ureteral pseudodiverticulosis. *Radiology* 1985; 155:561-6.
6. Pollack HM, ed. *Clinical Urography*. Philadelphia: W B Saunders, 1990: 685-6, 896-7.
7. Wasserman NF, Posalaky IP, Dykoski R. The pathology of ureteral pseudodiverticulosis. *Invest Radiol* 1988; 23:592-8.
8. Wasserman NF. Pseudodiverticulosis: unusual appearance for metastases to the ureter. *Abdom Imaging* 1994; 19: 376-8.
9. Finley DS, Perer E, Eichel L, Clayman RV. Ureteral pseudodiverticulum associated with absorbable suture clips after laparoscopic pyeloplasty: case report. *J Endourol* 2005; 19:726-9.
10. Cappellani A, Di Vita M, Zanghi A, Lo Menzo E, Conti P. Perforation of a ureteral diverticulum: a case report and review of the literature. *Ann Ital Chir* 2003; 74:349-53.
11. Wasserman NF, Zhang G, Posalaky IP, Reddy PK. Ureteral pseudodiverticula: frequent association with uroepithelial malignancy. *AJR Am J Roentgenol* 1991; 157:69-72.