

Received: 2020.04.18

Accepted: 2020.06.10

Available online: 2020.06.24

Published: 2020.08.11

A Rare Case of Acute Urinary Bladder Diverticulitis Mimicking Acute Appendicitis

Authors' Contribution:

Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

EF 1 **Min-On Tan**
AE 2 **Wai Loon Yam**
B 3 **Yung Khan Tan**
B 4 **Sing Joo Chia**
DEF 5 **Keng Sin Ng**

1 Department of Radiology, Changi General Hospital, Singapore, Singapore
2 Department of Urology, Changi General Hospital, Singapore, Singapore
3 Urohealth Medical Clinic, Mount Elizabeth Novena Specialist Centre, Singapore, Singapore
4 ML'Ve Urocare Center, Mount Elizabeth Novena Hospital, Singapore, Singapore
5 Department of Radiology, Mount Alvernia Hospital, Singapore, Singapore

Corresponding Author: Min-On Tan, e-mail: minon.tan@gmail.com

Conflict of interest: None declared

Patient: Male, 52-year-old
Final Diagnosis: Urinary bladder diverticulitis
Symptoms: Right iliac fossa pain
Medication: —
Clinical Procedure: Computed tomography • cystoscopy
Specialty: Urology

Objective: Rare disease
Background: Urinary bladder diverticula are common. They are typically asymptomatic and usually discovered incidentally. Urinary bladder diverticulitis, in contrast to colonic diverticulitis, is an extremely rare occurrence.
Case Report: We describe a case of a 52-year-old man who presented with isolated urinary bladder diverticulitis mimicking acute appendicitis. Focal inflammation of a urinary bladder diverticulum along the right lateral urinary bladder wall caused right iliac fossa pain. Predominant findings of red blood cells in the urine were not dissimilar to per rectal bleeding seen with colonic diverticulitis. Cystoscopy and uroflow dynamic study revealed features of chronic urinary bladder outlet obstruction despite a computed tomography scan showing a minimally enlarged prostate gland and the patient reporting no lower urinary tract symptoms.
Conclusions: Urinary bladder diverticulitis is a very rare condition with poorly understood underlying etiology. Hematuria is possibly an important presentation correlating with the per rectal bleeding seen with colonic diverticulitis. Depending on its position relative to the urinary bladder wall, it can mimic other more common presentations. Follow-up investigations using cystoscopy and uroflow studies are useful to evaluate for findings associated with chronic urinary bladder outlet obstruction.

MeSH Keywords: Diverticulum • Hematuria • Multidetector Computed Tomography • Urinary Bladder Diseases • Cystoscopy

Full-text PDF: <https://www.amjcaserep.com/abstract/index/idArt/925236>



1298



—



3



17



Background

Urinary bladder diverticula are common entities and are classified as congenital or acquired [1]. The incidence of congenital urinary bladder diverticula has been reported to be up to 1.7% [2]. Congenital urinary bladder diverticula are commonly seen in children younger than 10 years of age, and they are hypothesized to be related to weakness in the ureterovesical junction or a posterior urethral valve possibly from muscle layer hypoplasia or deficiency [2]. Acquired urinary bladder diverticula have been reported in about 15% of patients with lower urinary tract symptoms, being more commonly seen in men above 60 years of age [3–5]. These diverticula possibly form due to chronically increased intravesical pressures that cause the mucosal lining to herniate between muscle bundles and are more commonly seen along the lateral urinary bladder walls [1,6]. These diverticula are postulated to serve as a mode of decompression to protect the proximal urinary collecting system from high pressures [7].

Urinary bladder diverticula are commonly asymptomatic and usually discovered incidentally. Common symptoms related to urinary bladder diverticula include hematuria, urinary tract infections, urinary retention, malignancy, and rarely pain from rupture [8].

However, unlike colonic diverticulitis, urinary bladder diverticulitis without cystitis is an extremely rare occurrence.

We describe a case of symptomatic urinary bladder diverticulitis mimicking acute appendicitis, with discussion regarding the clinical features, computed tomography (CT) findings, and results of urinalysis.

Case Report

A 52-year-old man, a nonsmoker with no history of alcohol or drug abuse or previous medical issues, presented to our hospital clinic with 1 week of abdominal pain. The pain started as a constant central abdominal dull ache which subsequently localized to the right iliac fossa. There was no associated nausea, vomiting, diarrhea, or constipation. There was mild dysuria but no gross hematuria or fever. Physical examination revealed right iliac fossa tenderness but no guarding or mass.

Initial serum hematology and biochemistry revealed normal white blood and red blood cell levels. AST (70 U/L), ALT (99 U/L), and GGT (204 U/L) levels were raised. CRP was also slightly above normal (7.8 mg/L). Urinalysis revealed light yellowish urine with increased urine red blood cells. Minimal urine white blood cells were present.



Figure 1. CT scan (axial image) with intravenous contrast Omnipaque 350 (80 mL) shows focal outpouching of the right posterolateral bladder wall in keeping with a diverticulum (white arrow). Another smaller diverticulum is seen in the left posterolateral wall (white arrow head). Around the larger diverticulum, there is fat stranding. The diverticulum wall is thickened with increased enhancement and fuzziness compared with the rest of bladder wall, in keeping with acute transmural inflammatory changes.

Differential diagnoses of acute appendicitis, colitis, urinary calculus, and urinary tract infection were considered. In view of the atypical presentation, CT of the abdomen and pelvis was performed.

Contrast-enhanced CT revealed focal outpouching arising from the right postero-lateral urinary bladder wall with focal mural thickening and hyperenhancement (Figure 1). Mild surrounding fat stranding and a small amount of fluid were also present, indicative of active inflammation. Findings were consistent with acute urinary bladder diverticulitis. The inflammatory changes centered around the right distal ureter (Figures 2, 3). A smaller urinary bladder diverticulum was also seen arising from the left postero-lateral urinary bladder wall (Figure 1). Prostate gland was only minimally enlarged (31 cm³). The appendix was normal size with no evidence of inflammation.

The patient improved with intravenous clarithromycin (Klacid 500 mg, twice daily) and subsequently with oral amoxicillin/clavulanic acid (Augmentin 625 mg, twice daily). After resolution of symptoms, the patient returned for further evaluation with cystoscopy and uroflow dynamic study. Cystoscopy revealed intravesical protrusion of the prostate gland as well as bladder trabeculation suggestive of chronic urinary bladder outlet obstruction. Uroflow dynamic study results revealed slow urine flow. These findings suggest that the urinary bladder diverticula in this patient were the acquired form.

No surgical intervention was required.



Figure 2. Coronal oblique reconstruction shows the inflamed bladder diverticulum (white arrow) in close relation to the right distal ureter. There is mild thickening of the ureteric wall (white arrow head).

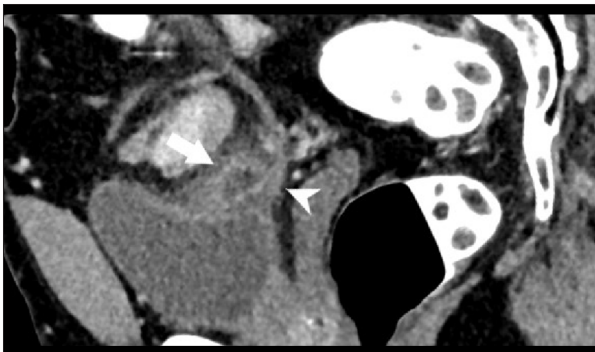


Figure 3. Sagittal oblique CT image shows the inflamed bladder diverticulum (white arrow) in close proximity to the right distal ureter (white arrow head), which may account for increased red blood cells in the urine as the surrounding fat stranding involves the right distal ureteric fat. The distal ureteric wall is thickened and enhancing.

Discussion

Urinary bladder diverticulitis is exceedingly rare relative to the incidence of urinary bladder diverticulum. This is possibly due to the sterile environment of urine with a lack of solid material, unlike the gastrointestinal tract and specifically colonic diverticulitis. Chronically increased intravesical pressures, most commonly from an enlarged prostate gland in males, is a predisposing factor for acquired urinary bladder diverticula. There is currently limited evidence to suggest that inflammation such as cystitis predisposes to the formation of urinary bladder diverticula. A few pathology papers have described a significant proportion of nonneoplastic urinary bladder diverticula having inflammatory changes [9–11]; however, as these were either postbiopsy or resected samples, it was difficult to determine if such inflammatory changes were directly involved in diverticulum formation or were the result of stasis of urine and the underlying clinical condition leading to the

biopsy and resection. Previous papers looking at colonic diverticula disease found no signs of inflammatory change in histological samples [12–14]. While the colon and urinary bladder are different organs with functionally different processes and contents, it would not be wrong to postulate the limited role inflammation has in causing urinary bladder diverticula to form. There is currently no specific operative treatment for urinary bladder diverticulitis, and the recurrence rate is unknown should the diverticulum be left untreated surgically.

To date, only one previous case report on symptomatic urinary bladder diverticulitis has been reported in the English literature. Silberman et al. [15] reported an 81-year-old man who presented with acute suprapubic pain of 2 days duration. The patient had a urinary tract infection which was partially treated with cephalexin for 7 days. He also had a background of benign prostatic hypertrophy, suggesting an acquired diverticulum. The patient had improvement in symptoms and left the hospital prior to being evaluated with cystoscopy.

In contrast, our patient was relatively young in developing an acquired urinary bladder diverticulum and had no complaints of any baseline lower urinary tract symptoms. However, there were features of chronic urinary bladder outlet obstruction on cystoscopy and uroflow dynamic study. While the prostate gland was only minimally enlarged on CT (33 cm³), there was intravesical protrusion of the prostate gland on cystoscopy suggesting an element of prostatic hypertrophy.

Similar to the patient in the Silberman et al. [15] case report, our patient had increased red blood cells in the urinalysis sample. Such findings suggest pathophysiological similarities to the per rectal bleeding seen in colonic diverticulitis. In contrast to colonic diverticulitis, however, the physiologically sterile contents of the urinary bladder reduce the chance of abscess formation. Other differential diagnoses related to hematuria and pain may commonly include pyelonephritis, urolithiasis, and renal or urinary tract malignancies.

As CT is the recommended examination of choice for adult patient with right lower quadrant abdominal pain [16], we feel that it is important to recognize and describe the CT imaging features of acute urinary bladder diverticulitis. Outpouching of the bladder wall and thickened and enhancing diverticulum with surrounding fat stranding should be classical features of the diagnosis. Furthermore, in the acute setting, cystoscopy or even surgery can be avoided if the CT findings are typical. CT is also invaluable to exclude other more sinister causes of pain and hematuria. In our case, the inflammatory changes involved the right distal ureter supported and explained the predominant finding of hematuria in the urine sample [17].

The abnormal liver serum biochemistry results at the time of presentation (raised AST, ALT, and GGT) were deemed attributable to hepatic steatosis, which was revealed on CT.

Our patient had an uneventful recovery with antibiotic treatment. Subsequent procedures such as cystoscopy may be performed after the acute illness resolves. No operation is needed to treat this condition, although further treatment for chronic bladder obstruction may be helpful to prevent recurrence.

References:

1. Rose DK: The pathogenesis of bladder diverticula. *Arch Surg*, 1927; 14(2): 554–65
2. Garat JM, Angerri O, Caffaratti J et al: Primary congenital bladder diverticula in children. *Urology*, 2007; 70(5): 984–88
3. Fox M, Power RF, Bruce AW: Diverticulum of the bladder – presentation and evaluation of treatment of 115 cases. *Br J Urol*, 1962; 34(3): 286–98
4. McLean P, Kelalis PP: Bladder diverticulum in the male. *Br J Urol*, 1968; 40(3): 321–24
5. Melekos MD, Asbach HW, Barbalias GA: Vesical diverticula: etiology, diagnosis, tumorigenesis, and treatment: Analysis of 74 cases. *Urology*, 1987; 30(5): 453–57
6. Lower WE: Diverticula of the urinary bladder. *Arch Surg*, 1921; 3(1): 38–55
7. Mann GS: Chapter 71. The paediatric renal tract and adrenal gland. In: Allan PL, Baxter GM, Weston MJ (eds.), *Clinical Ultrasound*. 3rd ed. Edinburgh: Churchill Livingstone, 2011; 1406–67
8. Sung CW, Chang CC, Chen SY, Tseng WP: Spontaneous rupture of urinary bladder diverticulum with pseudo-acute renal failure. *Intern Emerg Med*, 2018; 13(4): 619–22
9. Idrees MT, Alexander RE, Kum JB, Cheng L: The spectrum of histopathologic findings in vesical diverticulum: implications for pathogenesis and staging. *Hum Pathol*, 2013; 44(7): 1223–32
10. Tamas EF, Stephenson AJ, Campbell SC et al: Histopathologic features and clinical outcomes in 71 cases of bladder diverticula. *Arch Pathol Lab Med*, 2009; 133(5): 791–96
11. Wang J, Patel V, Inniss S, Manucha V: Histopathologic trends in bladder diverticula. *Am J Clin Pathol*, 2015; 144(Suppl. 2): A341
12. Tursi A, Elisei W: Role of inflammation in the pathogenesis of diverticular disease. *Mediators Inflamm*, 2019; 2019: 8328490
13. Tursi A, Brandimarte G, Elisei W et al: Assessment and grading of mucosal inflammation in colonic diverticular disease. *J Clin Gastroenterol*, 2008; 42(6): 699–703
14. Humes DJ, Simpson J, Smith J et al: Visceral hypersensitivity in symptomatic diverticular disease and the role of neuropeptides and low grade inflammation. *Neurogastroenterol Motil*, 2012; 24(4): 318-e163
15. Silberman M, Jeanmonod R: Bladder diverticulitis: A case report. *Case Rep Emerg Med*, 2011; 2011: 303498
16. Cartwright SL, Knudson MP: Evaluation of acute abdominal pain in adults. *Am Fam Physician*, 2008; 77(7): 971–78
17. Jones WG, Barie PS: Urological manifestations of acute appendicitis. *J Urol*, 1988; 139(6): 1325–28

Conclusions

Isolated urinary bladder diverticulitis is a very rare condition with a poorly understood underlying etiology. While information on the condition is scarce, we postulate that hematuria may be an important finding not dissimilar to the per rectal bleeding seen with colonic diverticulitis.

Urinary bladder diverticulitis can potentially mimic other more common presentations depending on its location in the urinary bladder wall as demonstrated in our case. We show and describe the typical CT findings. We suggest a follow-up cystoscopy and uroflow dynamic study in such patients to evaluate for findings of chronic urinary bladder outlet obstruction.

Conflicts of interest

None.