



Case report

Self-catheterization of urinary bladder complicated with extraperitoneal abscess that mimics an infected bladder diverticulum



Yu-Cing Juho, Seng-Tang Wu, En Meng, Chih-Wei Tsao, Tai-Lung Cha, Dah-Shyong Yu, Guang-Huan Sun, Cheng-Ping Ma, Sun-Yran Chang, Shou-Hung Tang*

Division of Urology, Department of Surgery, Tri-Service General Hospital, National Defense Medical Center, Taipei, Taiwan, ROC

ARTICLE INFO

Article history:

Received 4 April 2014

Received in revised form

17 August 2014

Accepted 18 August 2014

Available online 28 October 2014

Keywords:

bladder perforation

extraperitoneal abscess

intermittent urinary catheterization

neurogenic bladder

ABSTRACT

For patients who are suffering from neurogenic lower urinary tract dysfunction, intermittent urinary catheterization is an efficient way to empty the bladder.¹ However, the method may result in various complications. Herein we present a rare complication of extraperitoneal abscess owing to intermittent urinary catheterization in a 62-year-old male who had cervical spine injury and was treated with intermittent urethral catheterization for neurogenic lower urinary tract dysfunction. Treatment and a literature review are also described.

Copyright © 2014, Taiwan Urological Association. Published by Elsevier Taiwan LLC.

Open access under [CC BY-NC-ND license](http://creativecommons.org/licenses/by-nc-nd/4.0/).

1. Introduction

Clean intermittent self-catheterization (CIC) of the urinary bladder, proposed by Dr Lapedes in early 1972, is accepted as the standard of care in patients with neurogenic bladder, which failed in emptying urine.^{1,2} This technique is so commonly performed that many possible complications, including urinary infection, hematuria, bladder injury, and retained balloon fragments, are overlooked.³ A rare complication of bladder perforation could happen especially with long-term self-catheterization.⁴ The resulting sepsis can be life-threatening. Furthermore, bladder perforation is not always easily diagnosed in patients with spinal cord injury. We present a case of such an uncommon complication after a long-term CIC.

2. Case report

A 62-year-old male presented to our hospital with a history of high cervical spine injury with quadriplegia at the age of 48 years, who developed neurogenic bladder later on. Since then, he had been using regular CIC. The procedure has been performed regularly by his daughter for 14 years in a home-care setting.

Repeated urinary tract infections were noted a few times each year after the patient started to receive CIC. It was only a few days before coming to our hospital that he began experiencing low-grade fever as well as a markedly poor appetite. His family noticed a hyperemic, indurated area around the umbilicus.

On admission, the blood tests showed leukocytosis ($15,450/\text{mm}^3$), high C-reactive protein (1.74 mg/dL), and a serum creatinine level of 1.3 mg/dL. Marked pyuria was noted, and the urine culture later on showed the presence of *Pseudomonas aeruginosa*. He also underwent computed tomography (CT) scanning. The CT scan revealed a large homogenous hypodense lesion (10 cm × 10 cm × 12 cm in diameter) from the posterior aspect to the anterior aspect of the bladder. Both bladder diverticulum with infection or focal abscess were considered (Fig. 1). To clarify the nature of the lesion, we then performed cystography and cystoscopy. The cystography showed a large bladder diverticulum (Fig. 2), but the cystoscopy failed to identify the diverticulum opening.

This patient was initially treated conservatively with urethral catheter drainage and covered by broad-spectrum antibiotics, but the sepsis progressed. We then decided to perform transabdominal diverticulectomy and planned to convert the urethral catheter to suprapubic cystostomy for the neurogenic bladder. During the operation, we found that there was no bladder diverticulum at all, and the fluids were the localized, infected urine from a very small bladder perforation. The patient's condition was stabilized by the open drainage and the suprapubic cystostomy procedure. He was discharged with the perforation hole completely healed. The

* Corresponding author. Division of Urology, Department of Surgery, Tri-Service General Hospital, 3F Urology Office, Number 325, Section 2, Cheng-Gung Road, Taipei 114, Taiwan, ROC.

E-mail address: tansohorn@yahoo.com.tw (S.-H. Tang).



Fig. 1. Abdominal computed tomography reveals a huge homogeneous lesion (10 cm × 10 cm × 12 cm) from the posterior aspect to the anterior aspect of the bladder.

patient's suprapubic tube cystostomy continued to function well for 2 years. However, during this period, he received follow-up care at a community-based hospital for repeated episodes of pneumonia and septic shock. He eventually began to receive regular hemodialysis for the end-stage renal disease, and then the suprapubic tube cystostomy tube was removed.

3. Discussion

Cervical spine injury is associated with significant neurogenic lower urinary tract dysfunction.⁵ For patients who have sustained a cervical spine injury, the situation is usually further complicated by detrusor overactivity, with or without detrusor-external sphincter dyssynergia.⁶ Without proper intervention, this in turn results in a pattern of high-pressure voiding, and eventually damages the patient's renal function.

In the present case, catheterization is the standard of care to manage the high-pressure micturition. Options included clean intermittent urethral catheterization, indwelling urethral or suprapubic catheterization, and bilateral upper urinary tract

diversion.⁷ This patient, however, was treated with intermittent catheterization.

According to the literature and clinical guidelines, the frequency of catheterization should be at least four to six times per day. When CICs are performed properly, the complications are mostly related to bacterial infections, and major complications are rare. In patients with long-term urinary catheterization, complications of bladder perforation and subsequent infection have been reported. In the report of Spees et al.,⁸ three patients were diagnosed to have bladder perforation with peritonitis or intraperitoneal abscess. In our case, the patient, who had a history of neurogenic bladder due to cervical spine injury, had relied on intermittent urinary catheterization for 14 years. The long-term urinary catheterization might be a risk factor for developing bladder perforation.⁹ In that report, the patients were diagnosed by cystography, unexpected laparotomy for acute peritonitis, and autopsy. In our case, cystography and CT of the pelvis were arranged for diagnosis initially, but they failed to show the exact diagnosis, probably because of a localized and sealed perforation hole. Magnetic resonance urography (MRU) may have a role in differentiating between diverticulum, which contains urine, and infection, which contains abscess. Excretory MRU may reveal a high signal in bladder diverticulum and a low signal in extraperitoneal abscess.¹⁰ In the current case, we did not order for MRU because the bladder perforation was initially out of our expectation.

To avoid the complication of bladder perforation with intraperitoneal or extraperitoneal abscess, other methods for urine drainage such as suprapubic cystostomy may be considered, especially when the family caregiver is not well trained. In conclusion, patients who receive intermittent catheterization should be warned about the possibility of bladder perforation, even after a long period of incident-free practice.

Conflicts of interest

The authors declare that they have no financial or non-financial conflicts of interest related to the subject matter or materials discussed in the manuscript.

Sources of funding

No funding was received for the work described in this article.

References

1. Sorokin I, De E. Options for independent bladder management in patients with spinal cord injury and hand function prohibiting intermittent catheterization. *NeuroUrol Urodyn* October 22, 2013. <http://dx.doi.org/10.1002/nau.22516>.
2. Lapidus J, Diokno AC, Silber SM, Lowe BS. Clean, intermittent self-catheterization in the treatment of urinary tract disease. *J Urol* 1972;**167**: 1584–6.
3. Arun N, Kekre NS, Nath V, Gopalakrishnan G. Indwelling catheter causing perforation of the bladder. *Br J Urol* 1997;**80**:675–6.
4. Farraye MJ, Seaberg D. Indwelling Foley catheter causing extraperitoneal bladder perforation. *Am J Emerg Med* 2000;**18**:497–500.
5. Stöhrer M, Goepel M, Kondo A, Kramer G, Madersbacher H, Millard R, et al. The standardization of terminology in neurogenic lower urinary tract dysfunction with suggestions for diagnostic procedures. *NeuroUrol Urodyn* 1999;**18**: 139–58.
6. Sayılır S, Ersöz M, Yalçın S. Comparison of urodynamic findings in patients with upper and lower cervical spinal cord injury. *Spinal Cord* 2013;**51**:780–3.
7. Jamison J, Maguire S, McCann J. Catheter policies for management of long term voiding problems in adults with neurogenic bladder disorders. *Cochrane Database Syst Rev* 2013;(11):CD004375. <http://dx.doi.org/10.1002/14651858>.
8. Spees EK, O'Mara C, Murphy JB, Michigan S, Newton CG. Unsuspected intraperitoneal perforation of the urinary bladder as an iatrogenic disorder. *Surgery* 1981;**89**:224–31.
9. Merguerian PA, Erturk E, Hulbert Jr WC, Davis RS, May A, Cockett AT. Peritonitis and abdominal free air due to intraperitoneal bladder perforation associated with indwelling urethral catheter drainage. *J Urol* 1985;**134**:747–50.
10. Leyendecker JR, Barnes CE, Zagoria RJ. MR urography: techniques and clinical applications. *Radiographics* 2008;**28**:23–46.



Fig. 2. Cystography shows a large bladder diverticulum.