CASE REPORT

Herniation of a urinary bladder diverticulum: diagnosis and management of a fluctuating inguinal mass

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SUMMARY

Inguinal herniation of a bladder diverticulum is a rare finding. The diagnosis should be suspected if the size of hernia is variable on urination. These patients may also experience obstructive voiding symptoms. Various imaging modalities may clarify the diagnosis. In our patient, intravenous urography precisely showed a bladder diverticulum in the right inguinal area. The patient underwent open simple prostatectomy and herniorrhaphy. He remains symptom-free on follow-up.

BACKGROUND

Inguinal hernias are among the most common types of hernia, especially in elderly male population. Increases in intra-abdominal pressure as well as congenital or acquired abdominal wall defects are contributing factors to the aetiology of this type of hernia. As with incidence of hernia, benign prostatic hyperplasia (BPH) and lower urinary tract symptoms (LUTS) prevalence increases with age. To overcome the increased pressure from bladder outlet obstruction due to BPH, patients strain with urination. Hence, BPH severity and the subsequent chronic increase in intra-abdominal pressure are correlated with the incidence of inguinal hernia as well as trabeculation and formation of a bladder

diverticulum.¹ Bladder diverticulum is herniation of the urinary mucosa through a weakness or absence of the detrusor muscle. The peritoneal sac of the inguinal hernia may contain intraperitoneal viscera. However, the herniation of extraperitoneal organs such as bladder components is a rare entity. These organs are not included in the sac, but are pulled into the canal due to traction of the sac.² Herniation of a bladder diverticulum through the inguinal canal is a rare finding. Herein, we present an unusual case of recurrent indirect inguinal hernia with a giant bladder diverticulum and follow-up of the patient after surgical treatment.

CASE PRESENTATION

A man aged 79 years was referred to our urology clinic with recently exacerbated dysuria, and nocturia during the past 6 months in addition to his chronic straining, frequency, terminal dribbling and reduced urinary stream. The patient denied any recent urinary tract infections (UTI), haematuria, history of kidney or bladder stone or urinary retention. He also reported a large soft inguinal mass on the right side which fluctuated in size with bladder distension. Meanwhile, he had a history of bilateral indirect inguinal hernias 12 years ago, which had been managed by herniorrhaphy. Physical examination

Figure 1 Intravenous urography images in coronal view. (A) After 15 min of contrast injection, the bladder diverticulum is still not evident. (B) After 30 min, the bladder diverticulum (arrow) is filled with contrast medium.

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Figure 2 (A) Larger view of the bladder diverticulum (arrow) filling with contrast and descending in the inguinal canal. (B) The bladder diverticulum completely emptied in the postvoiding image.

revealed an enlarged prostate of ~80 cc and an inguinal hernia at the right side.

INVESTIGATIONS

Urinalysis, blood urea nitrogen, creatinine as well as other routine laboratory tests were within normal limits. The latest prostate-specific antigen (PSA) level 2 weeks prior to clinic visit was 7.0 ng/mL. Owing to the patient's advanced age, stable PSA values and extremely low PSA density, the shared decision between the patient and the physician was to not carry out a prostate biopsy prior to definitive management of the cause of the bladder outlet obstruction. To investigate the hernia content further, an intravenous urography (IVU) was performed which showed a contrast containing sac in the right lower abdomen/pelvis area after 30 min, which raised the suspicion of the presence of a bladder component in the sac of hernia. The shape of

the contrast-enhancing sac was consistent with a large bladder diverticulum (figure 1). Postvoid images showed complete emptying of the bladder diverticulum besides postvoid residual of contrast material most likely due to BPH (figure 2).

DIFFERENTIAL DIAGNOSIS

Differential diagnoses of inguinal mass in an elderly male patient include inguinal hernia, femoral hernia, lymphadenopathy, vascular aneurysm and lipoma or encysted hydrocele of the spermatic cord. Less commonly herniation of the bladder or its components may be encountered in such patients.

TREATMENT

Treatment options were discussed with the patient, including endoscopic and open techniques. Owing to the patient's rural living conditions, markedly enlarged prostate and the desire for

Table 1 Reported cases of inguinal herniation of bladder diverticulum in English language literature

Case#	First author	Year	Age/ sex	Presenting symptoms	Preop diagnosis	Surgical technique	D/C and complications
1	Kara ⁴	2014	74/M	Incidental finding	PET/CT	—	—
2	Burda ⁵	2014	54/M	Incidental finding	CT scan	—	—
3	Manfredelli ⁶	2012	63/M	Inguinoscrotal swelling and urinary symptoms	Abdominal US, cystography	Repair of wall defect by mesh fixation	D/C: POD 5
4	Duran Barquero ⁷	2010	70/M	Incidental finding	PET-CT	—	—
5	Ko ⁸	2010	2/M	Bilateral inguinal hernia	Not mentioned	Hernia repair, subsequent exploratory laparotomy due to complications	Perforation of the anterior bladder wall
6	Kramer ⁹	2009	76/M	Pain, erythema and purulent drainage from right inguinal area	CT scan, cystography	Abscess drainage, no treatment for BD due to patient's comorbidities	—
7	Hinojosa ¹⁰	2008	82/M	Incidental finding	PET/CT	—	—
8	Wienbeck ¹¹	2008	74/M	Incidental finding	PET/CT	—	—
9	Fuerxer ²	2006	80/M	Incidental finding	CT scan and CT angiography	No surgical treatment due to patient's physical condition	—
10	Fuerxer ²	2006	70/*	Incidental finding	CT scan	—	—
11	Iagaru ¹²	2006	53/M	Incidental finding	Bone scan, CT scan	—	—
12	Schewe ¹³	2000	80/M	Obstructive and irritative urinary symptoms	IVU, cystography	TURP followed up by herniorrhaphy after 3 months	D/C: POD 10 No complication
13	Bolton ¹⁴	1994	62/M	Frequency	IVU, cystography	Herniorrhaphy and open diverticulectomy	—
14†	Nabavizadeh	2016	79/M	Dysuria, nocturia, frequency and obstructive urinary symptoms	IVU	Simple prostatectomy and hernia repair	D/C: POD 3 No complication

*Patient's sex was not mentioned.

†Present case.

D/C, discharge; IVU, intravenous urography; PET, positron emission tomography; POD, postoperative day; US, ultrasound.

a single anaesthetic, the decision was made to proceed with open simple prostatectomy with right inguinal hernia repair at the same session. At the beginning of the operation, cystoscopy was performed to assess the location of the diverticular orifice. It revealed a diverticular orifice on the right posterolateral bladder wall well above the bladder neck and away from the right ureteral orifice. Then the urinary bladder was opened and the diverticulum was found and inverted to assess for abnormalities within the sac. Intraoperative evaluation of the diverticulum showed a broad stalk with no abnormalities. IVU had also indicated full emptying of the diverticulum. Therefore, diverticulectomy was avoided and simple prostatectomy was performed. Then, right inguinal herniotomy and herniorrhaphy was performed with a separate groin incision.

OUTCOME AND FOLLOW-UP

The patient was discharged on postoperative day 3 without any complications. He remains symptom-free on a 4-week postoperative visit.

DISCUSSION

Inguinal herniation of urinary system components is a rare finding. A retrospective study of 1910 patients with inguinal hernia revealed herniation of urinary bladder in seven patients (0.37%) and bladder diverticulum in only one patient (0.05%).³ We found 23 cases of inguinal herniation of the bladder diverticulum reported to date.^{2 4–22} Out of the 13 cases reported in the English language literature, 8 were identified incidentally on imaging obtained for other reasons (table 1). Herniation of bladder diverticulum may present with various clinical pictures according to its location, ranging from an asymptomatic inguinal mass that fluctuates in size with urination to obstructive urinary symptoms. It is often underdiagnosed, particularly when the diverticulum is small and asymptomatic. A high index of suspicion is required to diagnose these cases preoperatively to avoid unintentional damage to urinary system during the surgery. They are also associated with a higher risk of UTI, bladder calculi formation, fistula formation and rarely

malignancy.¹⁰ Thus, it is of utmost importance to diagnose and treat this rare condition properly. Different imaging studies including ultrasound scan, IVU and voiding cystourethrogram can aid with the diagnosis. Diverticulectomy is indicated for large diverticula with incomplete emptying, LUTS related to bladder diverticulum not responsive to medical therapy, chronic or repeated UTI, and stones or carcinoma within the diverticulum.²³ It is essential to identify and address the underlying cause, such as BOO, to prevent future recurrence.

Contributors AN and RN performed the surgery described. RN and BN collected the data. RN, BN and LH drafted the report. All authors revised the report critically and approved it for submission.

Competing interests None declared.

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Learning points

- Herniation of bladder diverticulum through the inguinal canal is a rare finding comprising <0.1% of inguinal hernia cases.
- A high index of suspicion is required, especially in older patients with long-standing history of benign prostatic hyperplasia and lower urinary tract symptoms, to achieve an accurate diagnosis prior to surgery to avoid unintentional damage to urinary system components.
- History and physical examination might reveal fluctuation in hernia size with urination.
- Proper imaging techniques including ultrasound, intravenous urography and voiding cystourethrogram can guide the diagnosis.
- Treatment includes alleviating the bladder outlet obstruction as well as hernia repair to tackle the aetiology and prevent recurrence of hernia.

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