



CASE REPORT

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A Right Indirect Bladder-Diverticulum Cystocele-Hernia, in Dual-Association with a Left Direct Inguinal Hernia and Benign Prostatic Hyperplasia: A Case-Report and Literature Review

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ABSTRACT

We present a rare case of a bladder diverticulum cystocele herniating into the right inguinal canal, and ending in the scrotal sac in a 55-year-old obese male, with an associated contralateral direct inguinal hernia, and a Benign Prostatic Hyperplasia (BPH). The crux of this case, an uncommon form of sliding hernia, highlights the importance of considering unusual contents within inguinal hernias and the need for thorough preoperative evaluation. The patient underwent successful surgical management, leading to significant symptomatic improvement.

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Introduction

Inguinal hernias are common surgical presentations, typically containing intra-abdominal viscera like omentum or small bowel surrounded by the peritoneum [1]. The presence of an extra peritoneal organ like the urinary system components within an inguinal hernia sac is exceptionally rare despite their proximity to the inguinal canal. Usually, an extra peritoneal organ like the bladder can be pulled along by the sac itself and become a component of the hernia but never the sac [2]. 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%) [1]. Bladder diverticula arise within a trabeculated or sacculated high pressure urinary bladder caused by bladder outlet obstruction [2]. The risk factors include male gender, advanced age, chronic urinary obstruction, weak pelvic musculature and obesity but in most cases, it is a result of benign prostatic hypertrophy [3].

Diagnosis of a bladder diverticulum hernia is challenging because patients that are symptomatic most often present with nonspecific symptoms such as inguinal swelling, dysuria, haematuria, and urinary [3]. It is, therefore not surprising that only 7% of inguinal bladder hernias are diagnosed prior to surgery, with the vast majority being diagnosed intraoperatively and 16% diagnosed postoperatively due to complications including bladder injury and leakage [4]. A high index of suspicion along with proper imaging studies are important in making a timely diagnosis. Bladder diverticulum hernia is usually associated with pathologies like benign prostatic hyperplasia, hydronephrosis, vesicoureteric reflux, and scrotal abscesses and further complicated by urinary tract infections, obstructive uropathy, and bladder infarctions that require subtotal cystectomy [5]. This report discusses the clinical presentation, diagnostic approach, and surgical management of this unusual case in a 55-year-old obese male of black African descent.

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Case Presentation

A 55-year-old hypertensive Ghanaian male of (African descent) presented to the Urology clinic with worsening Lower Urinary Tract Symptoms (LUTS) of over seven years' duration, including straining, weak stream, intermittency, a feeling of incomplete bladder emptying; necessitating a right hemiscrotal-compression (a Crede's manoeuvre-mimicry) to complete the emptying. Patient observed a tandem reduction in right hemiscrotal size, after each Crede's Manoeuvre. Patient also had nocturia of 6 times, but never had haematuria. International Prostate Symptom Score (IPSS) was 19/35, and Quality of Life (QoL) score was 5/6. Patient reported a painless, reducible right inguinal swelling that appeared with Valsalva manoeuvre and reduced only with manual compression after micturition. There was a much smaller left groin swelling which also appeared on vasoelvre; but was rather self-reducible. The patient was not a manual worker, patient does not indulge in heavy lifting, and had no chronic cough or constipation. Patient is non-compliant on his antihypertensive medications and non-diabetic. Patient is a heavy drinker but does not smoke. Patient's family was gravely concerned about his alcoholism and related absenteeism at work.

Images from bladder diverticulum cystocele hernia shown in Figure 1. Physical examination revealed a huge man with truncal obesity, a BMI (Body Mass Index)

of 34.56 Kg/m² and a mid-abdominal circumference of 122 cm at the level of the umbilicus, and hip circumference of 112 cm (Figure 1A). Abdominal and inguinoscrotal examination, revealed a palpable, non-tender, reducible mass in the right inguinal region. There was a lot a direct Left Inguinal Hernia (dLIH). The external genitalia was normal. A digital rectal examination, and an ultrasound scan, revealed a 42.71 g prostate, with benign features.

Laboratory investigations showed a total serum Prostate-Specific Antigen (PSA) of 2.4 ng/ml; with PSA density of 0.06 ng/ml². An ultrasound scan of the abdomen and pelvis revealed a cystic structure within the right inguinal canal. A Computed Tomogram-Intra Venous Urogram (CT-IVU) Scan was performed which showed a bladder diverticulum entering the right inguinal hernia sac (Figure 1B). A cystography (ordered due to our high-index of suspicion), showed the dumbbell/dog-ear appearance, confirming the diagnosis of bladder diverticulum cystocele (Figure 1C). The cystogram did not reveal any vesico-ureteric reflux disease. An Electrocardiogram (ECG) was normal; but his echocardiogram showed features suggestive of hypertensive heart disease. The management options were discussed with the patient, a written-informed consent was obtained; and he was subsequently scheduled for an elective diverticulectomy, alongside an exploration of hernia sac and hernia repair; since the hernia was uncomplicated.

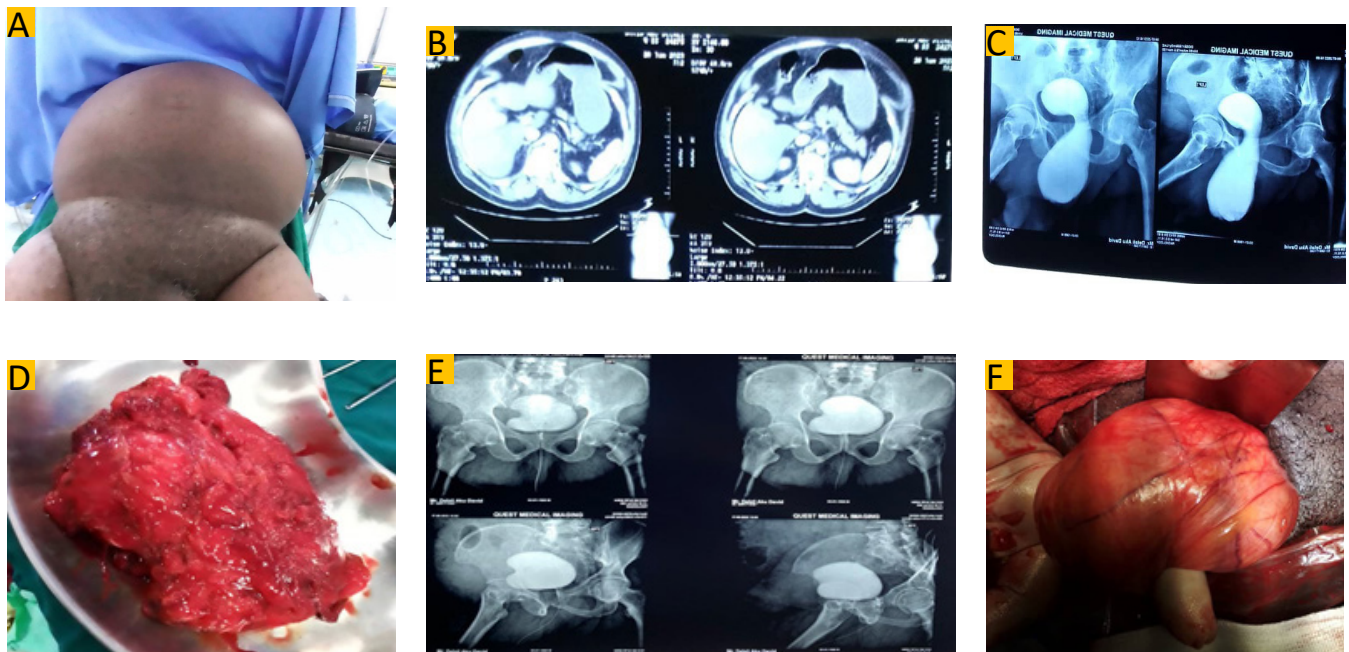


Figure 1. Images from bladder diverticulum cystocele hernia. **Note:** A) Huge man with truncal obesity; B) Bladder diverticulum entering the right inguinal hernia sac; C) Dumbbell/dog-ear bladder diverticulum cystocele; D) The excised diverticulum thickened with fat; E) Postoperative cystogram of bladder diverticulum cystocele; F) Bladder diverticulum cystocele.

Management

The patient underwent elective surgery under spinal anaesthesia. A sub-umbilical midline incision and a parainguinal incision were used to explore the extra-vesical space. The bladder diverticulum was delineated, dissected, manually reduced (with difficulty), and excised from the main bladder chamber. The hernia-neck thickness was 3 cm, there was no ipsilateral testicular hypoplasia and the contralateral testis was normal. The excised diverticulum, which appeared thickened with fat (Figure 1D) was sent for histopathology, which showed no urothelial malignancy in its mucosal linings or its walls. The bladder wall was closed in two layers using absorbable sutures, and the right posterior wall was repaired using a suture-based tension-free approach (nylon darn). An extra-peritoneal approach was maintained. The skin wounds were closed in two layers with absorbable sutures for the subcutaneous layer and nylon sutures for the skin. A 20-French two-way Foley catheter was left in the bladder for three weeks. Optimal deep venous thrombo-embolism prophylaxis was ensured during the entire course of management.

The left direct inguinal hernia was treated with an open, polypropylene mesh-repair as an interval-procedure, much later. The contents were omental and pre-peritoneal fat.

Postoperative course

The postoperative period was uneventful. A check cystogram (20 days post-operatively, POD 20) confirmed adequate complete healing, and an obliteration of the dumb-bell appearance (Figure 1E). The Foley catheter was removed after three weeks (POD 21). The patient's IPSS improved to 7/35, and QoL score improved to 2/6. He has since voided per urethra without the need for the Credé manoeuvre and has returned to work. He remains on his usual antihypertensives and tamsulosin, plus finasteride, for residual LUTS related to the enlarged prostate with benign features (clinically, a benign prostatic hyperplasia).

Discussion

Urinary bladder involvement in inguinal hernia is often unilateral with a 70% right-sided male predominance as seen in our case [6]. Nabavizadeh et al., explained that herniated extraperitoneal organs such as bladder or bladder diverticula are not included in the hernia sac, but are pulled into the canal due to traction of the sac to form a component of the hernia but not the sac itself [7]. In our case (Figure 1F) and other reported cases, the diverticulum was the sole-content of the hernia [6]. The pathophysiology of this entity involves pulling of the bladder diverticulum and a sheath of peritoneum that forms its sac through a weak point in

the abdominal wall [1,3]. The risk factors include male gender, old age, chronic urinary obstruction, pelvic floor muscle weakness, and obesity [3]. Our patient was morbidly obese (Figure 1A) and had a moderately enlarged prostate which could have increased his risk of developing the bladder diverticulum hernia.

Most patients with bladder or bladder diverticulum hernia are asymptomatic while the symptomatic ones present with nonspecific symptoms such as inguinal swelling, dysuria, haematuria, and urinary urgency [1]. The non-specificity of its symptoms can delay diagnosis and treatment and lead to serious complications or even death. In our patient, these symptoms could erroneously be attributed to his moderately enlarged prostate. However, although his enlarged prostate could be the culprit, the fact that his IPSS and QoL improved from 19/35 and 5/6 to 7/35 and 2/6 respectively after The diverticulectomy plus hernia repair, shows that it was not the chief cause of his symptoms.

Different imaging studies including ultrasound scan, Intra Venous Urogram (IVU) and voiding cystourethrogram can aid with the diagnosis. Ultrasonogram (USG) which is the most accessible modality may demonstrate hypoechogenic mass lesion protruding from the bladder through the inguinal canal [6]. The ultrasound of the abdomen of our patient revealed a cystic structure within the right inguinal canal. His CT-IVU scan showed a bladder diverticulum entering the right inguinal hernia sac and a cystography confirmed the diagnosis of bladder diverticulum cystocele. The rate of diagnosis of inguinal bladder hernia before surgery is very low. Hence, physicians should consider the probability of this type of hernia in the elderly, obese and male populations among which the prevalence of this hernia is 10% [1]. The preoperative diagnosis of bladder diverticulum cystocele as a component of the hernia in our case allowed a careful planning and successful management of our patient.

The treatment of choice for an IBH, is open surgery hernia repair with bladder contents either reduced or resected and repaired [4]. The indications for bladder resection include bladder trauma during hernioplasty, necrotic bladder neck, tumors of the bladder, diverticulum of the bladder (as in our case), and a hernia neck of <5 mm diameter [1,6]. In our case, a sub-umbilical midline incision and a parainguinal incision were used to explore the vesical space and the diverticulum was delineated, dissected, manually reduced (with difficulty), and excised from the main bladder chamber. Also, because the association between this type of hernia with other urological malignancies has been described in literature, the excised diverticulum was sent for histopathology,

which showed no urothelial malignancy in its mucosal linings or its walls [8]. Bladder injury and leakage during repair is a common complication with data suggestive of a 12% occurrence in inguinal bladder hernias [6]. In our case, the bladder wall was closed in two layers using absorbable sutures, the inguinal hernia was repaired using a suture-based tension-free approach (nylon darn) and the patient recovered without complications.

A long-standing history of difficulty in urination, incomplete voiding and straining associated with a groin hernia, as seen in our case should increase the suspicion for the diagnosis of a sliding hernia containing the urinary bladder or a bladder diverticulum.

Pertinent Literature Review on the Subject matter

Inguinal hernias are the most common types of hernia, especially in elderly male population [7]. Advanced age, increase in intra-abdominal pressure, and congenital or acquired abdominal wall defects are contributory factors to the aetiology of this type of hernia [6]. As with incidence of hernia, the prevalence of Benign Prostatic Hyperplasia (BPH) and Lower Urinary Tract Symptoms (LUTS) increases with age. To overcome the increased pressure from bladder outlet obstruction due to BPH, patients strain upon micturition. The subsequent chronic increase in intra-abdominal pressure correlates with the incidence of inguinal hernia as well as trabeculation and formation of a bladder diverticula [2]. Bladder diverticula are relatively rare [1]. Diverticular are usually thin walled, full of urine and adjacent to the bladder to which it is connected by a narrow opening or neck. Smooth muscles in the diverticular wall are scattered, inactive, and inconsistent making them unable to drain urine from the diverticulum during urination [9]. Bladder diverticula are usually associated with pathologies like benign prostatic hyperplasia, hydronephrosis, vesicoureteric reflux, and scrotal abscesses. They may also have severe urologic complications including urinary tract infections, malignant change, haematuria, obstructive uropathy, and even bladder infarctions that require subtotal cystectomy [3].

Inguinal Bladder Hernia (IBH) is a rare condition. Urinary bladder is found in 1%–4% of Inguinal Hernias (IH) but the incidence is higher (about 10%) in obese males, aged ≥ 50 years [9]. The hernia sac could contain any portion of bladder (diverticulum, part of bladder, ureter or entire bladder); and is often unilateral with a 70% right-sided predominance. There is also a predominance in males [4].

In the condition where the bladder is found in the inguinoscrotal hernia sac, it is referred as scrotal cystocele as described in 1951 by Levine [9]. In rare

cases of very severe bladder herniation, patients may describe a two-stage micturition in which they manually compress the scrotum in the second stage (cf, Crede's manoeuvre) in order to completely urinate [3]. Previous reports have described other rare cases including patients presenting with massive bladder herniation resulting in acute renal failure. Others include vesicoureteric reflux, bilateral hydronephrosis, inguinal bladder hernia masking bowel ischemia, bladder hernia with ureteral obstruction years after kidney transplantation, bladder rupture, and strangulation [5]. The involvement of the urinary bladder in a femoral hernia has also been reported [2]. Although bladder involvement in inguinal hernia is as low as 1%–4%, the involvement of a bladder diverticulum is even rarer [9]. 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%) [1].

More importantly, the pathophysiology of inguinal hernias dictates that only intraperitoneal viscera can be found in the sac while an extra peritoneal organ like the bladder or bladder diverticulum can only be pulled by the sac itself and become a component of the hernia but not the sac [2]. Contrary to this, few cases have been reported where the ureter, bladder or bladder diverticulum is a content of the hernia sac itself [6]. Small inguinal bladder diverticulum hernias are rarely symptomatic. However, most symptomatic patients present with nonspecific symptoms such as inguinal swelling, dysuria, haematuria, and urinary urgency [2]. Due to the non-specificity of its symptoms, diagnosis and treatment is often delayed leading to serious complications or even death. It is, therefore, not surprising that diagnosis is mostly clinched intraoperatively (77%), preoperatively (7%), and postoperatively (16%) [4].

Preoperatively, diagnosis is confirmed by Ultrasonography (USG), or Computed Tomography Urethrogram (CTU), Micturating Cysto Urethrogram (MCU), and Retrograde Urethrogram (RUG). USG using sector or linear probe is the most accessible modality and may demonstrate hypoechogenic mass lesion protruding from the bladder through the inguinal canal [6,9]. A multidetector CT gives better information on surrounding structures and morphology of anterior abdominal wall and is believed to be the study of choice in correctly localizing the groin hernia, in demonstrating its relationship with the inferior epigastric vessels and in the characterization of its contents [2]. CT scan is also indicated in obese males >50 years of age presenting with inguinal swelling and LUTS [9]. Evaluation of the bladder and prostate with urologic diagnostic modalities like flexible cystoscopy is especially recommended

in cases presenting with gross hematuria to exclude additional pathology of the bladder [4]. Additionally, voiding or micturating cystourethrography reveals a “dumbbell” or “dog-ear” shape of the bladder. It is the most sensitive test for diagnosis of inguinal bladder or bladder diverticulum hernia, and can confirm a diagnosis without additional need for CT [3]. A Voiding cystourethrogram is, therefore, recommended in cases where the suspicion for inguinal bladder hernia or bladder diverticulum hernia is high. This would help assess the urinary bladder anatomy and the degree of its involvement. It is also useful in cases where initial imaging with ultrasound or CT is inconclusive [2].

Open surgical repair performed either by extra or intra peritoneal approaches is preferred treatment of bladder or bladder diverticulum hernia [4]. For symptomatic bladder diverticula secondary to benign prostatic hypertrophy, either as a content of a hernia or not, it is treated by diverticulectomy and simple prostatectomy [2]. Catheterization prior to surgery for continuous bladder drainage, for a few days post-surgery is recommended to prevent urinary retention and straining which could potentially disrupt the sutures on the bladder [6]. The most important step at surgical treatment, is the clear identification of each anatomic element inside the hernia sac, resection of the diverticulum and repositioning of the bladder in its anatomical position [3]. Other indications for bladder resection are bladder damage during hernioplasty, necrosis of bladder neck, bladder tumours, and hernia neck of less than 5 mm in diameter [4]. Damage of bladder during surgery is common in about 12% of hernias involving the bladder or diverticulum but this rate drops when bladder or bladder diverticulum involvement is diagnosed preoperatively [6]. The resected bladder diverticulum is usually sent for histopathology because of the association between this type of hernia with other urological malignancies [8]. The abdominal wall defect could be repaired with or without mesh. Sometimes patients may opt for conservative therapy such as watchful waiting or intermittent catheterization (to reduce the bladder out of the hernia sac [4]). Other patients may also prefer medical treatment with alpha-blockers and 5-alpha reductase inhibitors over prostatectomy in the case of bladder diverticulum hernia related to BPH [2].

Conclusion

Inguinal bladder diverticulum hernia is a rare condition that poses a diagnostic challenge [with only 7% diagnosed preoperatively according to literature and requires a high index of suspicion especially in obese, elderly males >50 years with LUTS. Preoperative imaging including ultrasound, CT scan, and MCUG play a

key role in early diagnosis, preventing iatrogenic injury and complications. The degree of bladder involvement and damage should be assessed meticulously and a repair should be performed for any damage. The open surgical approach remains the standard of treatment consisting of diverticulectomy, repairing the defect with/without mesh, and treating sub vesical obstruction like BPH with simple prostatectomy or medical therapy (alpha-blockers and 5-alpha reductase inhibitors). Particular emphasis should be placed on excluding urologic malignancies intra or postoperatively. This case highlights the importance of considering atypical contents within inguinal hernias. More importantly, accurate preoperative diagnosis and careful surgical management are essential for optimal patient outcomes.

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Informed Consent

A written informed consent was obtained from the patient to use his case details, images and findings for this case study. More importantly, care has been taken to omit all identifying information of the patient.

Conflict of Interest

Authors have no conflicts of interest to disclose.

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