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Incarcerated Bladder Hernia as a Cause of Septic Shock: A Clinical Case Report

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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Case Study

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ABSTRACT

The prevalence of the bladder within the hernial sac in inguinal hernias is uncommon, being found in 1-4% of cases. Normally these patients present with few or no symptoms. We present the case of a 61-year-old male who was checked into our hospital for presenting septic shock due to an urinary infection as well as renal failure. An abdominopelvic tomography was performed which revealed the presence of an incarcerated bladder hernia with more than 50% of the urinary bladder, as well as the left ureter inside the hernial sac, with significant dilation of the Pelvicalyceal system. Under management by The General Surgery and Urolology departments.

Keywords: Bladder hernia; obstructive uropathy; septic shock.

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1. INTRODUCTION

More than 20 million inguinal hernia repairs are performed world-wide every single year. Around 10-15% of the world population will have an abdominal wall hernia throughout his lifetime; The most frequent (approximately 60%) will be in the inguinal region, predominantly in men, with a ratio of 3-4:1 compared to women [1]. The mechanisms involved in the formation of inguinal hernias are multifactorial. including disorders in collagen synthesis such as Marfan or Ehlers-Danlos syndrome, malnutrition, obesity, and smoking [2]. There are some anatomical factors that have shown a predisposition to the appearance of inguinal hernias, like: persistence of the peritoneum-vaginal duct in men, or the Nuck duct in women, the increase in the dimensions of Hesselbach's triangle, the absence of the aponeurotic fibers of the transversus abdominis muscle in its lateral portion or in the entire inguinal floor [1]. Chronic increases in intra-abdominal pressure, as occurs in patients with chronic obstructive pulmonary disease (COPD), cirrhosis, prostatic hyperplasia, multiple pregnancies, are also a possible cause of hernia [1]. The presence of the bladder within the hernial sac is uncommon, with a prevalence of 0.5-5% among inguinal hernia patients [3,4,7-11]. Normally these patients present with a few or no symptoms, only a mass in the inguinal region [4,6,8-10], being diagnosed in most cases during the intraoperative period [6-8,12]. Signs of obstructive uropathy, renal failure or sepsis is very uncommon among these patients [11].

2. PRESENTATION OF THE CASE

A 61-year-old male, with a history of smoking and chronic alcoholism, varicose ulcers in both legs for the past 16 years, managed with pentoxifylline 400mg/day, systemic arterial hypertension of more than 10 years of evolution, under treatment with losartan 50mg/day. He was admitted to the emergency department due to a 6-day evolution characterized by malaise, asthenia, adynamia, fever up to 40 °C in addition to dysuria, checked by a private doctor whose starts treatment with moxifloxacin (unknown dose) due to suspected infection of urinary tract. He presented impaired alertness and persistent fever, for which reason he was admitted to our hospital.

At the moment of admission, a sleepy, diaphoretic patient was found with a blood pressure (BP) of 80/40 mmHg, heart rate (HR) 100 beats per minute, respiratory rate (RR) 23 breaths per minute, oxygen saturation (SatO2) 92 % Temperature 39.8 °C. On physical examination, we found an obese and diaphoretic patient with a non-reducible left inguinoscrotal tumor with no color changes, rest normal. Blood tests were performed, in which a leukocytosis of 34 thousand/µL stood out. Hemoglobin 14.5 Hematocrit 40.5%, Platelets 181 thousand. Glucose 96 mg/dL Urea 181 mg/dL, Urea Nitrogen 84.8 mg/dL Creatinine 4.53 mg/dL C-Reactive Protein (CRP) 43.4 mg/dL Sodium 131 mEq/L, Potassium 4.2 mEq/ L, Chlorine 104 mEq/L, Calcium 8.5 mEq/L. In arterial blood gases pH 7.36 pCO2 17 mmHg pO2 59 mmHg HCO3 9.6 mmol/L SatO2 98% Lactate 4.1 mmol/L. Urinary catheter was inserted which revealed the presence of cloudy urine; in the urinalysis: leukocyte esterase of 500 cells/µL, nitrites negative, proteins 75 mg/dL, erythrocytes 8-10 per field, in the sediment leukocytes +++ few epithelial cells, bacteria +++.

Management began in conjunction with the nephrology department of stage III acute kidney injury, administering crystalloids, Bi-Pressure Positive System (BPAP), meropenem 500mg IV every 8 hours, as well as norepinephrine at 0.04 mcg/kg/min, maintaining BP of 110/60 mmHg HR 78x' RR 18x', SatO2 96%.

An abdominopelvic tomography was performed, showing the presence of more than 50% of the urinary bladder and left ureter within the inguinal hernial sac, besides grade V hydronephrosis (Figs. 1-5), for which he underwent surgery in conjunction with the urology service. An incision was performed in the left inguinal area, noticing paraperitoneal bladder hernia with the presence of the distal portion of the left ureter, both structures with no suggestive signs of ischemia, for which both structures were dissected and reduced; Bassini-type inguinal plasty was performed followed by cystoscopy and a Double-J Stent placement. The patient continues with a torpid evolution, presenting deterioration of alertness two days after the surgical intervention, in addition to fever, diaphoresis and changes in the respiratory pattern, requiring orotracheal intubation, presenting cardiorespiratory arrest during intubation, reversing after two cycles of advanced cardiopulmonary resuscitation. Norepinephrine infusion is increased to 0.1mcg/kg/min and vasopressin is added at 0.03 U/min. maintaining a HR 88x' and BP 115/80 mmHg with impaired renal function with creatinine of 4 mg/dl, uric acid 15.6 mg/dl, urea

nitrogen 10 mg/dl, hyperkalemia of 6 mEq/L, hypernatremia of 162 mEq/L , patient persists febrile with leukocytosis of 13 thousand/uL PCR 90 mg/L. A culture of the surgical wound was performed, resulting positive for multi-drug resistant Acinetobacter baumanii. Colistin was added, at 80 mg IV every 12 hours after been evaluated by the Infectious Disease Department. The patient continues with signs of septic shock and multiple organ failure, 10 days after intubation presents a cardiorespiratory arrest again, not responding to resuscitation maneuvers. He dies 20 days after admission.

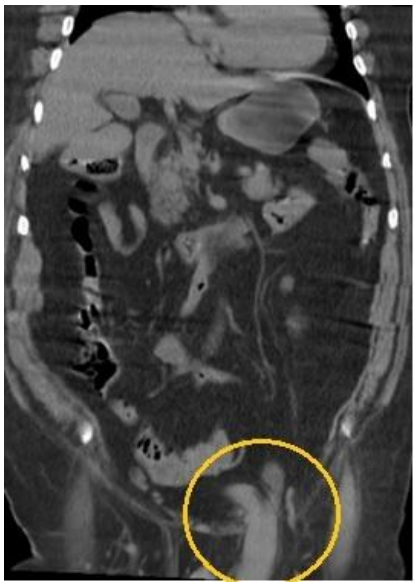

Fig. 1. Non-contrast Abdominopelvic CT, with the presence of a left inguinal hernia, with evidence of protrusion of the urinary bladder and lower third of the ipsilateral ureter, located within the hernial sac

Fig. 2. Coronal Non-contrast Abdominopelvic CT with visualization of grade V left hydronephrosis, secondary to protrusion of the distal third of the ureter through the inguinal hernia

Fig. 3. Abdominopelvic tomography, with sagittal reconstruction, where it is possible to corroborate the presence of approximately 75% of the urinary bladder inside the left inguinal hernial sac

Fig. 4. Abdominal and pelvic tomography, in this section it is possible to demonstrate the site of bladder protrusion through the left hernial defect, in addition to visualizing the Foley catheter balloon inside the bladder portion that remains within the pelvic cavity

3. DISCUSSION

Urinary bladder herniation is a rare pathological entity, with a prevalence ranging from 0.5 to 5% of all inguinal hernias in adults [4,7-11]. Until 2018, around 120 cases have been reported, 70% of which are characterized by obese male patients over 50 years of age [4,7,12,13] like our patient, who was a 61-year-old obese male. The risk factors involved in the pathogenesis of bladder hernias are weakness of the bladder wall and obstruction to low urinary flow [7,11,14,15],

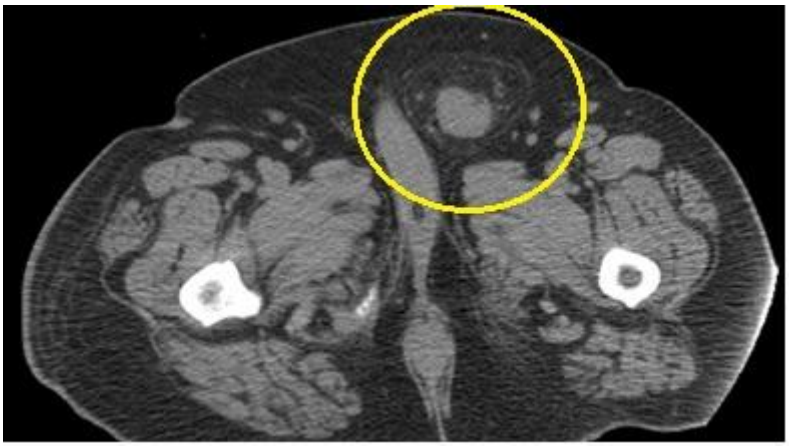

Fig. 5. Cross section of abdominal and pelvic tomography in simple phase appreciating left inguinal hernial sac with portion of urinary bladder and left ureter inside

causing an increase in intravesical pressure, so association with prostatic hyperplasia is very frequent [5,16]. Bladder hernia is a clinically rare entity, especially associated with herniation of the ureter [7] as it was in this case. Up to 75% is associated with an inguinal hernia [6]. Among inguinal bladder hernias, 60% are direct right-sided hernias. [4,7,8,12] contrary to our case, which was a left hernia.

Bladder hernias are classified as: paraperitoneal, extraperitoneal and intraperitoneal [5,8,17]. Paraperitoneal bladder hernias are the most frequent ones (60%), in these, the peritoneum covers its external side and can be a direct or indirect hernia. Extraperitoneal hernias are the second most frequent (32%) and are characterized by the fact that the peritoneum does not cover them and they are usually small. The intraperitoneal hernias are the least frequent (4-8%). In them, the peritoneum covers the entire herniated bladder portion, they are always indirect and are usually easily reduced [6,12,13]. In this type of hernia, the trigone usually remains fixed in its normal anatomical position, even in massive bladder hernias. Incarceration and strangulation are infrequent [5,8,16] so this case is striking in that there was displacement of a portion of the trigone, involving a large part of the bladder together with the left ureteral meatus and distal ureter, presenting not only incarceration, but also hydronephrosis and sepsis.

The patient presented a herniation of more than 50% of the bladder, which is considered a massive inguinoscrotal bladder hernia [16], which is a very rare entity. Bladder herniation is mostly diagnosed incidentally, since most patients are asymptomatic [4,6,8-10] or with non-specific symptoms such as increased urinary frequency, presence of scrotal mass, dysuria and urinary urgency [7,16,15]. Our patient was admitted with clear signs of shock, in addition to a history of previous dysuria, data that allowed the diagnosis to be reached preoperatively, facilitating the planning of the surgical procedure. Renal colic and hematuria may occur due to ureteral entrapment [6,10,11]. In the case of our patient, who presented involvement of the distal third of the left ureter, this caused obstructive uropathy with subsequent grade V hydronephrosis.

The most characteristic clinical finding in this type of hernia is urinary emptying in two times, which is known as Mery's sign [4-6,10,11,14,16,12]. In which the urine in the abdominal part of the bladder is emptied first, followed by the urine present in the herniated portion, which normally requires manual compression [7], in this patient this data was not assessable due to the altered neurological state that presented due to shock.

This type of hernia should be suspected in male patients over 50 years old, with inguinal hernia and lower urinary tract obstructive symptoms. On physical examination, the presence of an inguinal or inguinoscrotal tumor can be observed that may or may not be transillumination-positive and that varies in size after urination [6,11]. Ureteral involvement should be suspected when an inguinal hernia is diagnosed concurrent with hydronephrosis, renal failure, and urinary tract infections with no known cause [4,7]. Given this situation, we must make a differential diagnosis with communicating hydrocele, herniated mesenteric cyst, giant cord cyst [5], bladder diverticulum, pre or paravesical lipoma and

bladder duplication [6,11,17]. When there is suspicion of the bladder or ureter within the hernial sac, a computed tomography should be performed since ultrasound has low sensitivity and specificity [4,7], with voiding cystourethrography being the imaging test of choice [5,6,8,16]. It is advisable to perform a digital rectal examination and take prostate specific antigen levels, due to the high association of prostate hyperplasia in these patients [5]. Until 2008, 8 cases of bilateral renal obstruction and 4 cases of renal failure [11] have been reported, so this case would be the number 5 reported in the literature.

The treatment is strictly surgical, placing a Foley catheter prior to the procedure and passing through it a mixture of physiological solution and methylene blue [7]. In our case, methylene blue was not used because this dye would have interfered with the identification of the affected ureteral meatus during cystoscopy, not allowing the correct placement of a Double-J Stent. The repair is performed through an inguinal incision, subsequently, bladder reduction is performed while the hernial defect is repaired using the corresponding inguinal plasty surgical technique [8]. We opted for Bassini-type plasty due to its ease and speed, since the patient was hemodynamically unstable and there was no prosthetic material in our unit at the time of surgery. If a transurethral endoscopic procedure is indicated to correct the infravesical obstruction, it will be performed in a second surgical stage [6]. This is intended to avoid strangulation of the hernial neck, secondary to the elevation of intravesical pressure that occurs in said procedures. In this case, there was no evidence of infravesical obstruction, but there was at an ureteral level, which is why a Double-J Stent was placed, which would allow adequate urinary flow. When bladder lithiasis is present, the reduction of the hernia must be accompanied by cystolithotomy [11,14]. In the case of bilateral renal obstruction, the initial objective of treatment will be to achieve normalization of renal function by performing a bilateral percutaneous nephrostomy and the repair of the hernial defect will be considered in a second stage [11,12].

Although there is no consensus on the surgical management of the herniated portion of the bladder, it seems reasonable to opt for a conservative attitude as far as possible, proceeding with bladder reduction. Only in cases of necrosis due to strangulation, herniated bladder tumor [11], herniated bladder diverticulum or hernial neck smaller than 5 mm, partial cystotomy of the herniated portion is recommended [14-12,13]. In the present case, a conservative management was performed due to adequate tissue viability. Orchiectomy may be necessary if the testis or cord structures are closely related to the hernial sac [8]. The complications that may occur are those typical of hernia repair. Bladder injuries have been reported in 12% of cases, which can lead to the presence of hematuria, urinary leakage, fistula formation and even sepsis [7,9]. Neoplasia degeneration of the urothelium has been reported [10] due to the carcinogenic role of urine residue accumulated in the herniated portion [5,16]. In a review, it was shown that, of 116 patients with bladder hernia, 13 of them (11.2%) presented some type of malignancy: 9 presented bladder carcinoma and 4 prostate carcinoma [7,18].

4. CONCLUSION

Inguinal hernias are one of the most frequent pathologies that we face as surgeons and although the presence of the urinary bladder within the hernial sac is a relatively uncommon entity, it is important to take this variant into account, especially in male patients over 50 years of age and who also present urinary symptoms. This particular case demonstrates how serious failure to reach a prompt and adequate diagnosis can be. That is why it is extremely important to take this type of pathology into account, so that it allows us to improve our surgical practice and therefore the health and well-being of our patients.

CONSENT

We as authors declare that written informed consent was obtained from the patient for publication of this case report and accompanying images.

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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