

Inguinal Hernia Causing Ureteral Obstruction with Hydronephrosis and Subsequent Urosepsis

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Abstract

Introduction: Inguinal hernias are common anatomical deformities especially among men. Complications of inguinal hernias include incarceration, but incarcerated hernias rarely cause other disturbances.

Case Presentation: An 86-year-old man with a history of chronic kidney disease (stage IIIb), presented with recurrent urinary tract infections and acute kidney injury with sepsis. Physical examination revealed a right inguinal hernia, and computed tomography revealed right ureteral obstruction and distal entrapment by the inguinal hernia, with hydronephrosis. The patient underwent right retrograde pyelography and ureteral stent placement, followed by laparoscopic inguinal herniorrhaphy with mesh, which restored renal function. Our case is unique among obstructive uropathies due to inguinal hernias because the distal ureter was entrapped within the bowel mesentery communicating between the peritoneal cavity and retroperitoneum.

Conclusion: Both inguinal hernias and obstructive uropathy are common among elderly men. While the latter is often secondary to prostate malfunction, other causes of obstructive uropathy or hydronephrosis should be considered, especially if unilateral.

Keywords: Acute kidney injury; Hydronephrosis; Inguinal hernias; Obstructive uropathy; Sepsis

Introduction

Inguinal hernias account for approximately 75% of all hernias diagnosed. Over one million abdominal wall herniorrhaphies are performed annually in the United States, and approximately 800,000 of these are inguinal hernia repairs [1]. The incidence of inguinal hernia is higher in men (lifetime risk of 27%) than in women (3% lifetime risk). Furthermore, inguinal hernia incidence follows a bimodal age distribution, with the peaks occurring at approximately 5 and 75 years [2].

Risk factors for inguinal hernia development include: excessive physical exertion, obesity, increasing age, and congenital anomalies such as patency of the processus vaginalis. While hernias can occur in multiple anatomical locations, they mainly involve the expulsion of intra-abdominal contents through a fascial defect. Hernial contents normally comprise sections of the small bowel and adipose tissue which, on entrapment, can lead to complications such as bowel obstruction or strangulation [1]. These severe complications can be detected and repaired swiftly. In some instances, the ureter may become entrapped in the hernia sac, causing ureteral obstruction which resolves after hernial repair [3]. Herein, we describe the case of an 86-year-old man who initially presented with sepsis secondary to urinary tract infection (UTI). Our case is rare among previously reported cases of ureter entrapment within the hernia sac, as our patient's ureter was compressed by the hernia sac, which is anatomically inexplicable due to the retroperitoneal location of the ureter.

Case Description

An 86-year-old man, with a one-week history of generalized weakness, malaise, and anorexia, developed chills and sweats that prompted him to visit the emergency room. He experienced increased urinary urgency and frequency with dysuria, but denied hematuria. His past medical history included chronic kidney disease (CKD, stage IIIb), systemic hypertension, diabetes mellitus type II, and hyperlipidemia. Physical examination revealed a body temperature of 39.5°C, heart rate of 120 beats/minute and initial blood pressure of 147/76 mmHg. He appeared chronically ill and toxic, with dry mucous membranes. Lung examination was clear, and he had tachycardia without murmurs. Abdominal examination revealed diffuse nonspecific tenderness, more pronounced in the right lower quadrant. Further examination revealed a mass in the right inguinal area that was more pronounced on standing and coughing; hence, a right inguinal hernia was suspected. A comprehensive metabolic panel revealed the following: blood urea nitrogen level, 65 mg/dL (normal range: 7-18 mg/dL); creatinine level, 1.8 mg/dL (normal range: 0.7-1.3 mg/dL); and lactic acid level, 2.77 microkats/L (normal range: 2.34-4.68 microkats/L). The patient was diagnosed with acute kidney injury (AKI). Complete blood count examination revealed a white blood cell (WBC) count of $16.9 \times 10^9/L$ (normal range: $5-10 \times 10^9/L$) with a left shift and a neutrophil count of 93.6/high power field (HPF) (normal range: 42.2-75.2/HPF). Urinalysis revealed pyuria at 43 WBCs/HPF (normal range: 0-2/HPF), hematuria at 443 red blood cells/HPF (normal range: 0-2/HPF), nitrites, and moderate leukocyte levels, suggesting UTI. The patient was admitted for inpatient hospital care and ultimately diagnosed with sepsis. After appropriate blood and urine cultures were obtained, he received intravenous fluids of normal saline and 1 g of ceftriaxone intravenously.

Renal ultrasound revealed mild right-sided hydronephrosis and an angiomyolipoma in the left kidney.

A CT urogram revealed that the right distal ureter extended into the superior margin of the large right inguinal hernia, along with hernia-associated ureteral obstruction (Figure 1).



Figure 1: Computed tomography urogram without contrast with arrows pointing to the right distal ureter being compressed by the hernia sac.

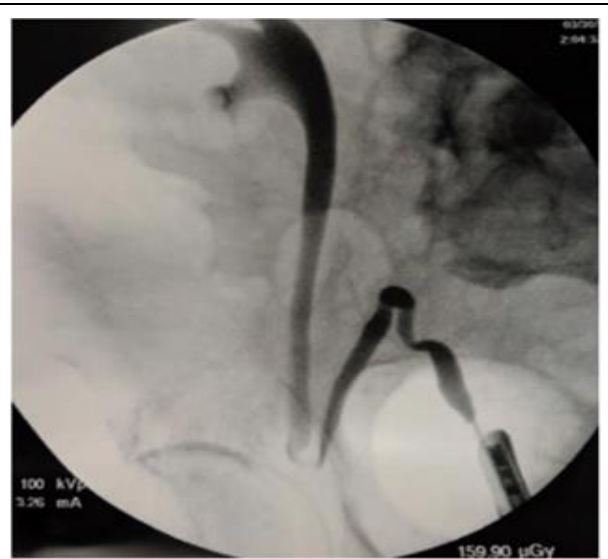


Figure 2: Retrograde ureterogram showing the compressed ureter.

Our patient underwent cystoscopy with right retrograde pyelography and placement of a right 28 × 6 cm double-J ureteral stent. However, a prior attempt was made to place a Pollack catheter (Cook Medical Incorporated, Bloomington, Indiana) to gain access to the ureter and maintain its patency, followed by an attempt to place an Amplatz wire (Boston Scientific, Marlborough, Massachusetts) to guide the stent. These failed to straighten the ureter due to an extreme ureteric angulation. Fluoroscopic imaging demonstrated appropriate stent position.

Laparoscopic right inguinal herniorrhaphy was performed immediately following stent placement. The hernia was repaired intraperitoneally with mesh placement, with no complications. The patient recovered with resolution of UTI, sepsis, and AKI, and the stent was removed.

Discussion

We describe a rare case of a hernia compressing the ureter, resulting in ureteral obstruction and subsequent AKI, UTI, and sepsis. Normally, preoperative or intraoperative stent placement is unnecessary for hernia repair [4] however, in our case, stent placement was necessary due to the unusual orientation of the ureter and its location relative to the hernia sac.

Abdominal hernias develop when the intra-abdominal contents protrude through a deficiency in the abdominal wall. There are several types of abdominal wall hernias, including inguinal, femoral, umbilical, epigastric, incisional, spigelian, and parastomal. Approximately two-thirds of inguinal hernias are classified as indirect, while one-third are classified as direct. Most childhood inguinal hernias are classified as indirect; occur lateral to the inferior epigastric vessels; and are thought to arise congenitally via patency of the processus vaginalis. Conversely, direct inguinal hernias are more common in older men; develop medial to the inferior epigastric vessels through Hesselbach's triangle; and are thought to be related to the decreasing abdominal wall tissue strength that occurs with aging. Any chronic condition associated with increased intra-abdominal pressure may contribute to inguinal hernia development [5].

Many inguinal hernias are asymptomatic and detected only during medical examination. Symptomatic patients often present with a painless groin swelling, which is more evident during upright and physical activities, and characteristically resolves while recumbent. Often, the patient experiences groin pain, especially during strenuous physical activity or lifting. Occasionally, an inguinal hernia may become irreducibly incarcerated in the hernia sac. This may lead to increased groin pain and obstruction of the trapped bowel. Rarely (<3%), an inguinal hernia may become strangulated with vascular compromise of the bowel [6]. The resulting intestinal ischemia can lead to perforation, peritonitis, and sepsis. Characteristic presentation may include a toxic-looking febrile patient with peritonitic signs on abdominal examination, and a very tender irreducible inguinal hernia with overlying skin erythema. The morbidity of strangulated inguinal hernia is high, with a perioperative complication rate of 12% and mortality rate of 6% [7].

Our case is unique because a direct inguinal hernia should not anatomically cause ureteral obstruction due to the specific locations of the structures involved, specifically the ureters residing in the retroperitoneum. Although there have been numerous cases of obstructive uropathy caused by ureteral inguinal hernias, the obstructive uropathy in our case was instead due to the unilateral external compression by the hernia sac on the ureter. In the only other reported case of ureteric compression by a hernia sac, the patient had an inguinoscrotal hernia that contained colon, differing from the findings in our patient [3]. The distal ureter of our patient became entrapped within the mesentery at the communication point between the peritoneal cavity and retroperitoneum. This is an important, albeit rare, condition that general surgeons should keep in mind when investigating a hernia, even in patients without urinary symptoms [8].

After the renal ultrasound showing mild right-sided hydronephrosis, the prompt CT urogram enabled visualization of the distal ureter extending into the inguinal hernial sac, resulting in ureteral obstruction, and necessitating a surgical procedure. Most patients >60 years old have an increased risk of developing direct inguinal hernias, yet obstructive uropathy in this age group is primarily caused by benign prostatic hyperplasia [9]. However, in patients presenting with signs and symptoms of obstructive uropathy, UTIs, or unilateral hydronephrosis, it is important to consider and investigate other differential diagnoses which may lead to an alternative treatment plan.

Conclusion

Obstructive uropathy due to inguinal hernias has previously been described as a result of incarceration. This unique case demonstrated distal ureter entrapment and compression within the bowel mesentery that communicated between the peritoneal cavity and retroperitoneum.

Data Availability

As this was a case report, the patient's data constituted his personal medical records, which were anonymized for publication. Confidentiality, as well as the United States Governmental HIPAA rules govern the release of complete data. This patient was treated at the Gulf Coast Regional Medical Center in Panama City, Florida, United States of America, and formally consented to the publication of this case report.

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