

# Inguinal Herniation of Perinephric Tissue: Case Report and Review of the Literature

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**Inguinal hernias containing a kidney or perinephric tissue are extremely rare and usually related to cases involving a kidney positioned in the pelvis. We report the case of a 79-year-old man who presented with abdominal pain and scrotal swelling. He was found on imaging to have an inferiorly displaced kidney with an inguinal herniation of Gerota fascia, as well as an obstructing ureteral stone with an associated forniceal rupture. The unusual renal anatomy, as well as the management of a forniceal rupture, is discussed.**

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**I**nguinal hernias containing the kidney or perinephric tissue are extremely rare and are usually related to a kidney positioned in the pelvis.<sup>1,2</sup> A case report by Farrell et al<sup>3</sup> described nephropexy for a supernumerary kidney contained within an inguinal hernia. The patient described in the present report had this unique anatomy coupled with urolithiasis and associated complications.

## Report of Case

A 79-year-old man with a history of nephrolithiasis presented to the emergency department with a 2-day history of left lower quadrant abdominal pain radiating to the groin. He had a visible left inguinal hernia, which had been present for years but had recently enlarged (**Figure 1**). He had associated anorexia, nausea, and vomiting. The patient denied fever, chills, dysuria, and urinary frequency or urgency. He reported mild hesitancy with initiating a urinary stream and swelling in the scrotum. He had no history of urologic conditions or abdominal operations.

The patient was afebrile with stable vital signs. A urinalysis demonstrated microscopic hematuria, and laboratory studies revealed a serum creatinine level of 1.2 mg/dL and a leukocyte count of 9000/mm<sup>3</sup> without bandemia. Computed tomographic images revealed an inferiorly displaced left kidney with a 3×4-mm proximal ureteral stone, hydronephrosis, perinephric fat stranding, and fluid tracking in the retroperitoneum around the kidney and into the scrotum. The left kidney was normally rotated and was supplied by a single renal artery and vein located at the L1 vertebra. These findings were consistent with a forniceal rupture secondary to ureterolithiasis, normal renal hilar anatomy, and inferiorly displaced kidney with herniation of the Gerota fascia into an inguinal hernia (**Figure 2** and **Figure 3**). The patient also had an incidental contralateral nonobstructing renal stone. He was taken to the operating room for bilateral ureteral stent placement. His urine culture was ultimately negative for bacterial infection, and he did not require antibiotics. His



**Figure 1.** Large left inguinal hernia with mild scrotal erythema in a 79-year-old man who presented with left lower quadrant abdominal pain radiating to the groin.

anorexia resolved after stent placement, and he was discharged the same day. He eventually underwent bilateral ureteroscopy with laser lithotripsy without complication or acute postoperative events.

## Discussion

Inguinal hernias are clinically common and usually contain fluid, intestines, or fat. Reports of inguinal hernias containing nephric or perinephric tissues, however, are extremely rare,<sup>3-5</sup> as are studies citing supernumerary kidneys presenting as hernias.<sup>4</sup> A case<sup>5</sup> of an inguinal hernia containing a portion of the bladder was described in association with a kidney positioned in the pelvis. To our knowledge, none of these cases were complicated by an obstructing ureteral stone or forniceal rupture.

Forniceal rupture is a radiographic finding indicating perirenal urinary extravasation associated with ureteral obstruction, usually due to distal ureteric calculi.<sup>6</sup> Rupture occurs because of higher than normal renal pelvic pressures secondary to obstruction. It is seen as

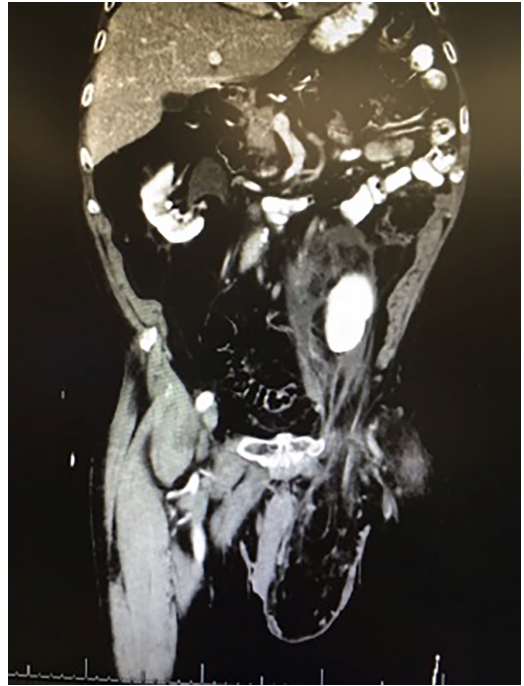
an irregularity of a single calyx, a loss in differentiation of renal sinus fat, asymmetric perinephric stranding, or, more commonly, a perinephric fluid collection. Forniceal rupture is associated with pain relief due to the immediate drop in intrapelvic pressure.

Although limited data are available in the literature on the management of forniceal rupture, clinical practice at our institution follows conservative, nonoperative management in the absence of infection, kidney failure, intractable pain, fever, or abscesses.<sup>7</sup> A study by Gershman et al<sup>6</sup> supported conservative management in the majority of cases, treating only 37% of patients with forniceal rupture operatively. Other studies have shown operative intervention rates of 59% to 100%.<sup>8,9</sup> Singh et al<sup>10</sup> reviewed the treatment of forniceal rupture in the literature between 1978 and 2007. They found that 50% of cases attributed to urolithiasis underwent operative intervention, and 95% of cases with other causes (malignancy, vascular abnormalities, posterior urethral valves, or bladder outlet obstruction) were operable. In the current case, operative management was chosen because the abnormal location of the kidney led to a symptomatic, expanding urinoma into the inguinal hernia sac and put the patient at increased risk for infection.

It is unlikely that our patient had true congenital renal ectopia. Ectopia occurs in approximately 1 in 900 persons, is more often left-sided, and can be found in pelvic, iliac, abdominal, or thoracic locations.<sup>11</sup> Embryologically, the kidney forms as the ureteral bud grows cranially toward the urogenital ridge and forms a cap of metanephric blastema. Both migrate cephalad and rotate ventromedially. Defects in ureteral bud development, metanephric signals, genetic abnormalities, teratogens, and maternal factors can all be involved in failure of renal migration and medial rotation. Ectopic kidneys are often small and irregularly shaped, with an anterior renal pelvis. The blood supply generally originates at the aortic bifurcation or iliac vessels. Ectopic kidneys may be more susceptible to stone formation as malrotation of the kidney has been implicated in impaired drainage of urine. Orthotopic ureteral orifices are expected cystoscopically. The normal anatomic location of the renal hilar vessels between L1 and L2 and the absence of malrotation would suggest acquired kidney



**Figure 2.** Left kidney with a 3×4-mm proximal ureteral stone, hydronephrosis, and perinephric fluid in a 79-year-old man.



**Figure 3.** Increased perinephric fat and an enlarged left inguinal hernia containing Gerota fascia in a 79-year-old man.

displacement in the current patient. Farrell et al<sup>3</sup> hypothesized that during cephalad ascent, a cone-shaped perinephric space is formed surrounded by an anterior and posterior fascial layer, which does not usually fuse inferiorly, creating a potential space for acquired displacement.

## Conclusion

Herniation of perinephric or nephric tissue is a rare entity that may be discovered on evaluation for inguinal hernia repair or incidentally during imaging for other presenting conditions, such as obstructive nephropathy. Concomitant findings, such as forniceal rupture, require unique management considerations.

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