Case - An unusual herniated organ: Periumbilical hernia containing orthotopic kidney

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INTRODUCTION

Herniation of the kidney is a rare urological complaint, with most reported cases describing post-operative hernias of transplanted kidneys [1,2] and congenital intrathoracic kidneys secondary to diaphragmatic hernia.[3,4] Isolated accounts regarding the orthotopic kidney largely consist of inguinal renal hernias [5-8] and incisional hernias through the posterior abdominal wall.[3,9,10] While umbilical hernias are a common anterior abdominal wall defect—contributing to 6-14% of all ventral hernias in adults—involvement of the kidney is exceptionally uncommon.[11] As a retroperitoneal organ, trans-abdominal migration of the kidney would understandably challenge conventional concepts of perirenal anatomy. To our knowledge, orthotopic renal herniation through the anterior abdominal wall has only been described twice, both as incisional hernias following abdominal surgery (laparotomy and partial colectomy in one case, colostomy in the other).[12,13] Here, we present the first documented case of an umbilical kidney hernia and discuss the management considerations of this unusual presentation.

CASE REPORT

We present a 36-year old female with a 3 day history of acute, severe abdominal pain in the periumbilical region worse with palpation. She denied any nausea, vomiting, bowel obstruction symptoms and continued to pass flatus. She had a history of umbilical hernia for greater than 5 years and had typically been reducible. There was no previous history of strangulation or incarceration.

Her past medical history included end-stage renal disease on hemodialysis from previous obstructive uropathy, cirrhosis, significant splenomegaly, portal vein thrombosis, sclerosing encapsulating peritonitis, schistosomiasis (treated) and cholecystectomy.

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She was on hemodialysis and makes minimal urine <100ml per day. There were no worsening lower urinary tract symptoms, flank pain, or fevers.

She was vitally stable with bloodwork showing only mild leukocytosis. On exam, she was exquisitely tender to the periumbilical region. A small but obvious mass was palpable at the umbilicus in keeping with hernia. Manual reduction attempted at bedside in conjunction with general surgery was unsuccessful.

Imaging through CT abdomen pelvis with contrast showed herniation of the lower pole of the left atrophic kidney through the umbilical hernia with moderate hydronephrosis (Figure 1).

Given her distorted anatomy, history of recurrent peritonitis as well as thrombocytopenia, she was deemed a poor surgical candidate for open repair. A decision was made to place a nephrostomy tube (NT) to decompress the hydronephrotic collecting system to maximize attempt at manual reduction. Interventional radiology successfully placed NT which drained approximately 100ccs of dark old urine.

Following NT insertion, her pain was improved although still present. Bedside attempt at manual reduction was unsuccessful, small residual mass was still palpable. Given her pain was improving, we attempted pain control and observation for a later attempt at reduction.

Three days later, her pain was much improved and the mass was no longer palpable. NT was left in place due to some residual outputs 50-100ccs/day. Repeat imaging with CT KUB noncontrast showed improved hydronephrosis with NT in situ and no residual herniation (Figure 2). She was discharged with the nephrostomy tube in situ for outpatient follow up in clinic. There was minimal output <50ccs per day through the NT and she tolerated a clamp trial, thus her NT was removed 4 weeks in clinic followup. She had no recurrence of hernia or abdominal pain at the most recent follow up 5 months later. Her CT then showed mild persistent hydronephrosis but no evidence of recurrent herniation (Figure 3).

DISCUSSION

Herniation of an orthotopic kidney through the anterior abdominal wall is exceedingly rare. Our patient's constellation of pre-existing medical conditions likely contributed an anatomical variant that increased her risk for umbilical renal herniation. On CT, she demonstrated marked splenomegaly, which displaced her left kidney anteroinferiorly. Profound renal atrophy and loss of retroperitoneal support likely permitted the kidney to migrate through her chronic umbilical hernia. Ultimately, progressive dilation of the herniated collecting system with urine limited any capacity for reduction.

Use of CT was critical in establishing the diagnosis of umbilical kidney hernia in this patient. Moreover, correlation of the imaging results with the patient's medical history provided detailed assessment of the patient's anatomic contributors and contextualized options for management. In a patient with functioning kidneys at baseline, serum creatinine and renal scintigraphy are well-suited for evaluating the necessity for prompt surgical decompression of the herniated renal tissue.[12,15,16]

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Given their scarcity, kidney hernias lack a standardized approach to management. Previously documented cases of incisional renal herniations through the abdominal wall were largely managed with hernia repair.[3,9,12-14] Surgery was pursued in these patients due to quality-of-life complaints (e.g., flank pain, prominent truncal mass) and concerns for obstruction leading to eventual renal compromise. In contrast, Hooti and colleagues described a similarly symptomatic and hydronephrotic patient with an incisional lumbar hernia following pyeloplasty a decade earlier who opted for nonoperative management with analgesia alone.[15] It is unclear whether the patient subsequently required more intensive interventions.

Our patient differs from the reports above in several aspects of clinical importance. Given she was dialysis-dependent with little urine output (<100 mL/day), preservation of renal function was not a primary consideration in her management. Moreover, her history of recurrent sclerosing encapsulating peritonitis and thrombocytopenia compelled her care team to explore nonoperative options as the first-line approach. Percutaneous nephrostomy was selected as a minimally invasive means of decompressing the herniated kidney. This patient's renal volume was composed primarily of a dilated collecting system given her significant renal cortical atrophy from ESRD thus draining the urine via nephrostomy facilitated spontaneous hernia reduction. The subsequent rapid resolution of the hernia supports renal distention as a key driver of its initial incarceration.

While most previous reports of renal herniation have been managed surgically, our case highlights an alternative, nonoperative approach. Hydronephrosis is a common finding in renal hernia cases, often arising from ureteral kinking or extrinsic compression of the kidney.[2,3,6,12,15] Our case suggests that hydronephrosis can be a contributor, rather than a consequence, of a nonreducible hernia. Decompression via nephrostomy can therefore serve as a minimally intrusive initial strategy that addresses the physiological obstacle directly impeding spontaneous hernia reduction. Moreover, this approach is a practical substitute for patients who decline or are ineligible for surgical management and may also reduce the risk of future pressure-induced parenchymal damage.

CONCLUSIONS

This is an unusual case of orthotopic kidney herniation through a periumbilical hernia. We highlight the patient's unusual abdominal anatomy, ESRD with renal atrophy, and hydronephrosis contributed to development. We present successful non-operative management of this rare presentation through a percutaneous nephrostomy tube for decompression to facilitate manual reduction. Subsequent cases should incorporate patient-specific physiological and anatomical factors to individualize management.

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FIGURES AND TABLES

Figure 1. Axial images of CT abdomen pelvis of herniated lower pole of left atrophic kidney through umbilical hernia. Mild-moderate hydronephrosis with minimal parenchyma.



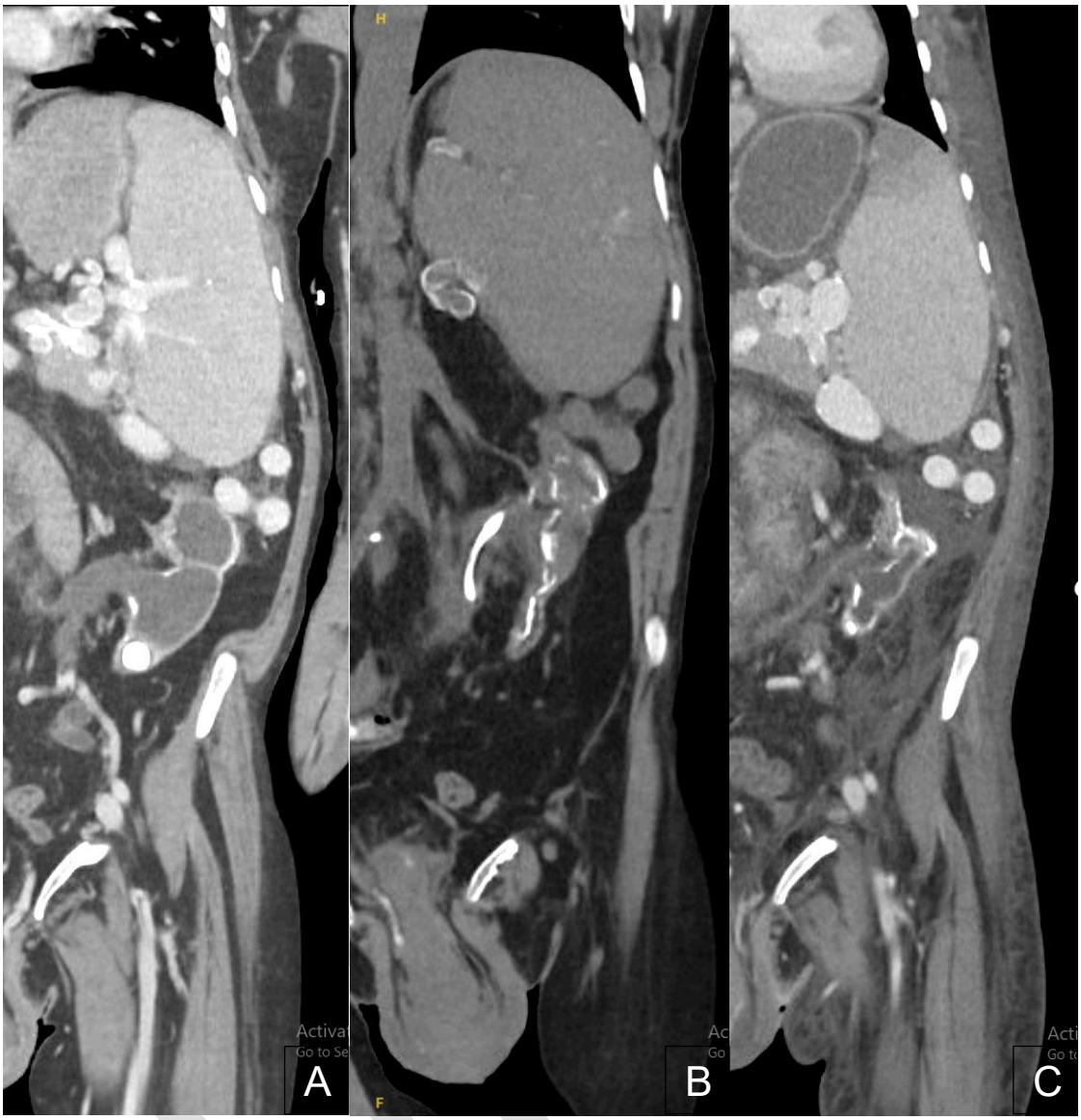
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Figure 2. Axial image CT abdomen pelvis noncontrast post-nephrostomy tube insertion. Left kidney decompressed with no residual hydronephrosis. Left nephrostomy tube in situ. Resolution of kidney herniation through the umbilical hernia.



Figure 3. Coronal images of CT abdomen and pelvis showing the hydronephrotic kidney (A) prior to NT placement; (B) after NT placed; and (C) 5 months after NT was removed.

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