Images – An obstructed intrathoracic kidney

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Introduction

Intrathoracic kidneys are rare clinical entities representing less than 5% of all cases of renal ectopia, with a total incidence estimated at 1 in 13 000.[1] There is limited published data on the management of stone disease in patients with intrathoracic kidneys. We report a case of flexible ureteroscopy for management of an obstructing ureteric stone within the thoracic cavity.

Case report

A 76-year-old female presented to hospital with localized right upper quadrant abdominal pain and was found to have gallstone pancreatitis. A chest x-ray showed significant elevation of the left hemidiaphragm, with adjacent compressive atelectasis and rightward mediastinal shift in keeping with a large diaphragmatic hernia (Fig. 1). On computed tomography (CT) scan, a large left-sided diaphragmatic hernia was confirmed with herniation of the kidney, a portion of the spleen and the colonic splenic flexure into the left hemithorax. An obstructing proximal ureteric stone was identified, with associated severe hydroureteronephrosis. She was asymptomatic from a stone perspective, with no voiding symptoms, hematuria, or left-sided flank or chest pain. Previous medical history included chronic obstructive pulmonary disease requiring home oxygen, type two diabetes mellitus, hypothyroidism, and hypertension.

CT scan demonstrated a malrotated left kidney with an extremely high inserting ureter. A 1 x 0.9 x 1.4 cm obstructing proximal ureteric stone located within the chest, in close proximity to the heart, was identified (Figs. 2, 3). Further stone burden was detected in the renal pelvis and in the infundibulum of a lower pole calyx causing mild dilation.

Definitive management was completed electively after resolution of her gallstone pancreatitis. Retrograde pyelogram was completed, revealing a proximal filling defect that delineated the obstructing stone (Fig. 4), followed by standard flexible ureteroscopy and laser lithotripsy. Subsequent renoscopy revealed some very small stones and sand in the renal pelvis, and stones in the lower pole and interpolar calyces that appeared fixed by relatively narrow infundibula leading into these calyces. The calyceal stones were left untreated due to the low likelihood that they would result in future problems, considering the narrow infundibula of the stone-bearing calyces and the high ureteric insertion point above the calyces as a result of the malrotation of the kidney.

Followup ultrasound at six weeks showed no evidence of residual hydronephrosis. On annual imaging, our patient has remained free from obstructing stones after two years of follow up.

Conclusion

Intrathoracic kidneys can be a result of a congenital Bochdalek hernia or secondary to an acquired diaphragmatic hernia. In patients with a congenital diaphragmatic hernia, intrathoracic kidneys are only identified in 0.25% of cases.[2] Treatment of an upper pole stone with percutaneous nephrolithotomy and open partial nephrectomy for renal cell carcinoma have been described, but the body of literature regarding treatment of common urological conditions in patients with intrathoracic kidneys is scant.[3,4]

Despite the abnormal anatomy presented by this thoracic kidney and very proximal obstructing ureteric stone, standard flexible ureteroscopy resulted in a successful outcome with no negative sequelae.

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Fig. 1. Portable upright chest x-ray showing the elevated left hemidiaphragm with resultant diminutive left lung volume and rightward mediastinal shift.

Fig. 3. Contrast enhanced coronal computed tomography image demonstrating the intrathoracic left kidney and the obstructing proximal left upper ureteric stone.

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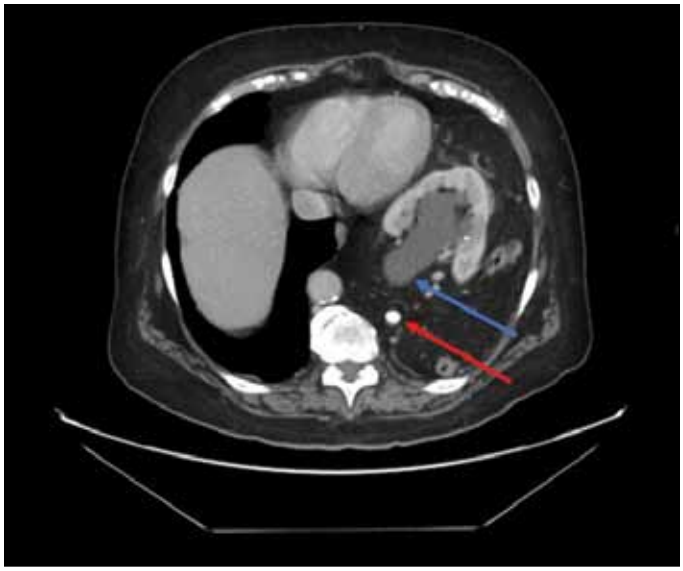

Fig. 2. Contrast enhanced axial computed tomography image demonstrating the large diaphragmatic hernia with the left kidney situated within the thoracic cavity next to the heart. The left kidney is malrotated with the renal pelvis facing posteriorly. There is evidence of hydronephrosis (blue arrow) secondary to an obstructing proximal ureteric stone (red arrow).

Fig. 4. Retrograde pyelogram demonstrating a proximal filling defect and malrotated collecting system.

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