CLINICAL VIGNETTE

Renal Cysts in Geriatric Outpatient Primary Care

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Case Reports

Patient #1: A 68-year-old female presented with abdominal and back pain. Abdominal ultrasound showed a simple-appearing left upper pole renal cyst, as well as slight interval enlargement of two or more adjacent parapelvic cysts over the last two years. The patient was referred to a urologist for evaluation who recommended CT urogram because the cystic characteristics were poorly visualized. CT demonstrated a 5.4 cm x 5.5 cm thin walled cyst with mild enhancement but without internal septations or calcifications noted within the upper pole of the left kidney. This patient was subsequently diagnosed with a Bosniak type IIF cyst within the upper pole of the left kidney, requiring follow-up evaluation in 6 months.

Patient #2: A 79-year-old female with poorly controlled hypertension and chronic kidney disease Stage 3 underwent a renal ultrasound to further evaluate her chronic kidney disease. Ultrasound showed a few bilateral peri-centimeter renal cysts, some with partially hyper-echoic periphery, compatible with calcifications, and no hydronephrosis. This patient was referred to a urologist for evaluation of calcified cysts. The urologist recommended MR urogram to better discern the complexity of the cysts. MR was significant for right kidney posterior lower pole exophytic cystic lesion, measuring 1.4 cm x 1.3 cm with intrinsic T1 hyperintensity and low level enhancement, suspicious for papillary renal cell carcinoma (Bosniak type IV).

In both patient cases above, the radiologists did not recommend ordering additional imaging based on ultrasound results. In a busy outpatient practice, it would be easy for clinicians to overlook these ultrasound findings. In this article, we review the features that make a "simple" cyst on ultrasound more worrisome and provide indications for additional imaging and urology referral.

Discussion

Renal cysts are common. About 40% of patients have one or more renal cysts incidentally found on CT.[1] The prevalence of cysts is higher in males than females and increases with age: less than 10% in adults under age 40 but greater than 60% among those over age 80.[1,2]

The prevalence of renal cancer also increases with age and accounts for 3% of all malignancies;[1] 50% of renal cancers are detected incidentally, and as many as 85% of suspicious renal lesions are malignant.[1,2] Thus, it is important to risk-stratify cysts to appropriate categories.

Simple cysts are frequently seen in normal kidney and are the most common renal masses. They can be solitary or multiple or can be unilateral or bilateral. They usually are small (< 2cm) but can grow very large (> 10cm). They are often asymptomatic. Symptoms, when present, include abdominal pain, flank pain, hematuria, abdominal mass, infection, and hypertension. Radiologically, simple cysts have a thin wall and do not have calcifications, enhancements, or septa.

Complex cysts, by contrast, have worrisome features. The greater the number of complex features present, the higher the risk of malignancy. These features include presence of calcifications, contrast enhancement, increased fluid density (high attenuation), thickened cyst wall, and thick wall septations. The Bosniak classification of renal cysts, which is used for risk-stratification, is based on these features. Although developed for CT, the Bosniak classification can be applied to MRI or ultrasound if contrast enhancement is used.[1,3]

Patient #1 was diagnosed with Bosniak Type IIF cyst, which is an indeterminate category and significant for approximately 25% likelihood of malignancy.[4] Bosniak Type II F cysts are characterized by multiple, hair-line thin septa with "perceived" enhancement but no measurable enhancement present. Other features can include minimal thickening of wall / septa, thick or nodular calcification in wall / septa, and no enhancing soft tissue tissue components. Bosniak Type IIF also includes non-enhancing, high attenuation lesions of 3cm or greater.[4] Treatment guideline is follow-up imaging in 6 to 12 months, then yearly for 5 years.[5]

Patient #2 had Bosniak type IV renal cysts, which are categorized as malignant. Bosniak type IV cysts are clearly malignant cystic masses that have all the criteria of Category III, as well as distinct enhancing soft tissue components. Bosniak type III cysts are in the suspicious indeterminate category and are characterized by multilocular lesion(s) with multiple enhancing septae, uniform wall thickening, nodularity, or thick/irregular calcification.[4] Treatment guideline for Type III and IV renal cysts include referral to a urologist for further evaluation and consideration of possible biopsy, percutaneous ablation, or laparoscopic/open, partial/

total nephrectomy. If a patient has limited life expectancy or significant comorbidities, then serial imaging with CT or MRI at 6 and 12 months and yearly for 5 years can be considered (if consistent with the patient's goals of care).[5]

When evaluating renal cysts, primary care providers must realize that ultrasound is operator dependent and may not be reliable. A radiologist may not necessarily recommend further imaging. Clinicians, therefore, must be aware of the worrisome features of renal cysts and know when urology referral is indicated. Providers can consider further imaging with CT or MRI, as well as referral to urology, if there is an enlarging cyst, multiple cysts, or presence of symptoms. MRI is indicated when there is an indeterminate CT lesion, contrast allergy, or kidney impairment. MRI may indicate additional septa, wall thickening and/or septa, and enhancement, which may lead to an upgraded Bosniak classification.[6] In a retrospective study, side-by-side comparison of CT and MRI images of 60 renal masses in 59 patients (with these images performed within 1 year of each other), MRI led to renal cyst classification upgrade in 7 lesions, affecting management of the patients.[6] However, study limitations included inability to assess inter-observer variability, possible observer bias (when MRI images were reviewed immediately after CT images), small sample size, and evolutionary changes in the lesion itself that may not be due to differences in imaging modality.[6] Since MRI may cause an upgrading of Bosniak classification, it may be particularly useful to assess patients with renal cysts Bosniak types IIF and III. Indications for urology referral include Bosniak type IIF or higher or if the clinician is uncertain how next to proceed.[6]

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