Diagnosis and Evaluation of Renal Cysts

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KEYWORDS

• Simple renal cysts • Complex renal cysts
• Autosomal-dominant polycystic kidney disease • Acquired cystic kidney disease

KEY POINTS

- Simple renal cysts are common findings and have specific imaging criteria that render them a benign condition. When these criteria are not met, and the cyst has a complex appearance, further evaluation with enhanced imaging studies becomes necessary to exclude the presence of malignancy.
- Renal cysts may be associated with reduced renal function, reduced renal size, and hypertension. Therefore their presence warrants screening for underlying kidney disease.
- Acquired cystic kidney disease is well documented in patients with advanced chronic kidney disease and is associated with an increased risk of renal malignancy. Patients with this disorder should be followed intermittently for the development of renal cell carcinoma.
- Differentiating between multicystic, polycystic, and acquired cystic kidney disease occasionally presents a challenge in clinical practice. Certain characteristics will help to distinguish these patients, and often chronologic assessment is necessary.

INTRODUCTION

Renal cysts are the most common structural lesions of the kidneys and represent a diverse group of entities, each having their unique significance. With the widespread use of diagnostic imaging studies, the incidental finding of renal cysts has become a frequent clinical dilemma for patients and their treating physicians. Often regarded as insignificant, there are concerns that would prompt further diagnostic evaluation and need for follow-up. This article focuses on issues pertaining to the more common adult cystic diseases including simple and complex renal cysts, autosomal-dominant polycystic kidney disease (ADPKD) and acquired cystic kidney disease (ACKD). Several points will be emphasized:

- The evaluation of solitary renal cysts for their malignant potential

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- Possible implications of simple renal cysts as potential associated risk factors for underlying renal disease
- The association of ACKD with chronic kidney disease and the risk of malignancy
- Distinguishing multicystic disease from polycystic kidney disease and ACKD

CLASSIFICATION OF CYSTIC DISORDERS

It is imperative to have a classification scheme to provide a framework for the various cystic disorders given their diversity in regard to anatomy, multiplicity, genetics, and clinical presentation. William Osler in the Principles and Practice of Medicine described 3 varieties of cysts: (1) The small cyst described in connection with chronic nephritis (2) solitary cysts and (3) congenital cystic kidneys.[1] After more than a century, the general concept is much the same. However, there are various ways to consider the different cystic disorders.

Anatomic location is one way of differentiating cystic disease. Much of the understanding about the genesis of cysts has been achieved through microdissection studies, localizing cysts to specific nephron segments.[2] Most cysts arise from tubular epithelial cells.[3] Others may arise differently, as with peripelvic cysts, which emanate from lymphatic channels. Cysts may have a predominance in the cortex, while in other conditions they localize in the medullary region as is the case with medullary cystic disease.

Cysts may be solitary or multiple. This would be a distinguishing factor separating simple renal cysts from a disorder such as polycystic kidney disease.

The course of cystic disease may be variable. Some disorders rarely affect renal function, while others have a hallmark trait that leads to progressive renal failure. Some disorders are localized to the kidney, while others behave as a systemic disease process.

Classification of renal cysts therefore must incorporate anatomic, clinical, and genetic information.[3] Despite all of these variables, some classification schemes group cystic diseases as either hereditary, developmental, or acquired. Fick and Gabow have categorized cysts accordingly as reflected and modified in **Table 1**.[4]

Table 1
Classification of cystic diseases of the kidneys

Genetic	Acquired	Developmental
Autosomal-dominant		
ADPKD Tuberous sclerosis complex Von Hippel-Lindau disease Medullary cystic disease	Simple renal cysts Parapelvic and peripelvic cysts Multilocular cystic nephroma Hypokalemic cystic disease ACKD Renal cystic neoplasms	Medullary sponge kidney Multicystic dysplasia Pyelocalyceal cysts
Autosomal-recessive		
Autosomal-recessive polycystic kidney disease Juvenile nephronophthisis		
Cysts associated with multiple malformation syndromes		

Data from Fick GM, Gabow PA. Hereditary and acquired cystic disease of the kidney. Kidney Int 1994;46:952; and Torres VE, Grantam JJ. Cystic diseases of the kidney. Brenner and Rector's the kidney. 8th edition. Philadelphia: Saunders; 2008. p. 1429.