

Canadian Urological Association

Guidelines on the Management of Renal Cyst Disease

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Introduction:

Renal cysts are a common finding on routine radiological studies. As such, patients are often referred to urologists for their opinion regarding potential intervention and follow-up.

Autopsy studies in patients over the age of 50, reveal greater than a 50% chance of having at least one simple renal cyst.¹ In 1983, using early CT scan technology, renal cysts were discovered in 33% of patients in the same age group.² Today, ultrasound and cross-sectional imaging studies are frequently used to aid in obtaining the diagnosis of abdominal complaints. With improved technology and newer generation diagnostic equipment, renal masses are more frequently identified than 25 years ago.³

Methods:

The CUA guidelines committee has reviewed the literature using a MEDLINE search of the English language and presents the following guidelines.

Definition:

Renal cysts, in general, may be classified as simple or complex. Simple cysts are best defined using sonographic criteria. These include: 1) absence of internal echoes, 2) posterior enhancement, 3) round/oval shape and 4) sharp, thin posterior walls.⁴ When all of the criteria are met, the cyst is benign and no follow-up is required. The difficulty arises, when cysts do not meet the rigid characteristics of the “simple” definition. Therefore, clinicians need to rely on a rapid, safe and accurate system to identify benign versus malignant masses and ultimately have the guidance on non-surgical or surgical treatment options.

The Bosniak classification of renal cysts:

The Bosniak renal cyst classification system was initially reported in 1986, using CT scan findings.⁵ Although, other imaging modalities are frequently used in the evaluation of renal masses (such as ultrasound and magnetic resonance imaging), CT scan (with and without contrast enhancement), remains the primary diagnostic technique.⁶

Ultrasonography is helpful for simple cyst identification, but provides limited information with increasingly complex renal cysts and solid masses. However, magnetic resonance imaging can be helpful with increasingly complex cyst identification. Recent developments with MRI scanning, allows shorter breath holds and increased contrast resolution with gadolinium-enhanced images. As such, the cysts may be characterized in greater detail, compared with CT scan. MRI may demonstrate poorly identified septa on CT scan and show enhancements that are not otherwise clearly perceived. Also, MRI may differentiate between hemorrhagic cysts and solid enhancing masses.⁷

The Bosniak system consists of four categories based on triphasic CT findings, ranging from simple to complex cysts. (table 1.) Category I cysts have no malignant potential and as such, no follow-up is required. However, there is a large difference in potential malignant risk, between category II and category III. These are 0-5% and approximately 50%, respectively. To clarify this further, a subcategory of II was developed, II F (for "Follow-up") Category II F identifies the category II cyst which was slightly more complicated, but not necessarily suspicious enough to warrant surgical exploration. Category II F includes cysts which have multiple thin septa, slight wall thickening *without measurable contrast enhancement*. They may have calcification, including thick, nodular or irregular calcification. Ultimately, 95% of category II F cysts are proven to be nonmalignant.⁸ While the importance of calcification has diminished over the years since the original classification, enhancement with CT contrast has not. Any mass studied with CT thin slice scanning, that increases between 10-20 HU (ie Category III and IV), is a renal cell carcinoma until proven otherwise.⁷

**Table 1:
The Bosniak classification of renal cystic disease**

Category I: Malignant risk less than 1%; No Follow-Up required

- uncomplicated, simple benign cyst
- anechoic, posterior enhancement (through transmission), round or oval shape, thin, smooth wall
- homogeneous water content, sharp delineation with the renal parenchyma, no calcification, enhancement or wall thickening

Category II: Malignant risk less than 3%; No Follow –Up required

- cystic lesion with some abnormal radiological features
 - < 1mm septations (hairline thin)
 - fine calcifications within the septum or wall
 - <3 cm in diameter
 - hyperdense cysts (>20 HU)

Category IIF: Malignant risk 5- 10%; Follow-Up recommended

- cystic lesion with increased abnormal findings
 - multiple thin septum

- septa thicker than hairline or slightly thick wall
- calcification, which may be thick
- intrarenal, >3cm
- no contrast enhancement

Category III: Malignant risk 40-60%; Surgical Excision recommended

- more complicated
 - uniform wall thickening/nodularity
 - thick/irregular calcification
 - thick septa
 - enhances with contrast

Category IV: Malignant Risk greater than 80%; Surgical Excision recommended

- large cystic components
- irregular margins/prominent nodules
- solid enhancing elements, independent of septa

Summary

There are no randomized controlled trials with regards to follow-up or management of cystic renal masses, as such, the recommendations are primarily expert opinion. At this time, category I and II renal cysts, do not require further imaging or follow-up. Category II F, because of an approximately 5% malignant risk, do require periodic imaging. (There is no consensus or evidence based interval determined for follow-up imaging). Combination of ultrasound and MRI should be considered as follow-up for Bosniak II F assists in younger patients (< 50 years of age) to reduce lifetime radiation dose (once the lesion has been characterized by triphasic CT scan). For Category III (50% malignant risk) and category IV (75-90% malignant risk) surgical excision is recommended.⁹⁻¹³ (level 3 evidence; grade B. recommendation) Although, MRI may add further information, it should be used as an adjunct to CT scans in difficult cases.(level 4 evidence; grade C. recommendation).

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