Table 1. Management recommendations for patients with incidental cystic renal masses

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| **Appearance** | | **Recommendation** | |
| --- | --- | --- | --- |
| **Bosniak Category** | **Imaging Features** | **General Population** | **Comorbidities or Limited Life Expectancy** |
| I[†](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext" \l "tblfn2" \o ") | Hairline-thin wall; no septa, calcifications, or solid components; water attenuation; no enhancement | Ignore | Ignore |
| II | Few hairline-thin septa with or without perceived (not measurable) enhancement; fine calcification or short segment of slightly thickened calcification in the wall or septa; homogeneously high-attenuating masses (≤3 cm) that are sharply marginated and do not enhance | Ignore | Ignore |
| IIF | Multiple hairline-thin septa with or without perceived (not measurable) enhancement, minimal smooth thickening of wall or septa that may show perceived (not measureable) enhancement, calcification may be thick and nodular but no measurable enhancement present; no enhancing soft tissue components; intrarenal nonenhancing high-attenuation renal masses (>3 cm) | Observe[http://www.jacr.org/webfiles/images/FLA/Glyphs/u204e.gif](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext#tblfn1)[§](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext" \l "tblfn4" \o ") | Observe[§](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext#tblfn4)http://www.jacr.org/webfiles/images/transparent.giforhttp://www.jacr.org/webfiles/images/transparent.gifignore[∥](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext" \l "tblfn5" \o ") |
| III | Thickened irregular or smooth walls or septa, with measurable enhancement | Surgery[‡](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext#tblfn3) | Surgery[‡](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext#tblfn3)http://www.jacr.org/webfiles/images/transparent.giforhttp://www.jacr.org/webfiles/images/transparent.gifobserve[§](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext#tblfn4) |
| IV | Criteria of category III, but also containing enhancing soft tissue components adjacent to or separate from the wall or septa | Surgery[‡](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext#tblfn3) | Surgery[‡](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext#tblfn3)http://www.jacr.org/webfiles/images/transparent.giforhttp://www.jacr.org/webfiles/images/transparent.gifobserve[§](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext#tblfn4) |

Note: These recommendations are to be followed only if nonneoplastic causes of a renal mass (eg, infections) have been excluded; see text for details. The recommendations are offered as general guidance and do not necessarily apply to all patients.

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| [http://www.jacr.org/webfiles/images/FLA/Glyphs/u204e.gif](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext#back-tblfn1)In selected patients (eg, young), early surgical intervention may be considered, particularly if a minimally invasive approach (eg, laparoscopic partial nephrectomy) can be used. |
| [†](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext#back-tblfn2)When a mass <1 cm has the appearance of a simple cyst, further workup is not likely to yield useful information. |
| [‡](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext#back-tblfn3)Surgical options include open or laparoscopic nephrectomy and partial nephrectomy; each provides a tissue diagnosis. Open, laparoscopic, and percutaneous ablation may be considered when available, but biopsy would be needed to achieve a tissue diagnosis. Long-term (5-year or 10-year) results of ablation are not yet known. |
| [§](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext#back-tblfn4)Computed tomography or MRI at 6 and 12 months, then yearly for 5 years; the interval and duration of observation may be varied (eg, longer intervals may be chosen if the mass is unchanged, longer duration may be chosen for greater assurance). |
| [∥](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext#back-tblfn5)Cystic masses ≤1.5 cm that are not clearly simple cysts or that cannot be characterized completely may not require further evaluation in patients with comorbidities and in patients with limited life expectancy. Reprinted with permission from Radiology 2008;249:16-31. |

Table 2. Management recommendations for incidental solid renal masses in patients in the general population

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| **Mass Size** | **Probable Diagnosis** | **Recommendation** | **Comment** |
| --- | --- | --- | --- |
| Large (>3 cm) | Renal cell carcinoma[†](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext" \l "tblfn7" \o ") | Surgery[‡](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext" \l "tblfn8" \o ") | Angiomyolipoma with minimal fat, oncocytoma, other benign neoplasms may be found at surgery |
| Small (1-3 cm) | Renal cell carcinoma[†](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext#tblfn7) | Surgery[‡](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext#tblfn8) | If hyperattenuating, and homogenously enhancing, consider MRI and percutaneous biopsy to diagnose angiomyolipoma with minimal fat |
| Very small (<1 cm) | Renal cell carcinoma, oncocytoma, angiomyolipoma[http://www.jacr.org/webfiles/images/FLA/Glyphs/u204e.gif](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext#tblfn6) | Observe until 1 cm[§](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext" \l "tblfn9" \o ") | Thin (≤3 mm) sections help confirm enhancement |

Note: These recommendations are best followed after nonneoplastic causes of a renal mass (eg, infections) have been excluded; see text for details. The recommendations are offered as general guidance and do not necessarily apply to all patients.

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| [http://www.jacr.org/webfiles/images/FLA/Glyphs/u204e.gif](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext#back-tblfn6)Benign entities are more likely in small renal masses than large ones. |
| [†](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext#back-tblfn7)Provided there is no detectable fat by CT or MRI using protocols designed to evaluate renal masses. |
| [‡](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext#back-tblfn8)Surgical options include open or laparoscopic nephrectomy and partial nephrectomy; both provide a tissue diagnosis. Open, laparoscopic, and percutaneous ablation may be considered when available, but biopsy would be needed to achieve a tissue diagnosis. Long-term (5-year or 10-year) results of ablation are not yet known. |
| [§](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext#back-tblfn9)Computed tomography or MRI at 3 to 6 months, 12 months, and then yearly; the interval and duration of observation may be varied (eg, shorter intervals if the mass is enlarging). |

Table 3. Management recommendations for incidental solid renal masses in patients with limited life expectancy or comorbidities that increase the risk of treatment

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| **Mass Size** | **Probable Diagnosis** | **Recommendation** | **Comment** |
| --- | --- | --- | --- |
| Large (>3 cm) | Renal cell carcinoma[†](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext" \l "tblfn11" \o ") | Surgery[‡](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext" \l "tblfn12" \o ") or observe | Angiomyolipoma with minimal fat, oncocytoma, other benign neoplasms may be found at surgery; biopsy can be used preoperatively to confirm renal cell carcinoma |
| Small (1-3 cm) | Renal cell carcinoma[†](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext#tblfn11) | Surgery[‡](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext#tblfn12) or observe | If hyperattenuating, and homogenously enhancing, consider MRI and percutaneous biopsy to diagnose angiomyolipoma with minimal fat |
| Very small (<1 cm) | Renal cell carcinoma, oncocytoma, angiomyolipoma[http://www.jacr.org/webfiles/images/FLA/Glyphs/u204e.gif](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext#tblfn10) | Observe until 1.5 cm[§](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext" \l "tblfn13" \o ") | Thin (≤3 mm) sections help confirm enhancement |

Note: These recommendations are best followed after nonneoplastic causes of a renal mass (eg, infections) have been excluded; see text for details. The recommendations are offered as general guidance and do not necessarily apply to all patients.

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| [http://www.jacr.org/webfiles/images/FLA/Glyphs/u204e.gif](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext#back-tblfn10)Benign entities are more likely in small renal masses than large ones. |
| [†](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext#back-tblfn11)Provided there is no detectable fat by CT or MRI using protocols designed to evaluate renal masses. |
| [‡](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext#back-tblfn12)Surgical options include open or laparoscopic nephrectomy and partial nephrectomy; both provide a tissue diagnosis. Open, laparoscopic, and percutaneous ablation may be considered when available, but biopsy would be needed to achieve a tissue diagnosis. Long-term (5-year or 10-year) results of ablation are not yet known. |
| [§](http://www.jacr.org/article/S1546-1440(10)00330-3/fulltext#back-tblfn13)Computed tomography or MRI at 3 to 6 months, 12 months, and then yearly; the interval of observation may be varied (eg, shorter intervals if the mass is enlarging); the duration of observation may be individualized. Observation may be considered for a solid renal mass of any size in a patient with limited life expectancy or comorbidities that increase the risk of treatment, particularly when the mass is small. It may be safe to observe a solid renal mass beyond 1.5 cm, but there are insufficient data to provide definitive recommendations on the risks and benefits of observation. |