

Expanding appropriateness criteria for RN to include all patients with high-complexity tumors with increased oncologic potential



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Introduction

The **American Urological Association (AUA)** guidelines for **renal mass and localized kidney cancer** recommend **partial nephrectomy (PN)** as the preferred treatment for most **cT1a renal masses** and for patients with a **solitary kidney, bilateral tumors, familial RCC, or preexisting CKD or proteinuria**.¹ PN preserves renal function and achieves excellent outcomes, with **94–97% 5-year cancer-specific survival** for T1a tumors.²

Radical nephrectomy (RN) is reserved for **highly complex tumors** when PN is not technically feasible and renal function can be maintained (**post-op eGFR > 45 mL/min/1.73 m²**).¹

However, many patients fall outside these criteria. **Campbell et al. (2021)** highlighted that those with **impaired renal function** or **complex anatomy** often require individualized decisions.¹ Reviews by **Stewart et al. (2022)** and **Rose & Kim (2024)** reaffirm PN as preferred when feasible, while **Young et al. (2024)** noted that **20–30% of small renal masses are benign**, emphasizing the need for **preoperative biopsy** and **multidisciplinary evaluation**.^{2–4}

This study examines how current surgical practice within MUSIC aligns with AUA guideline recommendations.

Methods

This **retrospective cohort study** included patients who underwent **partial (PN)** or **radical nephrectomy (RN)** for solid or complex cystic renal masses suspicious for RCC across **MUSIC practices** from **July 2019–June 2024**.

Exclusion criteria:

- Practice 104 (n=535)
- Missing RENAL score (n=1,131)
- Node-positive or metastatic disease (n=6)
- Clinical stage ≥T3b (n=1)

After exclusions, **1,210 patients** were analyzed.

Primary outcome:
Guideline concordance for RN and PN selection based on **AUA 2017 criteria**:

- Strong RN indication:** RENAL ≥9, high oncologic risk (≥7 cm, cT3a, infiltrative features, or high-risk biopsy), and preserved renal function (pre-op GFR ≥60; predicted post-RN ≥45).
- Strong PN indication:** Functioning ipsilateral kidney, low oncologic risk, and low tumor complexity, independent of renal function.

Secondary outcome:
Patterns of RN and PN use among **non-guideline-specified cases**, including those with mixed tumor, risk, or renal profiles.

Results

A total of **1,210 surgeries** were included for **cT1a–cT3aN0M0 renal masses**

Figure 1: Surgery Technique

Technique	Count	Percentage
Partial Nephrectomy	833	69%
Radical Nephrectomy	377	31%

Figure 2: Cohort Distribution by AUA Guideline Category

Category	Count	Percentage
Non-Guideline Specified	415	34%
Guideline Specified	795	66%
Strong indication for RN	32	3%
Strong indication for PN	763	63%

Figure 3: Guideline Concordance for RN and PN Selection

Indication	Concordant (%)	Non-Concordant (%)
Strong RN Indication	88%	12%
Strong PN Indication	85%	15%

AUA guideline adherence was high across both groups. Among patients with strong indications for RN, 88% underwent RN and 12% underwent PN. Among those with strong indications for PN, 85% received PN and 15% received RN.

Figure 4: Surgical Selection Among Non-Guideline-Specified Cases

Risk/Complexity Profile	RN (%)	PN (%)
High OR + High TC	88%	12%
High OR + Low TC	40%	60%
Low OR + High TC	58%	42%

The remaining **415 patients (34%)** did not meet clear AUA indications for either RN or PN. This group was further stratified based on: 1) **Oncologic risk (OR):** tumor ≥7 cm, cT3a, or high-risk biopsy, 2) **Tumor complexity (TC):** RENAL score ≥9, 3) **Renal function (RF):** pre-op GFR <60 or predicted post-RN GFR <45. Patients with **both high OR and high TC** tended to receive RN even with impaired renal function, while those with **discordant risk and complexity** (e.g., high OR but low TC) demonstrated the greatest variation in surgical choice.

Conclusions

AUA guidelines provided clear recommendations for **66% (795)** of patients, leaving **34% (415)** managed through individualized clinical judgment. Among guideline-defined cases, **12%** of patients with strong indications for **RN** underwent **PN**, and **15%** of patients with strong indications for **PN** underwent **RN**—both higher than rates reported by *Sarle et al.* and *Campbell et al.* This suggests growing flexibility in surgical decision-making but also highlights the limitations of existing guidelines in capturing real-world complexity.

Among patients **not fitting AUA scenarios**, treatment patterns reflected nuanced clinical reasoning:

High oncologic risk (OR), high tumor complexity (TC), and impaired renal function: 86% underwent RN—consistent with prior studies—supporting that oncologic priority often outweighs renal preservation when risks are high.

High OR but low TC: Only 40% underwent RN (vs. 56–80% previously), suggesting evolving judgment in this subgroup.

Low OR but high TC: 57% underwent RN, similar to earlier findings, but still demonstrating variability that may benefit from **multidisciplinary or tumor board review**.

Strong adherence to AUA guidelines was observed across MUSIC practices, yet **over one-third of cases remained uncategorized**, emphasizing the need for more adaptive guidance. Variability in management of borderline or discordant cases underscores the importance of **individualized decision-making** and **multidisciplinary evaluation** in optimizing patient outcomes.

References

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