AUA 2026 MAY 15-18 Washington, DC

Small Renal Masses: Alternatives To Surgery

John Brandon Arruda, MSN, APRN, AGNP-C, CUNP
West Virginia University Medicine
Department of Urology
Division of Urologic Oncology

AUA 2026 MAY 15-18 Washington, DC

Disclosures:

- Endo Pharma – Grant for Urology fellowship (2022-2023)
- Urogen pharma – Advisory board (Oct-Nov 2025)

AUA 2026 Washington, DC MAY 15-18

Objective

After participating in this CME Activity, Participants will be able to:

Evaluate renal masses and identify appropriate nonsurgical management strategies.

AUA 2026 Washington, DC MAY 15-18

Agenda

- Definitions.
- Background.
- Alternatives to surgery:
  - Active surveillance.
  - Percutaneous therapies.
    - Microwave ablation.
    - Radiofrequency ablation.
    - Cryoablation.
- Renal mass biopsy.
- Future directions.

Definitions

Small renal mass: a renal tumor that is sized less than 4 cm in greatest diameter.

Microwave ablation: percutaneous use of electromagnetic waves to generate high temperatures to destroy renal tumors.

Thermal ablation: minimally invasive, image-guided procedure that uses extreme heat or cold to destroy diseased tissue.

Radiofrequency ablation: a minimally invasive, image-guided procedure that uses radio waves to generate heat to destroy renal tumor.

Renal mass biopsy: image-guided procedure used to determine if a tumor is cancerous, benign, or infected by extracting a small tissue sample with a needle.

AUA2026 Washington, DC MAY 15-18

Background

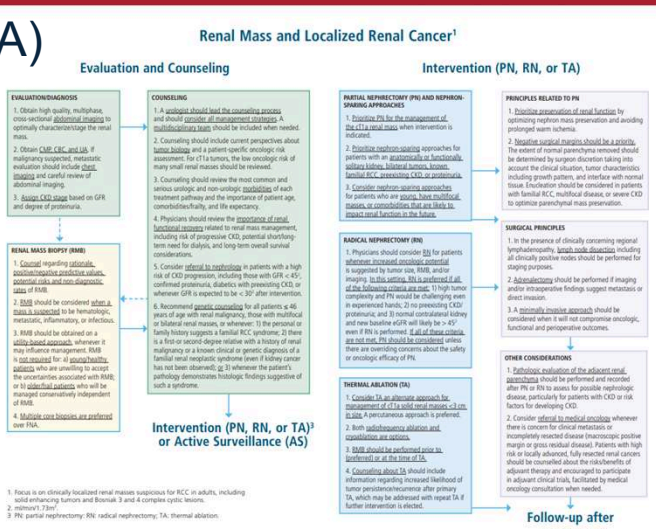
Small renal masses are classified as masses less than 4cm in size.

Detection rates have significantly increased since the 1970s from 7-13% to 46-64% 2025.

- Better images.
- Patient self awareness.
- Greater understanding of risk factors.

Malshy, K., Fazaa, N., Eigner, E., Steidle, M., Nsair, A., Atallah, M., Osinski, T., Rappold, P. M., & Bandari, J. (2025). *Shifting paradigms in the treatment of small renal masses. Translational Andrology and Urology, 14*(5), 1174–1181. https://doi.org/10.21037/tau-2025-213

Guidelines (AUA)



American Urological Association. (2021). *Renal mass and localized renal cancer: Evaluation, management, and follow-up.* www.auanet.org/guidelines

AUA2026 Washington, DC MAY 15-18

Management options

Active surveillance

Commonly used for patients who:

- Do not wish to undergo surgery.
- Are too ill to tolerate surgery.
- Whose mass is showing stable size and no/minimal growth. (<0.5cm/yr)

AUA 2026 Washington, DC MAY 15-18

Active Surveillance

Monitoring protocol:

- Every 6 -12 months with cross sectional images/ labs.
  - CT abdomens or MRI abdomen.
  - Comprehensive metabolic panel.
  - Chest images. (CXR or CT)

Percutaneous interventions

AUA2026 Washington, DC MAY 15-18

Microwave ablation

- Has been shown to have similar cancer specific survival rates as well as metastatic free survival as compared to partial or radical nephrectomies.
- Utilizing **high** intensity microwaves to thermally ablate tumor.
- Creates a larger, more predictable renal ablation cavity than radiofrequency ablation techniques.
- Shown to have superior post-operative recovery rates compared to partial or radical surgery.
- Can be utilized for sicker, less surgery inclined patients.

Roadman, D. F., Shapiro, D. D., Das, A., Nelson, L. W., Lotan, P., Risk, M. C., Richards, K. A., Koehne, E. L., Jarrard, D. F., Lee, F. T., Jr, Allen, G. O., Golden, E., Ziemlewicz, T., Hinshaw, J. L., & Abel, E. J. (2026). Percutaneous Microwave Ablation Preserves Renal Function with Similar Long Term Oncologic Outcomes Compared to Surgery for Clinical T1 Renal Cell Carcinoma. Cancers, 18(2), 334. https://doi.org/10.3390/cancers18020334

Microwave ablation

Follow up:

- Cross sectional CT or MRI within 3 months of initial microwave therapy.
  - Observe for a cavity and fully ablated site.
  - Observe for any recurrence within the ablation cavity.

AUA 2026 Washington, DC MAY 15-18

Microwave ablation

Follow up continued:

- Images every 6 months. (CT w/wo or MRI w/wo)
- CMP every 6 months.

Recurrence:

- Can retreat with ablation.
- Can proceed with partial vs. radical nephrectomy.

Radiofrequency ablation

Initially the first and still very widely used method of renal mass ablation.

Easy access, cost effective.

Uses heat (less than microwave) to ablate renal tumors.

Bertolotti, L., Bazzocchi, M. V., Iemma, E., Pagnini, F., Ziglioli, F., Maestroni, U., Patera, A., Natale, M. P., Martini, C., & De Filippo, M. (2023). Radiofrequency Ablation, Cryoablation, and Microwave Ablation for the Treatment of Small Renal Masses: Efficacy and Complications. Diagnostics (Basel, Switzerland), 13(3), 388. https://doi.org/10.3390/diagnostics13030388

AUA 2026 Washington, DC MAY 15-18

Radiofrequency ablation

Some advantages to this method include:

-Widely available.

-Cheaper than microwave ablation technology.

-Can be used for hilar tumors.

- located within the helium of the kidney.

Disadvantages:

- Can not get as hot as microwave.
- “Heat sink effect.”

Radiofrequency ablation

Follow up:

- First CT or MRI at 3 months
- Every 6 months for 2 years
- Annually or longer there after

Monitoring:

- Same as microwave ablation

AUA 2026 Washington, DC MAY 15-18

Cryoablation

At -190 degrees C, freeze, thaw cycling leads to cellular necrosis and death.

Goal is to create an ice ball around tumor to locally destroy it.

Can us multiple probes, spaced mm apart for complete coverage.

Cryoablation

Disadvantages:

- Can cause hemorrhages.
- Can lead to damage to surrounding tissue.
- More time intensive. (due to thaw, freeze cycling)

AUA 2026 Washington, DC MAY 15-18

Cryoablation

Follow up:

- First CT or MRI at 3 months.
- Every 6 months for 2 years.
- Annually or longer there after.

Monitoring:

- Same as microwave/radiofrequency ablation.

When to use…

Microwave ablation:

- Can be used for 3cm tumors, no heat sink loss, better cavity control.

Radiofrequency ablation:

- Strongly indicated for <3cm and exophytic.
- Not encouraged for central tumors due to the heat sink loss.

Cryoablation:

- Tends to be better suited for larger cT1a tumors and can even go to 4.0cm or more. (operator dependent)

AUA 2026 Washington, DC MAY 15-18

Renal mass biopsy

Role has evolved over the last 20 years.

- Recommended prior to ablative procedures.
- When results would alter treatment options.
- When patient requests, and results would influence their decision.

Role of renal mass biopsy for diagnosis and management: Review of current trends and future directions
Cancer Cytopathology 131(8):480-494 John Wiley and Sons, Ltd 20231934-662X10.1002/cncy.2269

AUA2026 Washington, DC MAY 15-18

Renal cell cancer – basics

80,000 new cases annually.

Mean age of diagnosis is: 65

Lifetime risk of renal cell cancer diagnosis: 2.2%

Number of deaths annually: 15,000

American Cancer Society. (2025, January 16). *Key statistics about kidney cancer*. www.cancer.org/cancer/types/kidney-cancer/about/key-statistics.html

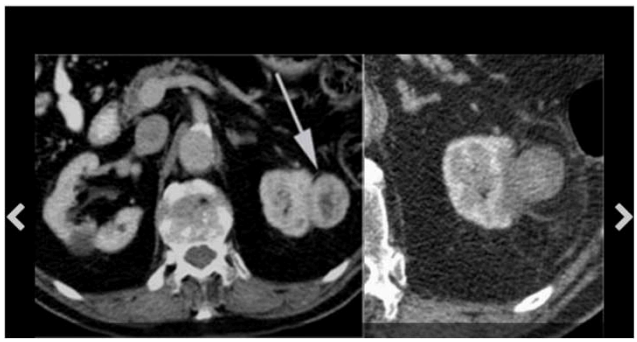
AUA2026 Washington, DC MAY 15-18

Images – because they are fun

Sebastià, C., Corominas, D., Musquera, M. *et al.* Active surveillance of small renal masses. *Insights Imaging* **11**, 63 (2020). https://doi.org/10.1186/s13244-020-00853-y

Small renal mass.

Pre/post ablation of small renal mass.



UCSF Department of Radiology & Biomedical Imaging. (n.d.). *Radiofrequency/Microwave Ablation for Treating Kidney Tumors*. University of California, San Francisco. https://radiology.ucsf.edu/patient-care/services/kidney-tumor-ablation#two

Future direction

AUA 2026 Washington, DC MAY 15-18

Future offerings

Histotripsy.

Irreversible Electroporation.

Combination Therapies.

- Pre ablation immunotherapy or arterial embolization.

Future offering

Histotripsy:

- Uses noninvasive ultrasound to create a cavitation and tissue destructions.
- Can be precise, localized.
- Remains in clinical trial.

Irreversible Electroporation:

- Use of pulsated electrical current to create nanopores to lead to apoptosis and renal mass death.

Dai, J. C., Morgan, T. N., Steinberg, R. L., Johnson, B. A., Garbens, A., & Cadeddu, J. A. (2021). Irreversible Electroporation for the Treatment of Small Renal Masses: 5-Year Outcomes. *Journal of endourology*, *35*(11), 1586–1592. https://doi.org/10.1089/end.2021.0115

Dai, J. C., Morgan, T. N., Steinberg, R. L., Johnson, B. A., Garbens, A., & Cadeddu, J. A. (2021). *Irreversible electroporation for the treatment of small renal masses: 5-year outcomes. Journal of Endourology*, *35*(11), 1586–1592. https://doi.org/10.1089/end.2021.0115

AUA2026 Washington, DC MAY 15-18

Future offering

Combination therapy: (arterial embolization + ablation)

- Could be used for tumors up to 5cm.
- Can be used for central tumors due to lack of heat sink concerns.
- Complications include hematoma and fluid collections.

AUA2026 Washington, DC MAY 15-18

Summary points

Surgery is still the go-to approach for most patients. But not everyone can or should have surgery, so other options are being used more often, especially for patients with complex health issues. Active surveillance and Ablation are nonsurgical options.

It's important to stay up-to-date on all available options so we can match each patient with the best fit.

Thank you!!

John Brandon Arruda, MSN, APRN, AGNP-C, CUNP
West Virginia University Medicine
Department of Urology
Division of Urologic Oncology
jarruda@hsc.wvu.edu

References

American Cancer Society. (2025, January 16). *Key statistics about kidney cancer*. https://www.cancer.org/cancer/types/kidney-cancer/about/key-statistics.html

American Urological Association. (2021). *Renal mass and localized renal cancer: Evaluation, management, and follow-up*. https://www.auanet.org/guidelines

Bastian, J. F., Seely, D. T., Day, A., White, J. J., Kolb, D., Bowers, C. A., Bailey, E., Jones, D. E., Fry, T. J., Gray, D. B., Oliver, T., Weber, J., Miller, J. J., & MacFarlane, J. E. (2020). *Deuterium–tritium (DT) fusion neutron spectrum measurements at the National Ignition Facility using the Magnetic Recoil Spectrometer*. *Physics of Plasmas, 27*(3), 032703. https://doi.org/10.1063/1.5144255

Bertolotti, L., Bazzocchi, M. V., Iemma, E., Pagnini, F., Ziglioli, F., Maestroni, U., Patera, A., Natale, M. P., Martini, C., & De Filippo, M. (2023). *Radiofrequency ablation, cryoablation, and microwave ablation for the treatment of small renal masses: Efficacy and complications. Diagnostics, 13*(3), 388. https://doi.org/10.3390/diagnostics13030388

Choy, B., Nayar, R., & Lin, X. (2023). *Role of renal mass biopsy for diagnosis and management: Review of current trends and future directions. Cancer Cytopathology, 131*(8), 480–494. https://doi.org/10.1002/cncy.22697

Dai, J. C., Morgan, T. N., Steinberg, R. L., Johnson, B. A., Garbens, A., & Cadeddu, J. A. (2021). *Irreversible electroporation for the treatment of small renal masses: 5-year outcomes. Journal of Endourology, 35*(11), 1586–1592. https://doi.org/10.1089/end.2021.0115

HistoSonics. (2023, October 24). *World's first kidney tumor treated using the HistoSonics Edison histotripsy system*. https://histosonics.com/news/worlds-first-kidney-tumor-treated-using-the-histosonics-edison-histotripsy-system/

Sebastià, C., Corominas, D., Musquera, M., Paño, B., Ajami, T., & Nicolau, C. (2020). *Active surveillance of small renal masses. Insights into Imaging, 11*(1), 63. https://doi.org/10.1186/s13244-020-00853-y

University of California, San Francisco, Department of Radiology and Biomedical Imaging. (2016, March 24). *Kidney tumor ablation: A nonsurgical option to nephrectomy*. https://radiology.ucsf.edu/news/kidney-tumor-ablation-nonsurgical-option-nephrectomy