

Image-Guided Renal Intervention



Gregory T. Frey, MD, MPH^a, David M. Sella, MD^a, Thomas D. Atwell, MD^{b,*}

KEYWORDS

- Renal ablation • Embolization • Radiofrequency ablation • Cryoablation • Microwave ablation
- Complications

KEY POINTS

- The increasing incidence of small renal cell carcinomas (RCCs), particularly in older patients, has led to the expanding role of renal ablation in tumor management.
- Radiofrequency ablation (RFA) and cryoablation have proven efficacy in managing small renal masses.
- Adjunctive procedural techniques can be used to assist in successful tumor treatment.

BACKGROUND

RCC is the most common malignant renal tumor, accounting for an estimated 2% to 3% of all malignancies in the United States.¹ The American Cancer Society predicted that an estimated 63,920 new cases of kidney (renal) cancer would be diagnosed in the United States in 2014.² The incidence has plateaued in North America and Europe in recent years but is increasing in developing countries.³

The classic symptoms associated with RCC include hematuria, flank pain, and a palpable mass. However, patients with these symptoms usually have advanced-stage disease.⁴ The survival profile for patients with localized disease is significantly better than that for those with regional or distant metastasis, emphasizing the importance of early detection.

Known risk factors in the development of RCC include smoking, hypertension, and obesity. Hereditary syndromes, including von Hippel-Lindau disease, hereditary papillary RCC, hereditary leiomyomatosis and RCC, and Birt-Hogg-Dube syndrome, are also risk factors. Widespread use of

computed tomography (CT) and ultrasonography (US) for evaluation of nonspecific symptoms and other abdominal disease has led to an increased amount of incidentally diagnosed RCCs. These tumors are commonly of a smaller and lower stage.⁴

STAGING OF RENAL CELL CARCINOMA

The staging systems for RCC have gradually evolved from the Robson classification to the TNM system as defined by International Union Against Cancer and the American Joint Committee on Cancer. The TNM system was most recently revised in 2010.⁵ The T stage consists of 5 stages: T0 to T4. Stages T1 and T2 and their subdivisions are defined based on size alone, while stages T3 and T4 are defined based on the degree of locoregional extension, which includes characteristics such as invasion of the renal vein, inferior vena cava, Gerota fascia, or the ipsilateral adrenal gland. T1a tumors are less than 4 cm, and T1b tumors are between 4 and 7 cm.

The Fuhrman nuclear grade classification system is the most commonly found histologic classification system.⁴ The World Health Organization

None of the authors have any disclosures or conflicts of interest.

^a Department of Radiology, Mayo Clinic College of Medicine, 4500 San Pablo Road, Jacksonville, FL 32224, USA; ^b Department of Radiology, Mayo Clinic College of Medicine, 200 1st Street Southwest, Rochester, MN 55905, USA

* Corresponding author.

E-mail address: Atwell.Thomas@Mayo.edu

Radiol Clin N Am 53 (2015) 1005–1019

<http://dx.doi.org/10.1016/j.rcl.2015.05.002>

0033-8389/15/\$ – see front matter © 2015 Elsevier Inc. All rights reserved.

defines 3 histologic RCC types: clear cell RCC (80%–90%), papillary RCC (10%–15%), and chromophobe RCC (4%–5%). Four Fuhrman nuclear grades are then assigned according to increasing nuclear size, irregularity, and nuclear prominence.

CURRENT TREATMENT GUIDELINES

The increased incidence of the incidentally detected renal mass along with the development of various nephron-sparing strategies has greatly affected the management of RCC. Both the American Urological Association (AUA) and the European Association of Urology (EAU) have published extensive guidelines regarding the treatment of localized RCC, local treatment of metastatic RCC, systemic therapy for metastatic RCC, and follow-up after radical nephrectomy (RN) or partial nephrectomy (PN) or ablative therapies for RCC.

The AUA management algorithm for the T1 renal mass incorporates the presence of major comorbidities, increased surgical risk, and tumor size. This algorithm essentially defines PN or RN as a standard therapy with ablative therapy or active surveillance as a recommendation only for those patients with a T1a renal mass and major comorbidities or at increased surgical risk.⁶

The EAU summary of the current evidence suggests that localized renal cancers are best managed by PN rather than RN, regardless of the surgical approach.⁴ The EAU makes no recommendation on RFA and cryoablation because of the low quality of the available data. In the elderly and/or comorbid patients with small renal masses and limited life expectancy, active surveillance, RFA, and cryoablation can be offered.

STANDARD OF CARE: SURGICAL OUTCOMES FOR T1 RENAL MASSES

Over the past several decades, the surgical management of T1 renal masses (<7 cm) has evolved almost entirely to PN, including open, laparoscopic, and robotic approaches. PN has the proven benefit of preserving renal parenchyma and thus renal function with equivalent oncologic outcomes.^{6–8}

Equal oncological outcomes have been demonstrated in several studies for patients with T1a (up to 4 cm) tumors treated with PN versus RN, citing a 5-year disease-specific survival up to 96%.^{7,9} Population-based analysis comparing outcomes of RN and PN for T1a tumors demonstrate a disease-specific survival for PN of 97.5%.¹⁰ In addition, there are growing data supporting equal oncologic outcomes for select T1b (4–7 cm) tumors reporting a 5-year disease-specific survival

rate of 98%; this is with the added benefit of preserving kidney function, therefore preventing secondary causes of morbidity and mortality.^{11–13}

ROLE OF SURVEILLANCE

Active surveillance has gained support in the past several years, based on the fact that despite earlier detection and treatment of small RCCs, disease-specific mortality has continued to increase.^{14,15} The increase in mortality is attributed to tumors larger than 4 cm, suggesting that smaller tumors have an indolent course. In fact, the average rate of small renal mass growth while under surveillance is 3 mm per year,¹⁶ and 1 in 4 tumors do not grow while under surveillance.¹⁷

Certain groups, including elderly patients, those with significant comorbidities, or those with limited life expectancy, have been managed safely with surveillance in several trials.^{18,19} There are no standardized active surveillance protocols addressing items such as patient selection; role of percutaneous renal mass biopsy; timing, type, or frequency of imaging follow-up; and growth rate thresholds at which to initiate intervention.

The AUA has published clinical guidelines pertaining to percutaneous biopsy and follow-up imaging.²⁰ These guidelines suggest that imaging follow-up take place with MR imaging or CT initially within 6 months of diagnosis to establish a growth rate. Following this, yearly follow-up is adequate unless the morphology of the mass changes or the growth rates increase.²⁰

EMBOLIZATION OF RENAL CELL CARCINOMA

Renal artery embolization (RAE) is currently used for several indications in the setting of both primary renal tumors and metastatic RCC, including preoperative embolization before nephrectomy, treatment of angiomyolipoma, as an adjunctive therapy for RCC ablation, and for palliation of advanced-stage RCC.²¹

Preoperative embolization in RCC has numerous proposed benefits including decrease in perioperative blood loss, creation of a tissue plane of edema facilitating dissection, and reduction in tumor bulk.²¹ Observational and retrospective studies demonstrate a wide variation in the achievement of desired results of reduction in intraoperative blood loss, transfusion requirements, surgical procedure time, surgical complications, and survival outcomes.^{22–25} There is no consensus on the appropriate timing of preoperative embolization and resection, and this in combination with the varied results have limited the use to local practice patterns.

Download English Version:

<https://daneshyari.com/en/article/4246781>

Download Persian Version:

<https://daneshyari.com/article/4246781>

[Daneshyari.com](https://daneshyari.com)