

Renal Tumor Ablation

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Percutaneous, image-guided ablation for renal cell carcinoma (RCC) is an important treatment option for many patients. With more than 60,000 new cases every year and nearly three-fourths of those presenting as stage 1A, minimally invasive, nephron-sparing therapies have become the standard of care. Stage 1 A (< 4 cm, organ confined) disease presents the best scenario for percutaneous ablation. Various other factors influence the decision-making tree, such as patient age, life expectancy, comorbid condition, renal function, and the risk of metachronous lesions. Preparation aims at minimizing risks and has been discussed in detail. Computed tomography guidance remains the best option, and conscious sedation is adequate for most cases. Ultrasound and more recently magnetic resonance guidance are becoming viable alternatives. Whether radiofrequency or cryoablation are chosen, a margin of at least 5 mm and up to 10 mm is recommended. Various maneuvers required for optimum outcome, including hydrodissection and preoperative embolization are also discussed. Most renal ablations can be performed on an outpatient basis. Reasons to admit include complications, high-risk patients, and the need for symptom management. Follow-up aims at (1) ensuring complete ablation and (2) monitoring against a metachronous lesion. For the former, a 3-month contrast computed tomography or magnetic resonance imaging is required and for the latter an annual examination is recommended. Though partial nephrectomy remains the gold standard, image-guided, percutaneous ablation for RCC can result in very similar outcomes. Over the last 10 years, there have been numerous studies reporting the efficacy and safety of ablation, and more recently, long-term studies have confirmed those numbers. Overall, the efficacy for percutaneous ablation for RCC stands at 90%-95% with a complication rate of 6%-7%. The most important factors for positive outcome are patient or tumor selection and operator experience.

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Introduction

Nearly 65,000 new cases of renal cell carcinoma (RCC) were diagnosed in the United States in 2012,¹ continuing an increasing trend in incidence over the past few decades (Table 1). The stage at diagnosis has also shown a trend toward earlier stage (Table 2). The latter is likely due to the increase in utilization of cross-sectional imaging as a primary diagnostic tool and the concomitant increase in incidental detection of RCC. These 2 factors have

provided the impetus behind minimally invasive techniques in treating RCC. Image-guided, percutaneous ablation is becoming an increasingly utilized and accepted treatment for organ-confined disease. Recent studies have demonstrated a low complication profile and a high efficacy for ablative interventions, approaching those of surgical treatments.²⁻⁶ We describe the clinical (patient selection, preparation, and follow-up) as well as technical (tumor selection, technique, and complications) aspects related to image-guided, percutaneous ablation for RCC.

Patient Selection and Preparation

Percutaneous ablation for RCC is a curative option and patient preparation should ensure that the chances of complete tumor response are maximized. Several factors influence outcomes including tumor size, location, and

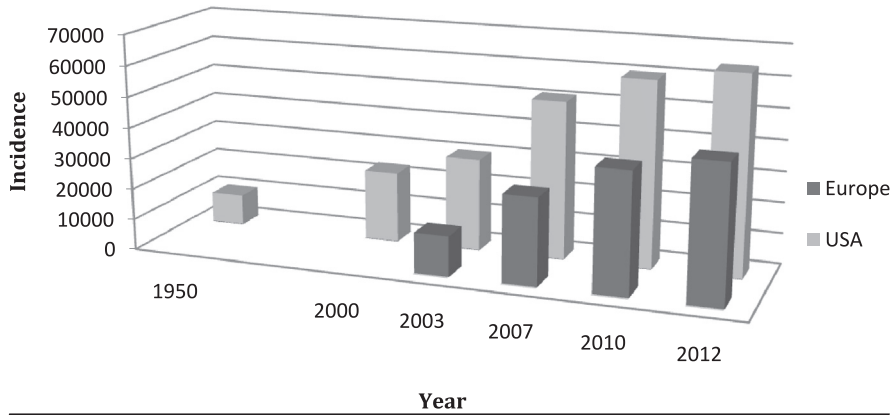
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Table 1 The Incidence of Renal Cell Carcinoma in the United States Currently (2012) Stands at Approximately 62,000. Though Lower, the Incidence in Europe Shows a Similar Rate of Increase Over Time. This is Attributed to (1) an Increase in the Associated Risk Factors (Obesity and Smoking) and (2) the Increasing Utilization of Cross-Sectional Imaging (CT and MRI) as Primary Diagnostic Tools. The Latter has also Resulted in Earlier Detection and Lower Stage at Diagnosis

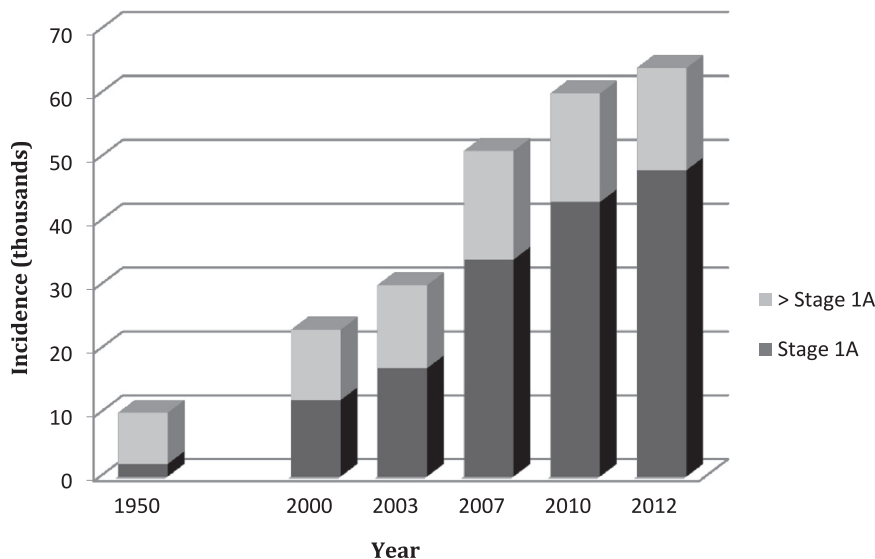


stage, as well as the patient's comorbid conditions and age. The ideal lesion is a stage 1A (<4 cm) lesion that is posterior, exophytic, and away from nontarget tissues (Fig. 1). The efficacy of percutaneous ablation for such lesions should approach 100%. However, the treatment of many lesions is complicated by difficult location, the presence of nearby critical nontarget tissues, size, and patient's comorbidities. Patient factors may play a decisive role in the management of RCC. In this regard, the essential question for every physician is whether treating the RCC

would result in any tangible benefit for the patient. A tiny RCC in an elderly patient with severe comorbid conditions is inconsequential. At the other end of the spectrum, any stage 1A RCC in a young, healthy adult should be treated with a curative intent. However, many patients fall in a “gray zone.” In such cases, the personal preference of the patient and family as well as other options (including follow-up) should help guide the physician.

Patient preparation includes a discussion on the advantages and disadvantages of percutaneous ablation relative

Table 2 Relative Incidence of Stage 1 A and Non-Stage1A Renal Cancers in the United States Since 1950. Before the Introduction of Cross-Sectional Imaging, Renal Cell Carcinomas Were Diagnosed at an Advanced Stage, Usually When Symptoms (Hematuria or Pain) Prompted Workup. After the Widespread Introduction of CT and MRI and Their Utilization as Primary Diagnostic Tools, Most Renal Cell Carcinomas are Diagnosed Incidentally (~75%) and at an Earlier Stage. Because of the Early Stage of Most Renal Cell Carcinomas, Percutaneous Ablation has Become an Important Treatment Option for Many Patients



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