

Patient and Tumor Characteristics can Predict Nondiagnostic Renal Mass Biopsy Findings

Joel Prince,* Eric Bultman,* Louis Hinshaw, Anna Drewry, Michael Blute, Sara Best,† Fred T. Lee, Jr., Timothy Ziemlewicz, Meghan Lubner, Fangfang Shi, Stephen Y. Nakada and E. Jason Abel‡

From the Departments of Urology and Radiology (EB, LH, FTL, TZ, ML), University of Wisconsin School of Medicine and Public Health, Madison, Wisconsin

Purpose: Identification of patient and tumor characteristics associated with nondiagnostic biopsies is necessary to improve prebiopsy counseling and patient selection.

Materials and Methods: We reviewed the clinical records and prebiopsy imaging of all patients treated with percutaneous biopsy for a renal mass 7 cm or less. Univariate and multivariate logistic regression models were constructed to examine the association between biopsy outcome and clinical/radiographic features.

Results: A total of 565 biopsies of renal tumors 7 cm or less in 525 patients were included in the study. There was no significant difference in age, body mass index, Charlson comorbidity score or gender between the patient cohorts with diagnostic and nondiagnostic biopsy. In 83 of 565 patients (14.7%) overall and in 72 of the 413 (17.4%) with a mass of 4 cm or less the biopsy findings were nondiagnostic. Overall 14.7% of masses were cystic and 85.3% were solid with a median tumor size of 2.75 cm (IQR 2.05–4.25). Independent predictors of nondiagnostic biopsy included cystic features, enhancement less than 20 HU, left tumor, tumor diameter and skin-to-tumor distance. The nondiagnostic rate of repeat biopsies was 20.8%, which did not statistically differ from the nondiagnostic rate at the initial renal mass biopsy attempt. Radiologist or pathologist experience was not associated with the biopsy nondiagnostic rate. In 7 of 565 patients (1.2%) hospital admission was required for adverse events after biopsy.

Conclusions: Nondiagnostic renal mass biopsies are more common in cystic, nonenhancing, small masses when patients have a skin-to-tumor distance of 13 cm or greater. Excluding patients with these criteria decreased the nondiagnostic rate from 14.7% to 8.7%.

Key Words: kidney; carcinoma, renal cell; biopsy; diagnosis; pathology

Abbreviations and Acronyms

BMI = body mass index
ccRCC = clear cell RCC
CT = computerized tomography
FNA = fine needle aspiration
RCC = renal cell carcinoma
RMB = renal mass biopsy
SRM = small renal mass
US = ultrasound

Accepted for publication December 5, 2014.
Study received institutional review board approval.

* Equal study contribution.

† Financial interest and/or other relationship with American Urological Association.

‡ Correspondence and requests for reprints: Department of Urology, University of Wisconsin School of Medicine and Public Health, 1685 Highland Ave., Madison, Wisconsin 53705 (telephone: 608-262-2691; FAX: 608-262-6453; e-mail: abel@urology.wisc.edu).

THE incidence and detection of RCC has increased significantly in the last 50 years.¹ Increased use of cross-sectional imaging techniques have enabled the detection of SRMs when they are asymptomatic, causing stage

migration in RCC² with masses 4 cm or less representing 48% to 66% of new diagnoses.³

Recently concern has been raised about overtreatment of SRM because as many as 33% of SRMs are found to

be benign tumors⁴ and many tumors have minimal metastatic potential.⁵ However, it is difficult to evaluate the risk associated with SRMs using imaging alone and many urologists perform RMB to provide a better assessment of the cancer risk in specific patients.⁶ Improved biopsy techniques allow for a safer and more accurate diagnosis in many patients⁷ and may decrease the total costs of treatment by identifying those with benign renal masses.⁸ However, the optimal use of RMB continues to be debated and biopsy is performed in the minority of patients who are treated for RCC.⁹

The ideal use of RMB remains a topic of debate, although algorithms have been developed to help guide treatment decisions based on pathological findings.¹⁰ A consistent limitation of RMB is an approximately 15% to 22% rate of nondiagnostic or indeterminate findings.^{6,11–13} Many factors may contribute to nondiagnostic biopsy findings, including sampling of tissue outside the target lesion (miss), failure to adequately sample the mass or obtaining tissue that is inadequate to pathologically diagnose a renal neoplasm.

Identification of patient and tumor characteristics associated with nondiagnostic biopsy is necessary to improve prebiopsy counseling and patient selection but few groups have evaluated predictors of nondiagnostic RMB findings. Therefore, we evaluated patient characteristics and tumor features that are predictive of nondiagnostic findings after percutaneous RMB.

MATERIALS AND METHODS

After receiving institutional review board approval we reviewed the clinical and radiological records of 613 percutaneous RMBs 7 cm or less performed from January 2000 to April 2014 at our institution. Excluded from study were 24 biopsies without available prebiopsy imaging within 3 months before RMB and 24 repeat biopsies in patients already in the study. Prebiopsy and intrabiopsy imaging were analyzed with our institutional PACS (picture archiving and communication system) (McKesson, San Francisco, California). Nondiagnostic biopsy was defined as normal renal parenchyma or fibrotic/necrotic material insufficient for pathological diagnosis. A select group of abdominal radiologists perform RMB and designated pathologists review genitourinary specimens at our institution using immunohistochemistry to facilitate diagnosis when indicated.

RMB is generally performed under ultrasound guidance to obtain core samples using an 18 gauge BioPince® biopsy device. FNA is occasionally done for smaller cystic lesions and CT guidance is used primarily for exophytic medial and superior pole masses at radiologist discretion. The biopsy indication was at treating physician discretion. RMB is performed before all ablation procedures and discussed with patients considering surgery or surveillance. Final treatments in this cohort included

surgery in 173 patients (30%), ablation in 196 (35%) and ablation plus surveillance in 196 (35%). During the study period 22.5% of patients with a renal mass 7 cm or less treated with surgery underwent biopsy preoperatively.

Putative prognostic factors for nondiagnostic biopsy included the imaging modality used before biopsy (magnetic resonance imaging vs US vs CT), laterality (left vs right), biopsy guidance imaging modality (CT vs US), biopsy type (FNA vs core vs FNA plus core), exophytic vs endophytic appearance on imaging (exophytic defined as greater than 50% tumor extending beyond the renal capsule), any cystic feature, proximity to liver or spleen, proximity to other organs, renal mass enhancement (20 HU or less vs greater than 20), any fat (present vs absent), any calcification (present vs absent), necrosis/hemorrhage (present vs absent), mass anterior or posterior position, mass polarity (inferior pole vs interpolar vs superior pole), mass mean axial diameter, patient BMI, skin-to-tumor distance, radiologist/pathologist experience and number of biopsy cores obtained.

We assessed differences in patient and tumor characteristics in the diagnostic and nondiagnostic groups using the 2-sided t-test with unequal variances, or the chi-square or Fisher exact test for each characteristic as appropriate. Univariate and multivariate logistic regression models were constructed to examine the association of biopsy outcome with clinical and radiographic features. All analysis was done with SAS®, version 9.2 with 2-sided $p \leq 0.05$ considered significant.

RESULTS

A total of 565 biopsies from 525 patients were included in study. Supplementary table 1 (<http://jurology.com/>) lists patient characteristics. There was no significant difference in age, BMI, Charlson comorbidity score or gender between the diagnostic and nondiagnostic biopsy patient cohorts. Biopsy findings were nondiagnostic in 83 of 565 patients (14.7%) overall and in 72 of 413 (17.4%) with a mass 4 cm or less. Overall 14.7% of the masses were cystic and 85.3% were solid with a median size of 2.75 cm (IQR 2.05–4.25). Enhancement (greater than 20 HU) after intravenous contrast administration was seen in 84.8% of renal masses while 4.4% were pseudo-enhancing (10 to 20 HU), 2.3% were nonenhancing and 8.5% could not be evaluated due to unavailable precontrast CT. The skin-to-tumor distance was 13 cm or greater in 9.2% of masses.

In 482 RMBs (85.3%) pathological evaluation of tissue resulted in diagnosis of a neoplasm. The diagnosis was RCC in 346 cases (71.8%), including clear cell in 75.1%, papillary in 13.9%, chromophobe in 1.4% and RCC unspecified in 9.5%. Oncocytoma was diagnosed in 77 (16.0%), angiomyolipoma in 11 (2.3%) and another malignant neoplasm in 47 (9.8%), including urothelial cancer, collecting duct

Download English Version:

<https://daneshyari.com/en/article/3858768>

Download Persian Version:

<https://daneshyari.com/article/3858768>

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