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Original contribution

Diagnostic criteria for oncocytic renal neoplasms: a survey of urologic pathologists ☆

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Summary Renal oncocytoma and chromophobe renal cell carcinoma have been long recognized as distinct tumors; however, it remains unknown if uniform diagnostic criteria are used to distinguish these tumor types in practice. A survey was distributed to urologic pathologists regarding oncocytic tumors. Responses were received from 17 of 26 invitees. Histologically, more than 1 mitotic figure was regarded as most worrisome (n = 10) or incompatible (n = 6) with oncocytoma diagnosis. Interpretation of focal nuclear wrinkling, focal perinuclear clearing, and multinucleation depended on extent and did not necessarily exclude oncocytoma if minor. Staining techniques most commonly used included the following: cytokeratin 7 (94%), KIT (71%), vimentin (65%), colloidal iron (59%), CD10 (53%), and AMACR (41%). Rare cytokeratin 7–positive cells (≤5%) were regarded as most supportive of oncocytoma, although an extent excluding oncocytoma was not universal. Multiple chromosomal losses were most strongly supportive for chromophobe renal cell carcinoma diagnosis (65%). Less certainty was reported for chromosomal gain or a single loss. For tumors with mixed or inconclusive features, many participants use an intermediate diagnostic category (82%) that does not label the tumor as unequivocally benign or malignant, typically "oncocytic neoplasm" or "tumor" with comment. The term "hybrid tumor" was used variably in several scenarios. A slight majority (65%) report outright diagnosis of oncocytoma in needle biopsies. The morphologic, immunohistochemical, and genetic characteristics that define oncocytic renal tumors remain incompletely understood. Further studies correlating genetics, behavior, and histology are needed to define which tumors truly warrant classification as carcinomas for patient counseling and follow-up strategies.

1. Introduction

Renal oncocytoma [1] and chromophobe renal cell carcinoma [2,3] have been recognized for decades as unique renal tumor histologic subtypes, the former widely accepted as a benign neoplasm [4] and the latter largely considered a favorable renal cancer histology [5]. For the classic appearance of chromophobe renal cell carcinoma, there is little similarity to oncocytoma; however, it is well known that the eosinophilic variant [3] may cause a diagnostic challenge in distinguishing it from oncocytoma. Although numerous techniques for differentiating these 2 tumor histologies have been explored over the years, including histochemical stains, immunohistochemistry, chromosomal changes, molecular assays, and electron microscopy [6], it remains unknown if uniform diagnostic criteria are used by urologic pathologists in practice.

2. Materials and methods

An online survey (SurveyMonkey.com, Palo Alto, CA) was written by 5 of the authors (S. R. W., R. G., R. B., C. G. R., and N. S. G.). Twenty-six urologic pathologists were invited to participate in the survey, based on (1) the perception by the survey authors of the invitees as substantially interested in tumors of the kidney, and (2) in an attempt to obtain a broad geographic distribution of academic urologic pathologists. The survey consisted of 32 questions addressing histologic morphologic features, use of immunohistochemistry and other staining techniques, interpretation of molecular or chromosomal data, and reporting terminology, all of which are discussed as follows. Survey questions were based on text descriptions of histologic features and assay results (Fig. 1), and therefore, participants were not required to interpret images or stains. The study was carried out in accordance with *The Code of Ethics of the World Medical Association* (Declaration of Helsinki) for experiments involving humans. Informed consent was obtained from the participants in the form that the intended use of the data was explained, and participants were given the option to withdraw participation at any time including at the completion of the survey or afterward.

3. Results

Seventeen participants completed the entire survey and were included in the data set, including 2 of the survey authors (S. R. W. and N. S. G.). One invitee responded but declined to participate in the study, 1 survey response was incomplete (which was excluded), and no response was received from the remaining 7 invitees. Participants represented the United States (n = 10), Canada (n = 2), New Zealand (n = 1), Czech Republic (n = 1), Italy (n = 1), United Kingdom (n = 1), and Switzerland (n = 1). Most participants (89%) confirmed evaluating more than 100 institutional renal tumors annually, and many reported receiving personal consultation cases for opinion on renal tumors. Seven (41%) identified the kidney alone as their principle clinical or research interest, and the remainder reported the kidney in combination with one or more organs.

3.1. Histologic features

Most participants responded that a few binucleated cells (82%) or multinucleated cells (71%) were compatible with a