



## Original article

# A contemporary series of renal masses with emphasis on recently recognized entities and tumors of low malignant potential: A report based on 624 consecutive tumors from a single tertiary center



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## ABSTRACT

**Introduction:** A number of new renal tumor entities have been recognized by the 2016 World Health Organization classification of urologic tumors. The classification includes tumors with different behavior and introduces one tumor with low malignant potential, the multilocular cystic clear cell renal cell neoplasm of low malignant potential (mcCCRCNLMP).

However, some categories still labeled as “carcinoma”, such as clear cell papillary renal cell carcinoma (CCPRCC), renal angioleiomyomatous tumor (RAT), and tubulocystic carcinoma (TCRCC), all with a particularly good prognosis when diagnosed as low stage, show no malignant behavior: in fact, no metastases have been reported in these categories when surgically excised. Current experience is limited to supporting these neoplasms as benign entities although, recent literature data is defining these entities as “low malignant potential tumors”.

**Material and methods:** We conducted a search through our files on a consecutive series of 624 renal tumors diagnosed over a period of 2 years to address the incidence of this category of tumors.

**Results:** Applying strict histological criteria, the “low malignant potential” tumors, comprised 7% of renal masses that are less than 4 cm in size and 3.8% of renal masses measuring 4–7 cm in the series of 624 renal tumors. When benign tumors are taken into considerations, the benign and “low malignant potential tumors” represent about one third of renal masses <4 cm and one sixth of renal masses between 4 and 7 cm. All these cases have not shown recurrence or metastasis at follow-up, mean follow-up of 18 months (range 6–30 months).

**Conclusions:** This information may assist urologists in developing guidelines for counseling and proper clinical management for patients with “low malignant potential” tumors or small renal masses.

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## 1. Introduction

A number of new renal tumor entities are now recognized by the 2016 World Health Organization (WHO) classification of urologic tumors [1,2].

The classification includes tumors with different behaviors. For example, multilocular cystic renal cell tumor of low malignant potential (mcCCRCNLMP) is now recognized as a non-aggressive tumor compared to the 2004 WHO classification [3,4].

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However, some categories still labeled as “carcinoma”, including clear cell papillary renal cell carcinoma (CCPRCC), renal angioliomyomatous tumor (RAT), and tubulocystic carcinoma (TCRCC), all with a particularly good prognosis when diagnosed as low stage (pT1a), show no malignant behavior: in fact, no metastases have been reported in these categories when surgically excised [5–14]. RAT is also considered by most authors as a morphologic variation of CCPRCC [15–17].

Because of the recognized good prognosis observed in CCPRCC, renaming them as low malignant tumors has recently been proposed [18].

However, some authorities consider current experience limited to supporting these neoplasms as benign entities. The experience on this tumor ranges from a few cases reported, to about 200 cases, but CCPRCC is recognized as the most common within the low malignant category [19–21].

In order to establish the incidence of these novel categories in clinical practice, we have carried out a 2-year study of a series of 624 consecutive renal tumors treated in a single tertiary center.

## 2. Materials and methods

We searched in the database (code T71000) of Pathology Archives of the University Hospital Careggi, Florence, Italy and identified all kidney tumor cases from September 1, 2013 to September 1, 2015. Exclusion criteria were upper urinary tract urothelial carcinoma, metastasis to the kidney, polycystic diseases, simple renal cysts, and biopsies for medical kidney disease. Patient's clinical information was obtained from medical records. The study series included 624 kidney tumors seen in 577 patients. Available hematoxylin–eosin and immunohistochemical slides were re-assessed (MRR and ALB) and final diagnosis was performed in accordance with the 2016 WHO classification of urologic tumors [1]. pT category was assessed according to 2010 revision of TNM [22].

The diagnosis of CCPRCC was made only when the cases were in full accordance with the description of this tumor entity [1]. In all the cases, the diagnosis was not only based on morphological features, but even on immunohistochemical staining such as: CK7 strongly positive, 34 beta E12 and CA IX positive, CD10, RACEMASE negative, as previously reported [23]. The final diagnosis of CCPRCC was not done in the case of borderline morphology [24]; the cases of tumors partially resembling CCPRCC by morphology, with a partially positive CK7 and/or CD10 positivity were classified as low nucleolar grade CCRCC [1,25].

In this series, the most relevant new entities of the 2016 WHO classification compared to the previous classification were CCPRCC, mcCCRCNLMP, RAT, and TCRCC (Fig. 1).

The aim of this research is to identify the incidence of these new entities and considering the benign lesions, estimate the cumulative percentage of small renal masses that have a favorable outcome.

## 3. Results

Out of all cases, 62.7% of patients were male, most (69.8%) were treated by conservative kidney surgery; among them, 382 patients underwent conservative surgery for a single mass, and 21 patients underwent conservative surgery for multiple tumors; 174 (30.1%) patients underwent radical nephrectomy, in 166 cases for a single lesion, and in 8 cases for multiple tumors.

Intrarenal masses less than 4 cm represented 55.1% of cases; and the intrarenal mass between 4 and 7 cm represented 14% of cases in the current series. Table 1 reports absolute numbers and percentages of kidney tumors according to the present WHO classification. [1]

The series additionally included 51 angiomyolipoma (3 of which of epithelioid subtype, and 4 cases with a leiomyomatous component only), one case of solitary fibrous tumor, one lymphoma, one dendritic cell sarcoma, and one leiomyosarcoma.

Particularly, among the 13 CCPRCC cases analyzed, 8 cases were in male patients, and five in female patients with a mean age of 60.8 years; 12 cases were pT1a stage, with a diameter from 1 to 3.5 cm (mean 2 cm); only one case measured 9 cm in diameter.

Regarding the 12 mcCCRCNLMP cases analyzed, 8 cases were in male patients, and 4 cases were in female patients, with a mean age of 63 years (range 38–80 years). The mean diameter was 3 cm (range 0.8–7 cm).

None of the tumors in the “low malignant potential” or benign categories behaved aggressively and none showed recurrence or metastasis at follow-up, mean follow-up of 18 months (range 6–30 months).

## 4. Discussion

In the current series, among the intrarenal masses less than 4 cm, benign tumors and all potentially low malignant tumors (CCPRCC, mcCCRCNLMP, RAT and TCRCC) represent one third of the diagnosis. This leaves 70% of the pT1a cases as malignant. Among the masses between 4 and 7 cm, benign and low malignant cases account for 17.5% of the cases, which represent half of the amount compared to the above mentioned masses less than 4 cm in diameter.

The low malignant potential tumors (CCPRCC, mcCCRCNLMP, RAT, and TCRCC) represent 7% of the masses less than 4 cm, and they represent 3.7% of the masses in the category between 4 and 7 cm.

These four types of tumors represent an entity which emerged recently based on novel tumor classification, [1] and on other recent literature data [8,16–18,25–28].

This fact, however, forces urologists to deal with many uncertainties due to limited information and experience currently available on these recently emerged entities [29].

In order to decide what the appropriate follow up scheme should be, this being an increasingly frequent problem in practice, we should clarify if the category still labeled as “carcinoma”, such as the case with CCPRCC and TCRCC, [1] is truly made up of renal malignant tumors.

To our knowledge, our study is the first to report on the incidence of these types of tumors diagnosed in the context of the management of patients with intrarenal masses less than 4 cm diameter and intrarenal masses between 4 and 7 cm. It shows that CCPRCC is the most common subtype seen in this category with a slightly higher incidence (5.4%) compared to the one reported by Zhou [30] who found a 4.1% incidence out of 290 nephrectomies performed over a 2-year period.

The different incidence of CCPRCCs among all RCCs that we reported compared to the report of Zhou [30] is probably related to the tumor stage. In our series of cases, when we included all the 458 RCCs, the incidence of CCPRCC represented 2.8% (with RAT 3%). When we calculate the incidence of CCPRCCs among the pT1a RCC cases, the incidence represented 5.4% (with RAT 5.9%). All tumors are in non end-stage patients.

In our series, the incidence of pT1a CCPRCC tumors was 92.3% among all the CCPRCCs, this is in accordance with the literature data i.e., according to Diolombi et al., who reported that 91.4% of the CCPRCCs were pT1 [18].

Importantly, none of our cases, just as the ones in Zhou's series, showed aggressive behavior: in fact, none of the previously reported cases so far has ever recurred or produced metastases

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