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Case Report

# Synchronous clear cell renal cell carcinoma and multilocular cystic renal cell neoplasia of low malignant potential: A clinico-pathologic and molecular study

Maria Rosaria Raspollini[a,*], Francesca Castiglione[a], Liang Cheng[b], Rodolfo Montironi[c], Antonio Lopez-Beltran[d,e]

[a] Histopathology and Molecular Diagnostics, Universital Hospital Careggi, Florence, Italy
[b] Department of Pathology and Laboratory Medicine, Indiana University School of Medicine, Indianapolis, IN 46202, USA
[c] Section of Pathological Anatomy, Department of Biomedical Sciences and Public Health, Polytechnic University of the Marche Region, School of Medicine, United Hospitals, Ancona, Italy
[d] Unit of Anatomic Pathology, Department of Surgery, Cordoba University Medical School, Cordoba, Spain
[e] Champalimaud Clinical Center, Lisbon, Portugal

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ABSTRACT

We report a rare case of synchronous clear cell renal cell carcinoma and multilocular cystic renal cell neoplasia of low malignant potential in the same kidney. The tumors were seen incidentally in a 45-year-old man. Pathologic study revealed that the former tumor was nucleolar grade 2, and the multilocular cystic renal cell neoplasia of low malignant potential was nucleolar grade 1. At immunohistochemistry, the clear cells in both tumors were positive for CD10 and CA IX. Interestingly, these uncommon synchronous tumors showed a different KRAS/NRAS mutation analysis that was characterized by KRAS mutation at codon p.G12C in the clear cell renal cell carcinoma, while this mutation was not present in the case of multilocular cystic renal cell neoplasia of low malignant potential. NRAS mutation was not seen in any of the tumors.



## 1. Introduction

About 10% of radical nephrectomy specimens show synchronous multicentric neoplasms, with clear cell renal cell carcinoma (CCRCC) being the most common histologic subtype [1,2]. CCRCC co-existing with mutilocular cystic renal cell neoplasia of low malignant potential (mcCCRCNLMP) in the same specimen is rare.

Synchronous renal neoplasms are reported in about 10% of the radical nephrectomy specimens [1]. Renal cell carcinoma represents more than 80% of all primitive tumors of the kidney, and clear cell renal cell carcinoma accounts for more than 80% of the renal cell carcinomas. Genetic events play a role in kidney carcinogenesis. For the majority of renal cell carcinomas, specific chromosomal anomalies have been reported.

Recent updates for the histopathological diagnosis of renal tumors are underlined by the classification of the International Society of Uropathology (ISUP) Vancouver 2013 [3]. According to the ISUP classification, genetic profiling is the basis for distinguishing subtypes of renal cell carcinoma, although little is known about the genetic events involved in tumor progression.

In this report, we describe two synchronously appearing renal cell tumors with clear cells in the same kidney in a patient who underwent multiple nephron-sparing surgery (NSS).

We analyzed the morphological and immunohistochemical features and studied the different genetic characteristics of RAS status in the two tumors in order to better understand their biology and the different evolutionary potential.

## 2. Materials and methods

### 2.1. Case report

A 45-year-old man underwent simple enucleation of two renal lesions of the left kidney. The larger lesion measured 3.2 cm × 2.7 cm × 2.6 cm, and the smaller measured

* Corresponding author at: Histopathology and Molecular Diagnostics, Universital Hospital Careggi, Largo Brambilla, 3, 50134 Florence, Italy.
*E-mail address:* mariarosaria.raspollini@aouc.unifi.it (M.R. Raspollini).

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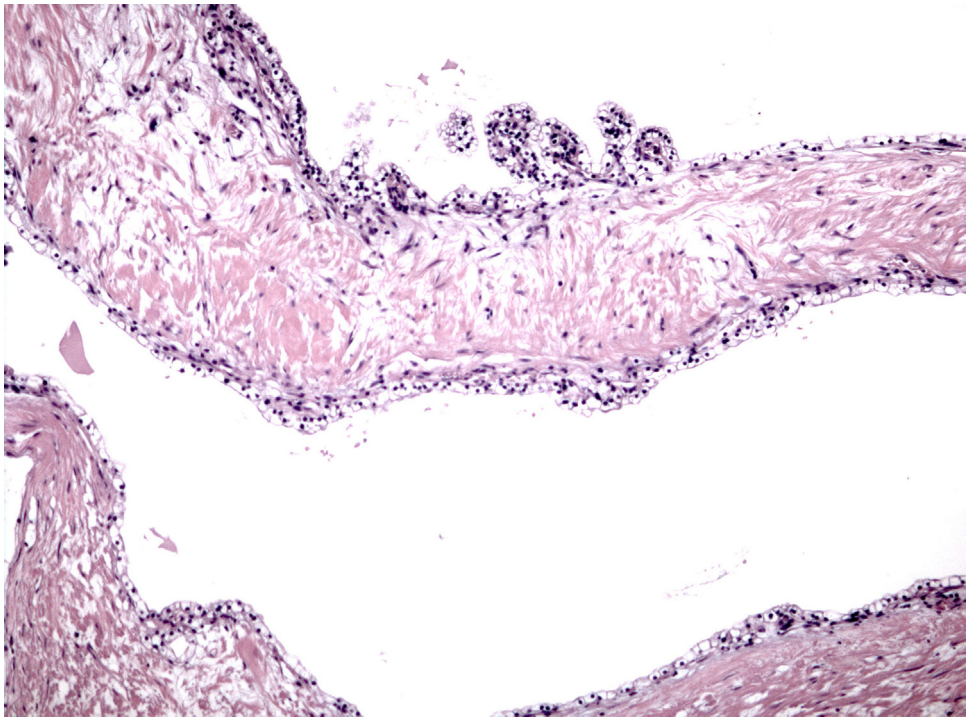

**Fig. 1.** Hematoxylin and eosin staining of the mcCCRCNLMP case.

1.3 cm × 1.3 cm × 1.3 cm. The histological evaluation revealed the presence of two distinct tumors: the larger was a multilocular cystic clear cell renal cell neoplasm of low malignant potential (mcCCRCNLMP), and the smaller was a clear cell renal cell carcinoma (CCRCC). The first tumor was characterized by cysts of various sizes, separated by thin septa and filled with clear, serous, or gelatinous fluid. The septa contain groups of clear cells indistinguishable from grade 1 clear cell carcinoma with prominent associated vascularity (Fig. 1). The cysts themselves were often denuded, but were lined by a single layer of flat to cuboidal epithelium, with clear cytoplasm. Immunohistochemically, the clear cells were positive for CD10 and CA IX, while the cells were negative for CK7 and AMACR/RACEMASI.

In addition, we evaluated six different codons of KRAS and six codons of NRAS: mcCCRCNLMP showed neither KRAS nor NRAS mutations.

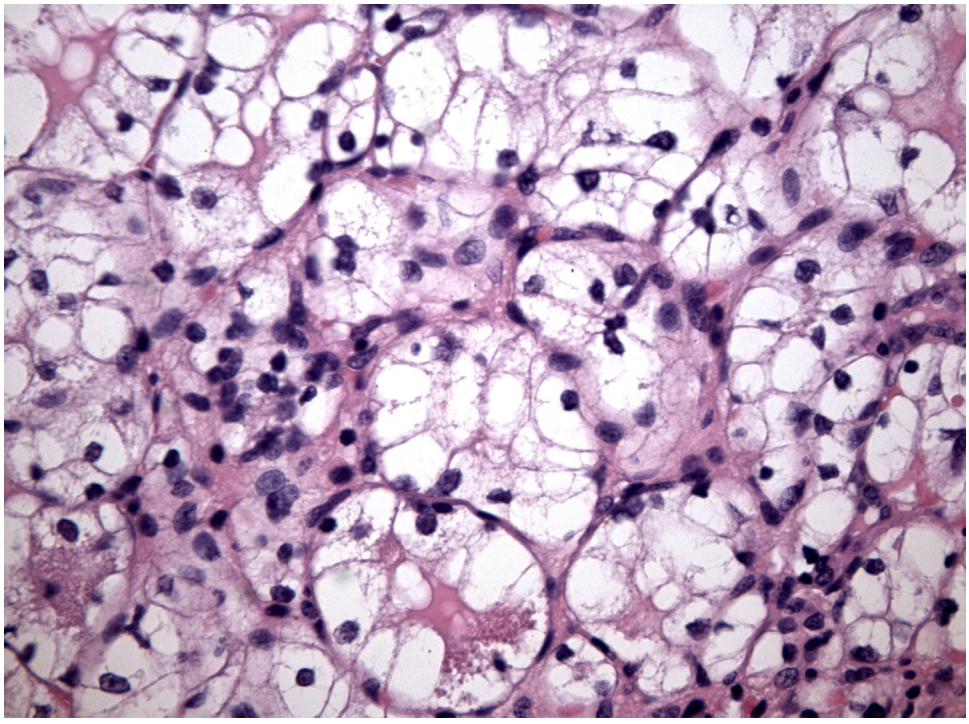

**Fig 2.** Hematoxylin and eosin staining of the CCRCC case.