Case Report

A case of synchronous papillary and clear cell carcinoma in the same kidney

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ABSTRACT

Renal Cell Carcinoma (RCC) comprises 2-3% of all cancers. Bilateral coexistent benign and malignant renal tumors have been defined in many reports. However, unilateral synchronous malignant tumors of different histologic subtypes are very rare and only a few such cases have been reported. Herein we describe a 56 year old male patient with coexistent clear cell RCC and papillary RCC in his left kidney that were successfully treated with radical nephrectomy.

Keywords: Renal cell carcinoma, Multifocal, Synchronous, Nephrectomy

INTRODUCTION

Renal tumors constitute a heterogenous group of neoplasms distinguishable histologically and cytogenetically. Renal tumors account for 3% of all malignant tumors and 2% of overall cancer mortality. The most common subtype of renal cell carcinoma are clear cell, papillary and chromophobe type RCC and account for approximately 80%, 10% and 5%, respectively. Renal oncocytoma, angiomylipoma and adenomas are the benign tumors of kidney. There are few studies that define bilateral synchronous malignant renal tumors or coexisting benign and malignant tumors arising within the same kidney. The incidence of clear cell RCC and papillary RCC arising within the same kidney is very low.

In this report, we describe a case of 56 year old male who had two different histological subtypes of RCC in the same kidney.

CASE REPORT

A 56 year old male patient was admitted to our hospital with abdominal pain since three months. Ultrasonography revealed a hypoechoic mass at upper pole of left kidney. On color Doppler, the mass seemed to be vascular with capsular vascularity and a possibility of renal neoplasm was suggested. Physical examination was within normal limits. On investigating, serum creatinine was found raised to 2.75 mg/dl and hemoglobin levels were low i.e. 9.8 gm/dl. Other biochemical and hematological parameters were within normal limits. Patient had no previous medical or surgical illness. He was a smoker for past 35 years. Patient underwent left radical nephrectomy and was discharged on the fifth postoperative day without any complications.

Pathology

We received the specimen of left radical nephrectomy weighing 488gms and measuring 16.5x11x6 cm. The
Kidney measured 11x5.2x3.7 cm. The ureter was 1.8 cm long. On cutting open, a partly circumscribed golden yellow tumor measuring 4.2x3.2x3 cm was noted at upper pole of the kidney. Gross tumor extensions into perinephric fat and renal sinus were not evident. The perinephric fat resection margin was 0.3 cm away from the tumor. Another tumor nodule measuring 1x0.8x0.7 cm was seen, inferior to the main tumor in the lower pole of kidney (Figure 1). The tumor nodule was intraparenchymal. The intervening renal parenchyma was grossly unremarkable. The adrenal gland measured 3x1.8x1.6 cm and was grossly unremarkable. Hilar lymph nodes were not identified grossly.

Microscopy revealed two different patterns in the two tumors respectively. The larger tumor had a pattern of clear cell RCC with Fuhrman nuclear grade 2 (Figure 2 and 3). The smaller tumor nodule was a papillary RCC, type 1 with Fuhrman nuclear grade 2 (Figure 4 and 5). Both the tumors were limited to kidney and there was no perirenal or perihilar invasion. Tumor necrosis and sarcomatoid features were not seen in both tumors. The intervening renal parenchyma was unremarkable. There was no invasion of blood and lymph vessels. Adrenal gland was unremarkable microscopically.

Areas of clear cell RCC were characterised by solid nests and sheets of carcinoma cells interspersed by prominent network of delicate blood vessels. Tumor cells had water clear cytoplasm surrounded by a distinct cell membrane. The Fuhrman nuclear grade was 2 as nuclei possessed granular chromatin and small nucleoli that were not discernible on 10X magnification. The nodule of papillary RCC was characterised by tightly packed tubulopapillary structures and nuclear morphology was consistent with Fuhrman grade 2.
Immunohistochemistry was performed and the tumor nodule with papillary RCC histology, revealed cytokeratin 7 positivity (Figure 6).

**Figure 6: Immunostain cytokeratin 7 positivity in papillary RCC (satellite tumor nodule).**

**DISCUSSION**

Renal tumors constitute a heterogeneous group of neoplasms distinguishable histologically and cytogenetically. Renal tumors account for 3% of all malignant tumors and 2% of overall cancer mortality. The incidence of pure papillary RCC is 11-20% of all RCCs. While the exact cause of renal cancer remains unknown, documented risk factors include cigarette smoking, obesity, hypertension, diabetes, oestrogen therapy, occupational exposure to petroleum products, heavy metals, asbestos, chronic dialysis and renal failure.

Smoking is clearly implicated in the etiology of RCC, with a strong dose-dependent increase in risk associated with numbers of cigarettes smoked per day and substantial reduction in risk for long-term former smokers. Smoking men who had smoked 1-9, 10-20, or 21 or more cigarettes/day had a Relative Risk (RR) of 1.60 (95% CI = 1.21-2.12), 1.83 (95% CI = 1.30-2.57), and 2.03 (95% CI = 1.51-2.74), respectively. And the advantages of smoking cessation were confirmed by a reduction in RR for those who had quit smoking for >10 years as compared to those who had quit for 1-10 years. Among the documented etiologic factors described above, smoking was the only etiologic factor in our case. There was a 40-year history of smoking and a 2.03 RR of kidney cancer for this case.

The widespread use of abdominal ultrasound and CT scan as investigative tools for many non-urolological complaints led to a dramatic increase in detection of small asymptomatic incidental renal masses. In general, renal tumors are in solid or cystic character according to the imaging findings. In our case the smaller tumor nodule was not detected on imaging studies. Currently, better understanding of molecular genetics has resulted in some exciting progress in the management of renal neoplasms. Surgical excision (partial or radical nephrectomy) is recommended for all localised RCCs.

A detailed and meticulous histopathological examination of tumor nephrectomy specimens is essential to establish histologic type and to record accepted histopathological prognostic determinants i.e. tumor size, histologic subtype, nuclear grade and stage in case of malignant renal neoplasms. Histopathologically, clear cell RCC has clear cytoplasm with solid, tubular or cystic growth pattern. Two different papillary RCC subtypes are defined: type 1 with small cells and pale cytoplasm and type 2 with large cells and eosinophilic cytoplasm. Both clear cell and papillary RCC originate from proximal tubules.

Immunohistochemistry has the potential to differentiate between different subtypes of primary renal neoplasms. Antibodies like CA IX, CK 7, C Kit, racemose and CD 10 have optimal efficacy. Clear cell RCC is characterised by the loss of genetic material of the short arm of chromosome 3 and mutations in VHL gene. Papillary RCC show frequent loss of chromosome Y (93% of cases), trisomy 7 and 17 (75% and 80% of cases respectively) and it has a characteristic pattern of genetic abnormalities that differ from those of other renal neoplasms. Papillary RCC has a significantly better prognosis than clear cell RCC.

There are some literatures that define the synchronous benign and malignant tumors in the same kidney. Billings et al. defined an 86 year old woman with a coexisting clear cell RCC and angiomylipoma. They also stated pertinent literature of 31 cases that had angiomylipoma and RCC in the same kidney. Besides these, oncocytoma has been defined with malignant tumors arising within the same kidney.

In addition to coexisting benign and malignant tumors in the same kidney, there have been described some reports that define the coexisting two different types of RCCs. Kuroda et al. reported a case of two different types of clear cell RCC: conventional clear cell RCC and clear cell papillary type RCC. After the genetic evaluation, they concluded that clear cell papillary type RCC is different from conventional RCC or papillary RCC. Kang et al. reported coexistent clear cell RCC, chromophobe RCC and multiple angiomylipomas within the same kidney. Richstone et al. retrospectively analysed 1071 patients who underwent radical nephrectomy due to renal tumors in terms of multifocality. 57 (5.3%) cases were of multifocality and 6 of them were bilateral synchronous tumors. Among these multifocal cases, 74% of the cases had same histologic subtypes. They found that papillary subtype was observed in 11.4% of RCC patients, while in 37% in multifocal group. Thus papillary RCC had a distinct association with multifocality. They also reported that 9 of 57 patients had pathologic discordance between primary and satellite tumors with a clear cell RCC and...
papillary RCC. Similar to their result, papillary type RCC is one of the components of multifocal tumors in our case.

Also, literature search lead us to three articles that have reported synchronous clear cell RCC and papillary RCC in the same kidney, similar to our case. Simhan et al. reported a data of 97 patients who had multifocal renal tumors. They reported 8 patients who had mixed papillary and clear cell RCC, all of which were treated with partial nephrectomy. Capaccio et al. found 7 patients with unilateral synchronous tumors with different histologic subtypes. 3 cases in this study had synchronous papillary and clear cell RCC and were treated by radical nephrectomy. Ustuner et al. reported a case of 67 year old male who had clear cell and papillary RCC in right kidney, that were successfully treated with radical nephrectomy.

There is insufficient data to compare the different types of RCCs in the same kidney with bilateral multifocal or unifocal tumors of the kidney in terms of survival or oncologic survey.

In conclusion, we present an additional case of synchronous clear cell and papillary type RCC in the same kidney, which is a rare occurrence. However, this synchronous presence of different types of RCCs in the same kidney should not change the management of the case (i.e. nephrectomy).

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