Editorial

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Nephrology And Urology

2021
Vol. 5 No. 3: e002

# Renal Cell Carcinoma: New Insights, Diagnosis and Management

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**Received:** June 02, 2021; **Accepted:** June 16, 2021; **Published:** June 30, 2021

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**Citation:** Richards S (2021) Renal Cell Carcinoma: New Insight, Diagnosis and Management. J Nephrol Urol Vol.5 No.3: e002.

## Description

There is a growing recognition of the complex interplay between renal cell cancer (RCC), kidney function and mechanical reduction of nephron mass and systemic agents targeting the cancer. Earlier detection of RCC and rising life expectancy of cancer survivors places a greater emphasis on preservation of renal function after cancer resection and during systemic therapy. Unique adverse effects associated with RCC drugs not only help reveal cancer pathophysiology but also expand our knowledge of normal cell signaling and metabolism. In this review, we outline our current understanding of RCC biology and treatment, their bidirectional relationship with kidney function, and unmet research needs in this field.

Renal Cell Carcinoma (RCC) is the most common malignancy originating in the kidney and the most lethal genitourinary cancer. It has been classically characterized by an asymptomatic disease course, with a late and highly variable presentation portending a poor survival prognosis. Although its management in the past involved primarily urologists and oncologists, more recently, changing trends in RCC epidemiology, new therapeutic options, and overall improvement in patients' life expectancy has drawn in nephrologists in a multidisciplinary approach to this disease and generated interest in the emerging field of onco-nephrology.

Kidney cancer is cancer that begins in the kidneys. Your kidneys are two bean-shaped organs, each about the size of your fist. They're located behind your abdominal organs, with one kidney on each side of your spine.

In adults, renal cell carcinoma is the most common type of kidney cancer. Other less common types of kidney cancer can occur. Young children are more likely to develop a kind of kidney cancer called Wilms' tumor.

The incidence of kidney cancer seems to be increasing. One reason for this may be the fact that imaging techniques such as computerized tomography (CT) scans are being used more often. These tests may lead to the accidental discovery of more kidney cancers. Kidney cancer is often discovered at an early stage, when the cancer is small and confined to the kidney.

Over the past decade, our understanding of the biology and pathophysiology of renal cell carcinoma (RCC) has improved significantly. Insight into the disease process has helped us in developing newer therapeutic approaches toward RCC. In this article, we review the various genetic and immune-related mechanisms involved in the pathogenesis and development of this cancer and how that knowledge is being used to develop therapeutic targeted drugs for the treatment of RCC. The main emphasis of this review article is on the most common genetic alterations found in clear cell RCC and how various drugs are currently targeting such pathways. This article also looks at the role of the immune system in allowing the growth of RCC and how the immune system can be manipulated to reactivate cytotoxic immunity against RCC.

Kidney cancer is one of the 10 most common cancers in the United States with 90% being attributed to renal cell carcinoma. Men, especially black men, are more likely to be affected than women. Renal masses, either cystic or solid, are best detected with contrast-enhanced, triple-phase computed tomography. Renal tumors are often detected incidentally during a computed tomography scan of the abdomen or chest that was ordered for unrelated symptoms. Hematuria serves as a warning sign that necessitates further evaluation and imaging leading to a diagnosis and treatment plan. Treatment options include active surveillance, ablation, nephron-sparing tumor excision, nephrectomy, and systemic treatment. Predictors of a poor prognosis include poor functional status and metastasis. In recent years new therapies have improved the prognosis for patients with metastatic disease. The family physician should be aware of risk factors (e.g., hypertension, tobacco use, exposure to trichloroethylene, familial syndromes) and lifestyle and dietary modifications that may reduce risk.

Renal cell carcinoma (RCC) is the most common type of kidney cancer in adults and represents approximately 80% of renal neoplasms. It is described as being among the most lethal of all the urological cancers. It is a collection of different types of neoplasms, each derived from the various parts of the nephron (epithelium or renal tubules) and possessing distinct genetic characteristics, histological features, and to some extent, clinical phenotypes. Historically, medical practitioners expected a person

to present with classic triad is hematuria, flank pain, and an abdominal mass, similar to bloating but larger. It is now known that this classic triad of symptoms only occurs in 10-15% of cases, and is usually indicative that RCC is in an advanced stage. Other signs and symptom may include; malaise, weight loss and/or loss of appetite, erythrocytosis due to increased erythropoietin secretion, varicocele, which is seen in males as an enlargement of the tissue at the testicle (more often the left testicle) hypertension resulting from secretion of renin by the tumor; hypercalcemia, which is; sleep disturbance or night sweats; recurrent fevers; and chronic fatigue, anemia resulting from depression of erythropoietin. Today, RCC is often asymptomatic (meaning little to no symptoms) and is generally detected incidentally when a person is being examined for other ailments. Although association with anemia is reported in one third of patients with renal cell carcinoma. Initial treatment is most commonly a radical or partial nephrectomy and remains the mainstay of curative treatment.

Significant stage migration of RCC at presentation due to earlier detection of smaller renal masses and greater life expectancy with novel treatment strategies associated with unique adverse effects offer fertile ground for research aimed at improving patient survival and understanding the molecular biology of RCC. A significant proportion of RCC patients with metastatic disease at presentation call for reliable screening biomarkers. Increased levels of markers of programmed cell death or altered angiogenesis such as cytokeratins or (PHD3) antibodies, respectively, have been detected in the serum of RCC patients.