

## Oncology

## Renal Cell Carcinoma in a Pregnant Woman With Horseshoe Kidney



Anna Scavuzzo, Zael Santana Rios, Cristobal Diaz-Gomez, Beatriz Varguez Gonzalez, Victor Osornio-Sanchez, Edgar Bravo-Castro, Edgar Linden-Castro, Pedro Martinez-Cervera, Miguel Angel Jimenez-Rios\*

Department of Urology, Instituto Nacional de Cancerologia, Mexico City 14080, Mexico

## ARTICLE INFO

## Article history:

Received 31 October 2015

Accepted 4 November 2015

## Keywords:

Clear cell carcinoma  
Horseshoe  
Nephrectomy  
Pregnancy

## ABSTRACT

To our knowledge, this is the first reported case of renal cell carcinoma in kidney horseshoe diagnosed in the second trimester of pregnancy. We performed open radical nephrectomy when the pregnancy was completed. Kidney cancer is rare during pregnancy and the symptoms can be mimic urinary infection. The diagnosis and its management can be a challenge.

© 2016 Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## Introduction

The cancer during gestation is a rare phenomenon with incidence of 1:1000 pregnancies approximately.<sup>1</sup> The most frequent tumors that affect pregnant women are cervical cancer, breast cancer, lymphomas and acute leukemias and melanoma. Less common malignancies are gastrointestinal, urological and lung cancers.<sup>2</sup>

Renal cell carcinoma (RCC) is the most common urological cancer during pregnancy, followed by bladder cancer and adrenal tumors, especially pheochromocytoma. Ureteral and urethral malignancies, and other malignancies that involve the urinary tract, are rare during pregnancy.<sup>3</sup>

We present kidney tumor found in a pregnant woman.

## Case report

A woman aged 37, gravida 4, para 3, was referred to our hospital by an obstetrician who had diagnosed a mass in her right kidney at 26th weeks' gestation. She had previous history of hypertension and gestational diabetes mellitus. The mass has been detected after onset of hematuria and urinary tract infection during second trimester. Blood count, urea, creatinina and electrolytes were normal. Renal ultrasonography revealed a 8 cm solid mass, heterogeneous echotexture, arising from mid to lower pole of the right

kidney. To assess the nature of the mass further, MRI was performed and showed right solid, heterogeneous renal mass in the lower pole and middle upper pole of horseshoe kidney. There was no evidence of surrounding soft tissue invasion, of retroperitoneal lymph node enlargement or infiltration IVC (Fig. 1).

The patient's hematuria resolved spontaneously. After discussion with the patient, it was decided to adopt a conservative approach to management until delivery. She continued the pregnancy until 35 weeks' gestation; a 2150 g boy was born with Apgar scores of 9 at 1 minute and 9 at 5 minutes.

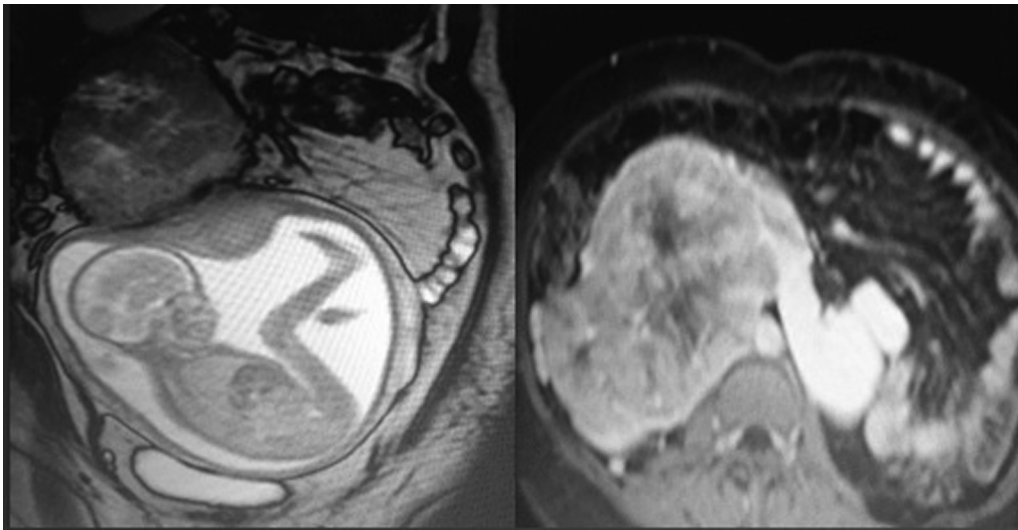
The woman underwent a right radical nephrectomy at 4 weeks after cesarean section. Surgery was performed through a midline transperitoneal incision.

After mobilization of the right colon and duodenum, the horseshoe kidney was exposed; the right ureter was dissected off the mass (Fig. 2).

The right renal hilum was exposed and divided. The isthmus was divided and remaining portion was closed with running suture (Fig. 3).

Operative time was 2 hours. The estimated blood loss was 1500 cc, the patient required transfusion of 3 units of packet red blood cells. She did experience severe hypertension during initial postoperative recovery, so she treated with alpha methyl dopa 50 mg every 8 hours, hydralazine 50 mg every 6 hours and nifedipine 20 mg every 12 hours. Postoperative hemoglobin concentration was 10.5 g/dL, HT 32%, leukocytes  $8.2 \times 10^3/\mu\text{L}$ , platelet count nadir was 169 ( $10^3/\mu\text{L}$ ), lactate dehydrogenase 600 (U/L), creatinine 0.83 mg/dL, normal liver enzymes.

\* Corresponding author. Tel.: +52 56280400x60550; fax: +52 5655 1693.  
E-mail address: [drmajr@prodigy.net.mx](mailto:drmajr@prodigy.net.mx) (M.A. Jimenez-Rios).



**Figure 1.** MRI, kidney horseshoe with renal tumor on the right side.

She was discharged home postoperatively after 5 days with indication of nifedipine 20 mg every 8 hours.

Histopathological examination revealed clear-cell renal carcinoma, Furhman grade 2 with maximum diameter of 14 cm, there was no invasion of the renal capsule and with necrosis. Pathological staging was T2b, Nx, M0.

### Discussion

Cancer in pregnancy seems be more common over the last thirty years, the main reason being the increasing number of women childbearing at older age.<sup>2</sup> Despite the current tendency of women to bear children at more advanced ages, renal malignancies is rarely diagnosed during pregnancy; approximately 102 cases have been reported in medical literature.<sup>4</sup>

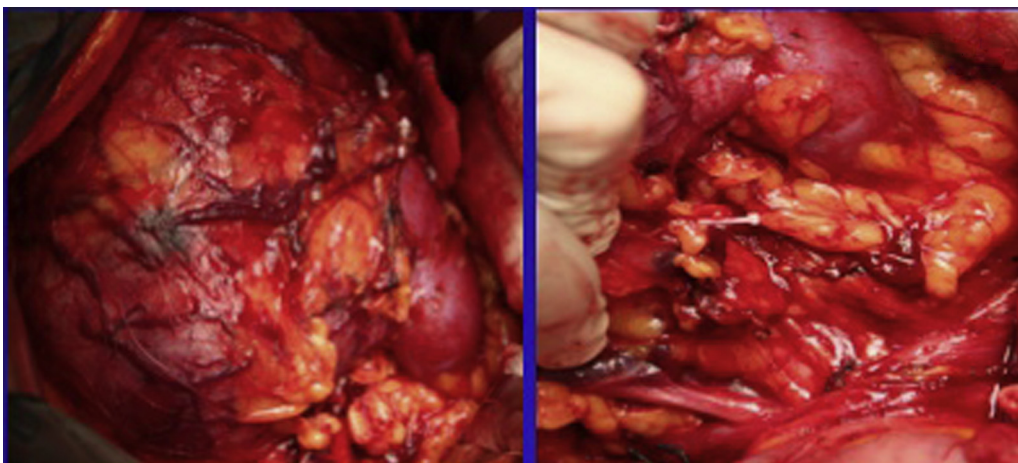
The incidence of RCC in pregnant women is only partially explained by increasing maternal age; in Sweden study, there is positive association between parity and the risk of renal cancer: compared to nulliparous women, the risk was nearly two times higher between women with five or more live births.<sup>5</sup>

The risk of renal cancer in pregnancy could be explain by three mechanisms<sup>6</sup>: 1) increment in BMI, and increased risks of

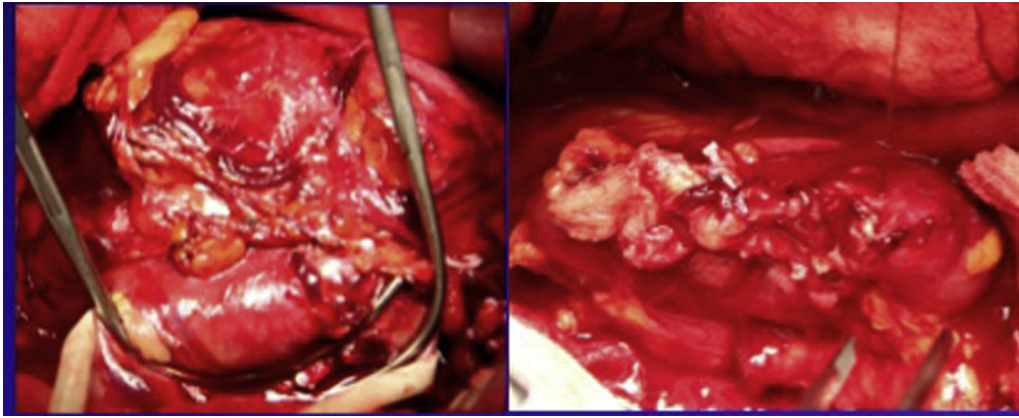
hypertension and diabetes are factors to the development of renal malignancy; 2) pregnancy is characterized for new tissues and vascular structure and the associated increase in angiogenesis might have a role in the genesis of RCC<sup>6,7</sup>; 3) there is in model animal, evidence of association between estrogen and progesterone on renal cancer.

The pregnant women can be present typical symptoms of renal cancer or diagnosed incidentally on routine abdominal ultrasound.

In a recent review, Boussios and Pavlidis found that the primary presentation of renal cell carcinoma in pregnancy were pain and hematuria; while triad of pain, palpable mass, and hematuria was present in 26% of cases, followed by hypertension in 18% of the patients.<sup>4</sup> Symptoms of RCC, such as pain, hematuria, hypertension during gestation may mimic symptoms of common pregnancy-related disorders. Hematuria in pregnancy is usually due to non-neoplastic causes. Hypertension, such as symptom of RCC in pregnancy, represents a diagnostic dilemma because hypertension is often seen in pregnancy and may mimic pre-eclampsia.<sup>4</sup> Obstetricians in the presence of loin, abdominal pain, hematuria or hypertension keep in mind in diagnostic evaluation with a full abdominal ultrasound to allow early diagnosis of malignancies.



**Figure 2.** Tumor on the horseshoe kidney during the surgery.



**Figure 3.** Suture' isthmus.

Evaluation of hematuria in pregnant women includes urinalysis, urine culture and cytology, abdominal ultrasound, and cystoscopy. MRI without contrast can be performed when ultrasound is non diagnostic. In cases of indeterminate masses, diagnosis can be performed on the basis of ultrasonography guided biopsy; if the mass will be inflammatory or benign, the pregnancy can be continued with close radiological follow-up.<sup>7</sup>

The standard treatment reported in series cases was open radical nephrectomy, nephron-sparing surgery and laparoscopic approach in few patients.<sup>4</sup>

There are several practical considerations when treating RCC in pregnancy.

The safety of the mother should always be a priority, though management must take into her wishes regarding health of unborn child.

The timing of surgery depends on by biological behavior of the tumor and neonatal survival rates for different gestations.

The average growth of RCC is 0.28 cm per year, and tumor doubling time is around 300 days, 72 weeks.<sup>6,7</sup> The majority of small renal masses have a slow growth rate and do not need urgent intervention, and can be safely observed until the pregnancy is completed, or up to 28 weeks.<sup>6</sup> Although it has been described a case of a fatal fast-growing RCC diagnosed in the second trimester of pregnancy and increasing three-fold in size over 14 weeks.<sup>8</sup>

When surgery is performed during the first trimester, there is increased risk the life of the fetus; whereas surgical treatment in

the second and third trimester is considered to be reasonable and safe after careful consideration of the maternal and fetal.<sup>6</sup> In our case, we think that it is advisable to continue the pregnancy.

#### **Conflict of interest**

None of the contributing authors have any conflict of interest, including specific financial interests or relationships and affiliations relevant to the subject matter or materials discussed in the manuscript.

#### **References**

1. Pavlidis N. Cancer and pregnancy: what should we know about the management with systemic treatment of pregnant women with cancer? *Eur J Cancer*. 2011;47:348–352.
2. Pentheroudakis G, Pavlidis N. Cancer and pregnancy: poena magna, not anymore. *Eur J Cancer*. 2006;42:126–140.
3. Martin FM, Rowland RG. Urologic malignancies in pregnancy. *Urol Clin North Am*. 2007;34:53–59.
4. Boussios S, Pavlidis N. Renal cell carcinoma in pregnancy: a rare coexistence. *Clin Transl Oncol*. 2014;16:122–127.
5. Lambe M, Lindblad P, Wu J, et al. Pregnancy and risk of renal cell cancer: a population-based study in Sweden. *Br J Cancer*. 2002;86:1425–1429.
6. Khochika MV. Management of urological cancers during pregnancy. *Nat Rev Urol*. 2010;7:195–205.
7. Lee JY, Kim CK, Choi D, Park BK. Volume doubling time and growth rate of renal cell carcinoma determined by helical CT: a single-institution experience. *Eur Radiol*. 2008;18:731–737.
8. Bettez M, Carmel M, Temmar R, et al. Fatal fast-growing renal cell carcinoma during pregnancy. *J Obstet Gynaecol Can*. 2011;33(3):258–261.