Renal Tumor in Pregnancy: A Case Report and Review of the Literature

Csaba Berczi M.D., PhD; Tibor Flasko M.D., PhD

Department of Urology, University of Debrecen, Hungary

Running title: renal tumor in pregnancy

Key words: pregnancy, renal tumor, nephrectomy, partial nephrectomy, laparoscopy

Corresponding author: Csaba Berczi M.D., PhD
Department of Urology, University of Debrecen
Nagyerdei krt. 98, Debrecen, Hungary, H-4032
E-mail: berczi@med.unideb.hu
Fax: + 36 52 255256

Abstract

The authors present their renal tumor cases observed during pregnancy and review the literature related to this topic.

Between 01 January 2000 and 01 January 2015, altogether three patients were treated for renal tumor during pregnancy. Two of them had surgery performed during pregnancy, while in the other premature birth of the baby preceded surgery.

In the first case a laparoscopic tumor resection was performed in the 29th week of her pregnancy. In the second case a transperitoneal radical nephrectomy was carried out during the 10th week of pregnancy. In the case of the third patient a caesarean section was performed during the 32nd week of gestation, and then followed later by surgery for the metastatic renal tumor. However, the tumor was found to be inoperable.

Introduction

Malignant renal tumors occurring in pregnancy are extremely rare and only a few cases have been reported so far [1]. In the cases of renal tumors occurring in pregnancy the diagnostic possibilities are limited, thus, instead of the conventional CT scan an MRI examination is usually carried out in order to avoid exposure of the foetus to radiation. If imaging procedures confirm the presence of a renal tumor, then radical nephrectomy or tumor resection is generally recommended. The operation can be performed by an open surgery or a laparoscopic procedure [2-6]. The timing of the surgery is also very important, and depends on the stage of the pregnancy, as well as on the size of the tumor [7].

Case report

Case 1

In the first patient aged 26, an ultrasound examination showed a small tumor in the right kidney during the 23rd week of pregnancy. A subsequent MRI examination depicted a 2 cm structure in the kidney. An ultrasound guided renal biopsy was performed with histology showing chronic pyelonephritis. However, a repeat MRI examination following an antibiotic treatment still depicted the 2 cm mass in the kidney. The patient was therefore referred to our department. During the 27th week of the pregnancy an ultrasound guided renal biopsy was again performed with the histology showing a suspected case of malignancy. Thus, at the 29th week of the pregnancy a laparoscopic retroperitoneal tumor resection was carried out.
Histology revealed papillary type renal cell carcinoma (pT1, Grade: I).
No other complications occurred during the later course of the pregnancy.
Eight years of follow-up has not revealed any recurrence of tumor.

Case 2

At the 9th week of pregnancy of the second patient, aged 24, ultrasound examination showed a 14.5 cm sized tumor in the right kidney. Consequently, an MRI examination was performed, which confirmed the diagnosis of a tumor (Figure 1).
Taken into consideration her early stage of pregnancy and the size of the tumor it was decided that surgery be performed immediately. So at the 10th week of pregnancy a transperitoneal radical nephrectomy was carried out.
No complications occurred during the postoperative period.

The histological examination revealed a chromophobe renal tumor (pT2b, Grade: III). Eleven months have elapsed since the radical nephrectomy and the follow-up examinations showed no recurrence of the tumor.

Case 3

A routine ultrasound on the 3rd patient, a 33-year-old lady in her 29th week of pregnancy showed a large left kidney tumor. According to the MRI examination performed subsequently the tumor had spread from the renal hilus to the iliac vessels. An ultrasound guided biopsy was then performed, but the histology could not be evaluated. Considering the fact that the patient was already in last trimester of pregnancy the baby was delivered by a Caesarean section during the 33rd week of pregnancy. During the Caesarean section a sample was also taken from the tumor, for which the histology confirmed a papillary type renal tumor.
A CT scan performed following the Caesarean section showed a tumor thrombus extending into the inferior vena cava, as well as lung metastases.
During the surgery a locally advanced tumor was found, which could not be removed.

Discussion

Renal cell tumor occurring in pregnancy is a rare phenomenon [2].

Most frequently such renal tumors are discovered during routine ultrasound examinations in pregnancy. Less frequently they are diagnosed during examinations carried out due to patient's complaints [1,3,5,8].

Diagnostic procedures which can be performed in pregnancy are limited. Ultrasound is most frequently used, but CT is usually avoided, because it has both teratogenic and carcinogenic effects on the developing foetus [9]. For these reasons, ultrasound examination is usually followed by an MRI during pregnancy.

In the case of a renal tumor occurring in pregnancy radical nephrectomy or partial nephrectomy can be applied depending on the size of the tumor. All surgery types can be performed using the transperitoneal or extraperitoneal approach, or open surgery, laparoscopy or robotic assisted laparoscopy, as well.

Although the laparoscopic procedure is gradually replacing open surgical interventions in the case of renal tumors, yet in surgeries performed during pregnancy this approach is not generally applied. Nevertheless, in recent years more and more reports of laparoscopic surgical interventions are being published with regard to renal tumors diagnosed in pregnancy [2,3,5,6].

Besides the numerous advantages of the laparoscopic technique it is disadvantageous when applied on the growing uterus because of difficulties in handling the equipment, and consequently a greater risk of injury to the uterus. The artificially formed pneumoperitoneum increases the intraabdominal pressure, which by falling on the blood vessels reduces the blood supply of the uterus, the cardiac output and maternal venous return [3].

With regard to surgeries performed during pregnancy the time at which it is performed is crucial, and also depends greatly on the gestational age.

If the renal cancer is discovered in the first trimester, the surgery should not be postponed [7]. If on the other hand the tumor is diagnosed in the second trimester, then it is worth waiting until week 28, when the lungs of the foetus would have adequately matured. Furthermore, surgeries performed in the second trimester are predisposed to uteric contractions, which may result in foetal distress or spontaneous labour.

Resection of a tumor discovered in the third trimester is usually recommended together with a Caesarean section. If the tumor is discovered near to the expected date of labour, then the surgery may be postponed until the labour.

During surgery in pregnancy competent anaesthesia must be provided for both mother and child. Safety of the foetus requires avoidance of potentially harmful drugs at critical times of foetal development, maintenance of stable maternal hemodynamic parameters to provide adequate uteroplacental circulation, and avoidance of preterm labour.

All general anaesthetic drugs cross the placenta and there is no optimal general anaesthetic technique. Any drug given during pregnancy could potentially negatively affect the development of the foetus depending on the dosage, the route and the time of administration.

During the first 15 days of gestation an all-or nothing phenomen occurs. Between days 15 and 60 the embryo is most vulnerable to the teratogenic effects of drugs.

In conclusion, renal tumor occurs rarely in pregnancy. In our patients surgery was performed during pregnancy in two cases, and in one occasion only after the premature birth of the newborn.

Conflict of interests

The authors have no conflict of interests.

References

1. Kobayashi T, Fukuzawa S, Miura K, Matsui Y, Fujikawa K, Oka H, Takeuchi H. A case of renal cell carcinoma during pregnancy: simultaneous caesarean section and radical nephrectomy. J. Urol. 2000;165:1515–1516

2. Boussios S, Pavlidis N. Renal cell carcinoma in pregnancy: a rare coexistence. Clin Transl Oncol. 2014 Feb;16:122-7.

3. Domjan Z, Holman E, Bordas N, Dakay AS, Bahrehmand K, Buzogany I. Hand-assisted laparoscopic radical nephrectomy in pregnancy. Int. Urol. Nephrol. 2014;46:1757–1760.

4. Gnessin E, Dekel Y, Baniel J. Renal cell carcinoma in pregnancy. Urology 2000;60:1111

5. Sainsbury DCG, T. J. Dorkin TJ, Macphail S, Soomro NA. Laparoscopic radical nephrectomy in first-trimester pregnancy. Urology 2004; 64: 1231.e7–1231.

6. Yin L, Zhang D, Teng J, Xu D. Retroperitoneal laparoscopic radical nephrectomy for renal cell carcinoma during pregnancy. Urol Int. 2013;90:487-9.

7. Loughlin, K. R. The management of urological malignancies during pregnancy. Br J Urol. 1995;76: 639.

8. Schnoller TJ, Jentzmik F, Al Ghazal A, Zengerling F, de Petriconi R, Hefty R, Rinnab L, Schrader M, Schrader AJ. Renal masses in pregnancy. Diagnostics and therapeutic management. Urol. A. 2011;50:1064–1067.

9. Wang PI, Chong ST, Kielar AZ, Kelly AM, Knoepp UD, Mazza MB, Goodsitt MM. Imaging of Pregnant and Lactating Patients: Part 1, Evidence-Based Review and Recommendations. AJR 2012; 198:778–784.

Legend for Figure

Figure 1

Renal tumor in a pregnant patient. Coronal MRI image shows the renal tumor and the embryo in the uterus.

Figure 1