Partial Nephrectomy for Multiple Renal Cell Carcinoma in a Patient with Solitary Kidney

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Abstract

Introduction and Objectives. Renal cell carcinoma (RCC) represents about 3% of all cancers. The classic triad of flank pain, palpable abdominal mass and hematuria, is present in less than 10% of patients and as many as 60% of renal masses are detected incidentally. The treatment methods for renal tumors include radical nephrectomy and partial nephrectomy. Partial nephrectomy or nephron-sparing surgery (NSS) is considered the treatment of choice for localized small renal masses with oncological outcome in cases of renal cell carcinoma (RCC) similar to that of radical nephrectomy (RN). The aim of this paper is to present partial nephrectomy as a treatment method in a patient with multiple renal cell carcinoma on a solitary kidney.

Materials and Methods. A 59 years old male patient who referred to our clinic with three renal masses on the left kidney. The patient had a history of right radical nephrectomy, performed 7 years prior, for a pT3aNxMx RCC. We opted for an open partial nephrectomy in order to preserve as much of the renal parenchyma as possible and avoid dialysis. After performing a left subcostal incision, we dissected the kidney and were able to identify the renal masses on the lower extremity of the kidney .After clamping the renal vessels we performed a wedge resection for all three tumors, while also being careful to keep a maximum amount of healthy renal tissue intact. We sutured the kidney and after adequate hemostasis, two drainage tubes were inserted using a small incision and the surgery was completed.

Results. The operative time was 90 minutes with a warm ischemia time of 20 minutes. No major complications were encountered in the postoperative setting. The patient was discharged on the 8th postoperative day, with a subsiding creatinine level (from 3.49 mg/dL at the 48 hour mark to 1.79 mg/dL) and subsequent follow-ups have been nominal. The histopatological examination revealed clear cell renal carcinoma pT(m)3a pNx pMx.

Conclusions. Nephron sparing surgery should always be considered when managing patients with renal tumors, especially in cases of solitary kidneys, in order to maintain normal renal function and avoid dialysis. While laparoscopic partial nephrectomies are feasible for patients with multiple RCCs, they should be avoided in solitary kidney cases, due to a longer warm ischemia time and higher blood loss when compared to the open approach. Open partial nephrectomy is the preferred approach for these types of patients at high risk for chronic kidney disease.

Key-words: solitary kidney, renal cell carcinoma, partial nephrectomy

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Introduction and Objectives

Renal cell carcinoma (RCC) represents about 3% of all cancers [1], with an increased incidence in recent years, especially due to the improvement of diagnosis techniques and the subsequent incidental detection of renal masses. The classic triad of flank pain, palpable abdominal mass and hematuria, is present in less than 10% of patients, and among those patients that are symptomatic, 30% already are at a metastatic stage at the moment of diagnosis [2, 3].

As many as 60% of renal masses are detected incidentally, and many of these tumors are smaller, less likely to metastasize and are often amenable to nephron sparing surgery [4]. The treatment methods for renal tumors include radical nephrectomy and partial nephrectomy. Partial nephrectomy or nephron-sparing surgery (NSS) is considered the treatment of choice for localized small renal masses with oncological outcome in cases of renal cell carcinoma (RCC) similar to that of radical nephrectomy (RN) [5].

The presence of a tumor in a solitary kidney represents a mandatory indication for partial nephrectomy. Those patients who underwent radical nephrectomy on one side, and have developed a renal tumor on the contralateral kidney are considered high risk patients by most urologists, mainly due to the risk of developing end-stage renal disease and they are usually referred to tertiary care centers.

The aim of this paper is to present partial nephrectomy as a treatment method in a patient with multiple renal cell carcinoma on a solitary kidney.

Materials and Methods

We present the case of a 59 years old male patient who was referred to our clinic with three renal masses on the left kidney. The patient had a surgical history of right radical nephrectomy, performed 7 years prior, for a pT3aNxMx RCC. The patient reported no hematuria, no weight loss or back pain. Physical examination findings were insignificant, with normal blood pressure and no abdominal sensitivity and with an ECOG performance status of 0. The laboratory data were as follows: hemoglobin, 15.1 g/dL; hematocrit 44.7%; blood urea nitrogen 42.2mg/dL; creatinine 1.21 mg/dL. The CT scan revealed three renal masses measuring up to 34 x 42 x 32 mm, located posteriorly on the lower pole and having a RENAL score of 9.

We opted for an open partial nephrectomy. After the induction of general endotracheal anesthesia a nasogastric tube was inserted in order to decompress the stomach during surgery. After inserting a Foley catheter in order to drain the bladder, we placed the patient in a right lateral decubitus position (Fig. 1) and we performed a left subcostal incision, just below the 12th rib. We dissected the kidney and after identifying the renal artery we placed a tourniquet around it (Fig. 2).

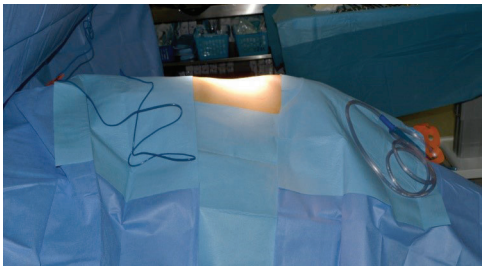


Figure 1. Placement of the patient in a right lateral decubitus postion

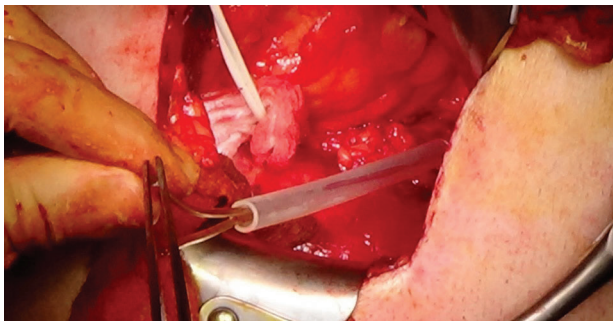


Figure 2. Placing a tourniquet on the renal artery

The renal fat of the lower pole was carefully dissected and we were able to identify the three renal masses and we circumferentially marked them with the electrocautery (Fig. 3). In order to exclude the presence of other renal masses without expression on the surface of the parenchyma we performed an intraoperatory ultrasound (Fig. 4), that showed no other tumor present inside the kidney.

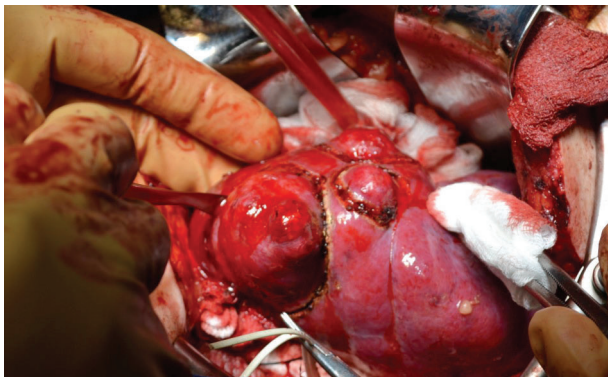


Figure 3. The dissection of the three renal tumors

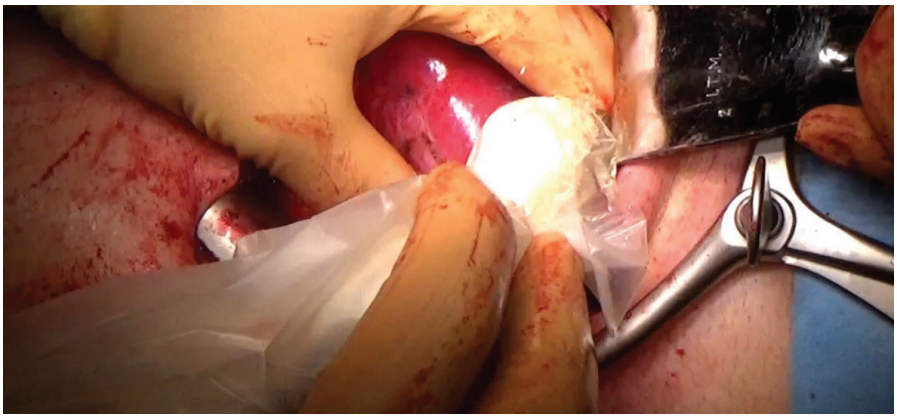


Figure 4. Intraoperatory ultrasound

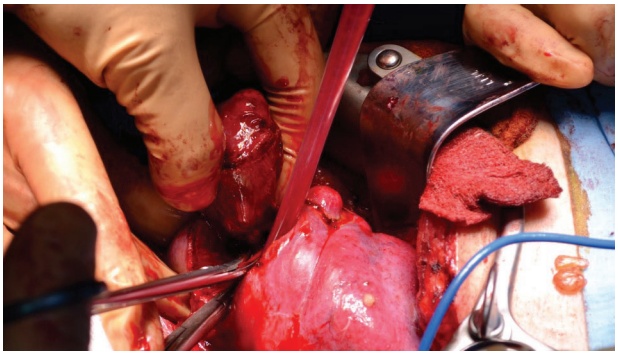


Figure 5. Wedge resection of the renal tumors

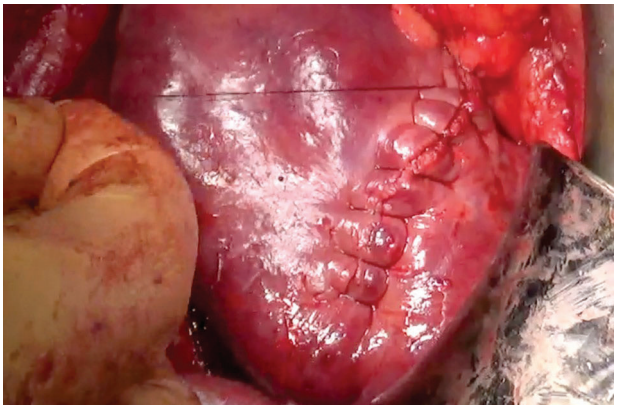


Figure 6. Suture of the renal parenchyma

We performed a wedge resection for all three renal tumors (Fig. 5), while also being careful to keep a maximum amount of healthy renal tissue intact. We sutured the kidney using 3.0 PDS wires in a double layered manner (Fig.6), and after ensuring that adequate hemostasis was achieved, we declamped the kidney with no important blood loss being encountered and without the need of additional sutures or hemostatic material. Two drainage tubes were inserted near the kidney using a small incision and the surgery was completed.

Results

The operative time was 90 minutes. There were no intraoperative complications or incidents encountered. Warm ischemia time was 20 minutes. Blood loss was approximately 300 ml. No major complications were encountered in the postoperative setting. Prior to the surgery the patient had a blood creatinine of 1.21 mg/dL. After the intervention, the creatinine level began to rise up to 3.49 mg/dL at the 48 hour mark, then subsiding the following days to 1.79 mg/dL. The patient was discharged on the 8th postoperative day, and subsequent follow-ups have been nominal. The histopathologic examination revealed clear cell renal carcinoma pT(m)3a pNx pMx.

The follow-up of the patient will include clinical evaluation, blood biochemistry, thoraco-abdominal CT scans at 3, 6, 12, 18, 24, 60 months then yearly up to 5 years and afterwards every two years.

Discussions

Renal cell carcinoma represents 2-3 % of the total neoplasms, with an increasing incidence during the last years, mainly due to the increased use of ultrasonography and computed tomography in patients. Risk factors involved in the ethiology of RCC include: smoking, obesity, arterial hypertension and chronic kidney disease (CKD). Classifications of RCC include clear cell, chromofobe, papillary, collecting duct and unclassified RCC [6]. The standard treatment for renal tumors is represented exclusively by the surgical excision of the tumor. The gold standard technique for partial nephrectomy consists in the tumor removal with an adequate safety margin of healthy renal parenchyma [7]. Partial nephrectomy is the right choice for patients with small renal masses (T1) as it minimizes the risk of chronic kidney

disease or CKD progression [8], and avoids its complications (such as anemia, osteoporosis, the need for hemodialysis, renal transplant [9]). It is highly recommended in patients with solitary functional kidney or bilateral renal tumors. Mir et. al.[10] revealed, in study that involved more than 11000 patients with T1b and T2 renal tumors, that nephron sparing surgery achieved lower rates of tumor recurrence and mortality compared to radical nephrectomy.

A solitary kidney with renal cell carcinoma is an imperative indication for nephron sparing surgery. In this setting radical nephrectomy renders the patient anephric, requiring hemodialysis or renal transplantation. In these difficult cases (including large tumors, centrally located tumors, multiple tumors, tumors with a RENAL score of 9 or 10) all surgical efforts should be made to preserve as much healthy renal parenchyma as possible and try to avoid dialysis.

Conclusions

If possible, nephron sparing surgery should always be considered when managing patients with renal tumors, especially in cases of solitary kidneys, in order to maintain normal renal function and avoid dialysis. While laparoscopic partial nephrectomies are feasible for patients with multiple RCCs, they should be avoided in solitary kidney cases, due to a longer warm ischemia time and higher blood loss when compared to the open approach. Therefore, open partial nephrectomy is the preferred approach for these types of patients at high risk for chronic kidney disease.

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