

# Evaluation of patients who underwent radical nephrectomy due to renal tumor

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**Abstract.** The aim of the present study was to evaluate the results of the cases that underwent radical nephrectomy due to renal cell carcinoma (RCC) and to discuss the results together with the literature. Eighty-three patients (51 males), who underwent radical or partial nephrectomy because of renal tumor between 2005 and 2011 were retrospectively evaluated. 70 patients underwent open radical nephrectomy and 13 patients underwent open partial nephrectomy. With regard of tumor localization, 50 were localized in the left and 33 were localized in the right kidney. Tumor sizes varied between 2 cm to 16 cm. According to the subtypes of RCC, five-year survival rate was 72% for clear cell, 80% for papillary carcinoma, 66.6% for chromophobe, and 71.4% for other malignant lesions. Five-year disease specific survival rates of the patients with T1, T2, T3, and T4 renal carcinoma were 91.3%, 87.5%, 50%, and 0%, respectively.

Radical nephrectomy is the standard method for the treatment of RCC. Survival rate in the patients with renal tumor is directly associated with the tumor stage.

Key words: Radical nephrectomy, tumor size, renal tumor, subtypes of RCC

## 1. Introduction

Renal cell carcinoma (RCC) accounts 2%-3% of adult malignant tumors and approximately 85-90% of all parenchymal renal tumors. It is the third most common cancer of genitourinary system tumors following prostate and bladder tumors. It can also cause deaths among the urologic tumors (1,2). More than 40% of the patients with RCC die because of cancer (1).

RCC is the most common cancer in both genders among 15 malignancies and the incidence has been continuously increasing since 1975 (2). The most important reason for the increasing is the developments in imaging techniques and the common use of these techniques, which have surely resulted in considerable changes in the diagnosis and therapeutical strategies of the disease. In spite of the varying ratios in the

literature, five-year disease-specific survival rate is approximately 95% in the patients with T1 renal cancer, 88% in T2, 59% in T3, and 20% in T4 renal cancers. More than 40% of the patients with RCC die of cancer (1). Aim of this study was to evaluate the outcomes of masses surgery for renal tumors.

## 2. Materials and Methods

The medical records of 83 patients (51 males), who underwent radical or partial nephrectomy between 2005 and 2011 because of renal tumor were retrospectively evaluated. The age range was 25-79 years for males (mean age: 63.5 years) and 31-75 years for females (mean age: 65.4 years). 70 patients underwent open radical nephrectomy and 13 patients underwent open partial nephrectomy. The five-year survival rates could be evaluated only for 45 patients.

## 3. Results

When the tumor localization of the patients was evaluated, it was found that lesions in 50 patients (60.3%) were localized in the left and lesions in 33 patients (39.7%) were localized in the right kidney. Tumor sizes changed between 2 cm and 16 cm. Tumor diameter was  $\geq 4$  cm in 4, 4-7 cm in 31, 7-10 cm in 26, and  $\geq 10$  cm in 22 cases. Of the

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Table 1. Tumor diameters of the patients undergoing radical nephrectomy

Tumor diameter (cm)	Number of the patients with benign lesion	Number of the patients with malignant lesion
≥4	2	2
4-5	7	8
5-7	4	12
7-10	-	26
≥10	-	22

Table 2. Five-years survival rates of the patients with malignant lesions

	Cases (n)	Those completed 5 years duration (n)	Those alive (n)	5-years survival rate
TNM stage				
1	46	23	21	91.3%
2	15	8	7	87.5%
3	5	2	1	50%
4	4	2	0	0%
Histological				
Conventional (clear cell) RCC	44	25	18	72%
Papillary RCC	11	5	4	80%
Chromophobe RCC	5	3	2	66.6%
Other malignant lesions	10	7	5	71.4%

TNM; tumor-node- metastasis, RCC; renal cell carcinoma.

cases, 84.3% were malignant and 15.7% were benign, and the diameter of the benign lesions was <7 cm (Table 1). When the distribution of histological types of the tumor among the cases was evaluated, 44 patients had clear cell, 11 had papillary, 5 had chromophobe, 10 had other malignant lesions of the kidney, 6 had oncocytoma, 3 had angiomyolipoma, 1 had chronic pyelonephritic changes, 2 had xanthogranulomatous nephritis, and 1 had simple cyst. 20 cases were accidentally diagnosed using ultrasonography (US) and/or computed tomography (CT) imaging for any other reasons. Classical symptom triad including side pain, macroscopic hematuria and palpable abdominal mass is rarely seen in RCC. CT was performed in 34 patients, magnetic resonance imaging (MRI) in 11, US and CT in 8, and CT and MRI in 6. None of the patients underwent fine needle aspiration biopsy in this study.

The most commonly seen histological type was clear cell and the most benign lesion was oncocytoma. According to the subtypes of RCC, five-year survival rate was 72% for clear cell, 80% for papillary, 66.6% for chromophobe, and 71.4% for other malignant lesions. Moreover, five-year disease specific survival rate was 91.3% for the patients with T1 renal cancer, whereas it

was 87.5% for those with T2, 50% for those with T3 and 0% for those with T4 renal cancer (Table 2).

#### 4. Discussion

Renal tumors account for 2%-3% of overall adult tumors and 85%-90% of solid renal lesions (3). They are more prevalent among males (male/female ratio ranges between 1.5/1-2/1). It is most frequently seen between the ages 60-70 years. Known risks factors for renal tumors include smoking, obesity, and hypertension (4). The incidence of RCC is constantly increasing every year and more than 1/3 of the new cases are diagnosed when metastasis have already occurred (5,6). In the present study, male-female ratio was 1.5/ 1 and the mean age of the patients was 64 years.

Today, the diagnosis of more than half of the patients with RCC, who has nonspecific symptoms, is made during the examination by non-invasive imaging methods. The incidence of accidentally diagnosed cases has reached up to 60% (7). In the present study, 20 cases were accidentally diagnosed using US and/or CT imaging performed for any other reasons. Classical symptom triad including side pain, macroscopic hematuria and palpable abdominal

mass is rarely seen in RCC (8). Limited number of patients presents with symptoms due to metastatic disease such as bone pain and persistent cough (6).

The majority of renal tumors are diagnosed by abdominal US and/or CT performed due to various reasons (8). Abdominal CT assesses the tumor size and extrarenal spread, and provides information about venous involvement, regional lymph nodes, adrenal glands and the liver (9-11). can be used in cases when CT is unavailable (12-14). MRI is an option also for the evaluation of thrombus extension into the inferior vena cava and for unclassifiable renal masses (15). In the present study, CT was performed in 34 patients, MRI in 11, US and CT in 8, and CT and MRI in 6. Fine needle aspiration biopsy has a limited role in the clinical assessment of the patients with RCC and should be performed only in the selected cases (16,17). None of the patients underwent fine needle aspiration biopsy in this study.

Radical nephrectomy is a treatment method known to have the highest cure rate in the treatment of renal tumors (18). Tumor embolization is indicated in patients who are not available for surgical intervention, but it is indicated in patients with macroscopic hematuria and in patients before undergoing surgical resection due to large paravertebral metastases. Tumor embolization prior to routine radical nephrectomy is not beneficial (19,20). In spite of the clinical benefits of regional lymph node dissection in staging, which has become a part of the original technique since the year it was first defined, it is generally accepted by the authors but its therapeutic benefit is a matter of debate (21).

In RCC, the rates of survival without recurrence and long-term survival after nephron-preserving surgery in patients with a single tumor largest diameter < 4 cm are similar to those observed after radical surgical procedures (22). In some series, nephron-preserving surgery has been performed even in the patients with a tumor diameter up to 7 cm and equivalent oncological outcomes to those of radical approach have been observed. In the present study, 13 patients whose tumor size was < 7 cm, underwent partial nephrectomy. A minimal tumor-free surgical margin after nephron-preserving resection in renal tumors seems to be adequate to prevent local recurrences.

Laparoscopic nephrectomy for RCC has become a worldwide method until now from the time it was first performed. Retroperitoneal or transperitoneal laparoscopic nephrectomy should

provide the similar oncological principals to the open surgical procedures. Morbidity rate is lower in laparoscopic radical nephrectomy as compared to the open surgery. Tumor control rates seem to be equivalent to the open radical nephrectomy in the cases with T1-T2 tumors, as well as in the cases with T3a tumors when performed by experienced surgeons. Laparoscopic partial nephrectomy may be an alternative to the open nephron-preserving surgery in the hands of experienced surgeons and in well selected patients (23). Non-surgical therapies, percutaneous and minimal invasive techniques performed together with imaging methods such as percutaneous radiofrequency (24), microwave ablation, laser ablation, and high-intensity focused ultrasound (HIFU) have been propounded as alternative methods to the surgical treatment of RCC (25). It has been shown that immunotherapy combined with radical nephrectomy provides significantly higher survival rates as compared to the immunotherapy alone in the patients with metastatic RCC (26).

There are some factors, such as anatomic, histological, clinical and molecular, affecting the prognosis of renal tumors. Anatomical factors include tumor diameter, venous invasion, renal capsule invasion, adrenal involvement, lymph node involvement, and presence or absence of distant metastasis. In the present study, an association was detected between tumor diameter and malignancy. Histological factors include Fuhrman grading, RCC subtypes, sarcomatoid appearance, microvascular invasion, tumor necrosis, and collector system invasion (27). Tumor limited to the kidney is associated with better prognosis. In spite of the varying ratios in the literature, five-year disease-specific survival rate is approximately 95% in the patients with T1 renal cancer, 88% in T2, 59% in T3, and 20% in T4 renal cancers (6). In the present study, five-year disease-specific survival rates were 91.3%, 87.5%, 50%, and 0% in those with stage T1, T2, T3, and T4, respectively and partially different from the literature. The fact that the five-year survival rate of those with stage T4 was 0% might be attributed to the small number of patients. The diameter of renal tumors is a guide in assessing whether the tumor is malignant or benign. Diameters of the majority of benign masses are < 7 cm, as was in the present study (< 4 cm). Therefore, tumor diameter should be taken into consideration for the radiological differential diagnosis. There is an association between tumor diameter and malignancy (28). In the literature, the prevalence of benign renal lesions following the surgery varies between 14% and 21.1%;

however, it has been found 12.8% as well (29). In the present study, 15.7% patients had benign renal lesions.

The main subtypes of RCC include conventional clear cell (80%-90%), papillary (10%-15%) and chromophobe (4%-5%). In the present study, clear cell was found in 44 (62.8%), papillary was found in 11 (15.7%), chromophobe was found in 5 (7.1%), and other types were found in 10 (12%) of the patients. Many studies have shown that the prognosis is the best in the chromophobe, whereas it is the poorest in the conventional clear cell. Five-year survival rate is 73.2% in the conventional clear cell, 79.4% in the papillary, and 87.9% in chromophobe subtype (30). According to the subtypes of RCC, five-year survival rate was 72% for clear cell, 80% for papillary, 66.6% for chromophobe, and 71.4% for the other malignant lesions.

## 5. Conclusions

In conclusion, the risk for malignancy, rather than benign lesions, increases as the tumor size increases. Radical nephrectomy is the standard method in the treatment of RCC. Increasing in the tumor diameter contributes to the malign character. Survival rate of patients with renal tumors is directly associated with the tumor stage and as well as histological subtype.

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