

## RESEARCH ARTICLE

# Nature of Lesions Undergoing Radical Nephrectomy for Renal Cancer

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### Abstract

**Aim:** The aim of the present study was to evaluate retrospectively histopathologically-diagnosed lesions that were detected in the kidney after radical nephrectomy for a preoperative diagnosis of kidney cancer. **Methods:** The medical records of 83 patients (51 male, 32 female) were included. Preoperative staging was accomplished by various methods including physical examination, blood hemography and biochemistry, abdominal ultrasonography (US), chest x-ray, abdominal computed tomography (CT) and abdominal magnetic resonance imaging (MRI). **Results:** Totals of 70 patients underwent radical nephrectomy and 13 nephron sparing surgery. Of the 83 patients, 70 had malignant lesions (renal cell carcinoma, squamous cell carcinoma or other malignancies) 13 had a variety of benign lesions, the most frequently detected being oncocytoma (6), angiomyolipoma (3), xanthogranulomatous pyelonephritis (2), cortical cyst (1) and chronic pyelonephritic change (1). **Conclusion:** It was concluded that in spite of great technological developments regarding radiological imaging modalities such as US, CT and MRI, benign lesions might still be detected pathologically in patients who undergo radical nephrectomy with the preoperative diagnosis of renal cancer. But, all renal masses should be regarded as malignant and should be managed surgically otherwise proven benign.

**Keywords:** Kidney tumors - renal cell carcinoma - histopathology - benign lesions

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### Introduction

Renal cell carcinoma (RCC), the eighth most common malignancy affecting adults, accounts for between 3% and 4% solid tumors and approximately 85-90% of all parenchymal renal tumors. Among the urologic cancers, it ranks third in frequency after prostate and bladder tumors. Most tumors present in the fifth to seventh decade of life, with a median age at diagnosis of 66 years and median age at death of 70 years. However, cases detected at a young age have also been reported (Jacqmin et al., 2001; Chaan et al., 2008; Levi et al., 2008). RCC is among the most common 15 malignancies occurring in both sex and the incidence has been continuously increasing since 1975 (Edwards et al., 2005). The most important reason for the increase in the incidence is the advances in imaging techniques and the common use of these techniques, which have surely resulted in considerable changes in the diagnostic and therapeutical strategies of the disease. However, in spite of all these advances in imaging techniques, it is not possible radiologically to differentiate between the benign-malign natures of all masses. In benign masses in particular, such as focal xanthogranulomatous pyelonephritis, oncocytoma, chronic pyelonephritis and angiomyolipoma, it is difficult to establish a definite diagnosis before surgery (Remzi et al., 2007).

### Materials and Methods

Based on the retrospective assessment of the records of 83 patients (51 males and 32 females) who had been operated with the preoperative diagnosis of renal tumor, histopathologically benign lesions were determined and assessed. Before the surgical treatment, physical examination, hemogram and biochemistry, abdominal US, chest X-ray, abdominal CT and when necessary, abdominal MRI methods were used. Considering that the lesions were malign using the available imaging methods, surgical exploration was performed in patients.

### Results

This study included 51 men and 32 women. The mean age of patients at surgery was 65 years, ranging between 25 and 79. Seventy cases underwent radical nephrectomy and 13 cases underwent partial nephrectomy. Based on the pathological assessment of the patients undergoing surgical treatment with the preoperative diagnosis of renal tumor, 70 cases had malign, 13 cases had benign lesions and of the benign cases, 6 were detected to have oncocytoma, 3 were detected angiomyolipoma, 2 were detected to have xanthogranulomatous pyelonephritis, 1 was detected chronic pyelonephritic changes and one

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**Table 1. Benign Lesions Detected Pathologically in Patients Undergoing Surgical Treatment with the Preoperative Diagnosis of Renal Tumor**

Lesions	N
Oncocytoma	6
Angiomyolipoma	3
Xanthogranulomatous pyelonephritis	2
Chronic pyelonephritis	1
Simple cyst	1

**Table 2. Size of the Lesions Treated by Radical Nephrectomy**

Tumor size (cm)	Benign	Malign
<4	2	2
4-5	7	8
5-7	4	12
7-10	-	26
>10	-	22

was detected to have a simple cyst. The rate of the benign lesions was 15.7% in our series (Table 1). The tumor diameter in benign cases was < 7 cm and the sizes of the malignant lesions are summarized in Table 2.

## Discussion

RCC, the eighth most common malignancy affecting adults, accounts for between 3% and 4%, solid tumors and approximately 85-90% of all parenchymal renal tumors. RCC is more common in men than in women (ratio 2:1), Most tumors present in the fifth to seventh decade of life, with a mean age at diagnosis of 66 years and median age at death of 70 years (Jemal et al., 2007; Chaan et al., 2008; Levi et al., 2008). The standard treatment of the renal masses detected with the preoperative diagnosis of RCC is the surgical excision of the mass. As the radiological imaging methods such as US and CT become more commonly and routinely used, many renal lesions are detected accidentally without any clinical manifestations. Most of these cases are detected by investigations performed in patients presenting to the physician with non-urological complaints. Thus, the rate of the renal masses detected by the preoperative diagnosis of RCC has increased from 10% to 70%, particularly in the last 25 years (Espinosa et al., 1994; Silver et al., 2001).

As the use of radiological imaging devices became more widespread, the detection of the renal benign lesions, except RCC, increased. Some of them are detected by histopathological investigation of the nephrectomy specimens of the patients undergoing surgical treatment with the preoperative diagnosis of RCC. These benign lesions include renal adenoma, renal oncocytoma, angiomyolipoma, xanthogranulomatous pyelonephritis, renal cysts and others benign lesions (Volpe et al., 2004).

The methods used for determining the type and establishing the diagnosis of renal masses include CT, chest x-ray and MRI. Using these techniques alone or in combination, it is possible to establish a diagnosis in a considerable some of the renal masses (Remzi et al., 2009). However, the gradually increasing uses of imaging

methods such as US, CT and MRI have also increased the accidental diagnosis of asymptomatic and small RCC (Jacqmin et al., 2001). While radiological imaging methods such as US and CT have facilitated the diagnosis of solid renal masses, radiological assessment performed for diagnostic purposes prior to surgical treatment may be inadequate in certain cases (Dechet et al., 1999). In cases of focal xanthogranulomatous pyelonephritis and chronic pyelonephritis in particular, the radiological diagnosis may not always be adequate and suspected images of RCC may be observed (Silverman et al., 2006).

In many epidemiological studies investigating the renal tumor incidence between 1983 and 2000, a 285% increase in the incidence of tumors smaller than 2 cm was detected while this rate was 244% for a size of 2-4 cm, 50% for 4-7 cm and 26% for tumors larger than 7 cm (Shannon et al., 2008). We have observed that biopsy had not been included in the algorithms on renal tumor until recently. Biopsy is not routinely performed in the diagnosis of renal masses (Volpe et al., 2008). Renal biopsy is rarely required for renal masses that are planned to be treated by radical nephrectomy. Since the rate of false positive results is high in renal biopsy, the probability of it supporting diagnosis is low (Dutcher et al., 2009). Renal tumor biopsies can be used in the differentiation between the benign-malign nature of suspected masses, determination of the treatment course before ablative treatment and for monitoring. While surgical excision is the appropriate treatment for the young, healthy patients who try to avoid the risks associated with the potential uncertainties of biopsy, and older patients with high comorbidity may be administered biopsy in selecting the minimal invasive surgery or monitoring protocols (Charboneau et al., 1983; Ligato et al., 1999; Duchene et al., 2003; Eggener et al., 2004;).

In the literature, the detection of benign lesions following surgery shows variable rates, ranging between 14 and 21.1% and the most common lesions include angiomyolipoma, oncocytoma and simple cysts (Frank et al., 2003; Thompson et al., 2009). There is also another trial underlining the fact that angiomyolipoma, oncocytoma and renal adenoma are more commonly observed relative to the other benign lesions. Charboneau et al. (Licht et al., 1995) detected benign lesions in 23 of the 125 cases (18.4%) undergoing nephrectomy with the preliminary diagnosis of renal tumor. The literature reports demonstrate varying rates of benign lesions (Frank et al., 2003; Thompson et al., 2009). In our study, we also detected benign lesions of similar type and at similar rates and the rate of benign lesions was detected to be 15.7%. Studies suggests that an increase in renal tumor size is significantly associated with an increased likelihood of malignancy (Wolf et al., 1998). In our study, the diameter of the benign lesions is less than 7 cm and a majority of these varied between 4 and 5 cm in diameter.

Together with the increasingly widespread use of US and CT, the number of incidentally detected cases of angiomyolipoma is increasing. This lesion consists of fat, smooth muscle and vascular components. Although US and CT images are characteristic, sometimes it may be difficult to differentiate these lesions from the other

lipomatous tumors and RCC. In particular, the fat content can be easily detected by US and CT. The difficulty in differentiating from RCC is reported to occur in cases of angiomyolipoma with a dominant muscle component and a low fat content.

We detected angiomyolipoma in three patients in our study. Renal adenoma and oncocytoma are commonly detected in the form of small renal masses and have no pathognomonic radiological appearance for differentiation from RCC.. We detected six cases of oncocytoma in our 83-case series and we believe this number would increase with the increase in the number of cases. The renal cysts commonly observed, particularly in middle aged people represent the majority of the benign renal masses. While the simple renal cysts can be easily diagnosed with US, US may fail to diagnose complicated cysts, abscess and cystic tumors and CT or MRI may give more detailed information for differential diagnosis.. Among our patients, 48 underwent CT, 15 underwent MRI, 11 underwent US and CT, and nine underwent CT and MRI.

In conclusions, it was concluded that while RCC represents a vast majority of renal parenchymal mass lesions, the differentiation between the benign-malign type of the renal masses cannot be clearly made before surgical treatment and some of the cases undergoing radical nephrectomy with the preoperative diagnosis of renal tumor may have various pathologically benign lesions detected. The risk of malignancy is directly associated with the size of the renal mass. Since renal biopsy is not accepted for use in routine practices, all renal masses that are not detected to be benign should be considered malignant and treated with surgery.

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