The relationship between histopathology and age factor in patients who were operated for renal masses

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ABSTRACT

Objective: Renal neoplasms have a predilection to occur in older patients and they are often malignant. They may have different structural characteristics according to age groups. In our study, we have investigated age-related demographic characteristics of the patients who were operated because of suspected malignant renal masses.

Material and methods: Between 2010 and 2014, 129 patients were treated surgically for suspected malignant renal masses at our institution. These cases had undergone open radical, open partial, and laparoscopic radical nephrectomies. Patients were divided into two groups based on their ages and evaluated accordingly as Group 1 (≤ 50 years) and Group 2 (> 50 years). Groups were compared based on their clinical and pathological features.

Results: Group 1 and Group 2 consisted of 29 (22.4%) and 91 (77.6%) patients, respectively. The mean age of younger patients was 43.1 years (23–49 years), with a male to female ratio of 19/10, while the average tumor size was 57.6 mm (20–120 mm). Twenty-four patients (83%) had a malignant pathology and five patients (17%) had a benign pathology. Clear cell carcinoma was diagnosed in 67% of the patients in both groups. There was no significant difference with respect to age and tumor size of male and female patients in the younger age group, while younger female adults tended to have a more benign pathology than their male counterparts (40% and 5%, respectively, $p < 0.05$).

Conclusion: There was no significant difference with respect to gender, tumor size, laterality, and surgical and pathologic features between younger and older patients. An organ- sparing approach should be strongly considered when treatment for renal tumors in young females is performed because of a potentially higher incidence of a benign pathology of renal masses.

Keywords: Age; benign pathology; kidney tumor; nephrectomy; renal mass; younger patients.

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Introduction

Renal cell carcinoma (RCC) is the most frequently observed tumor arising from renal parenchyma in patients with a median age of 62 years. With the development of diagnostic methods in recent years, increased rates of RCC have been detected, and majority of cases has been diagnosed after 40 years of age. Only 5% of the renal tumors are diagnosed before 40 years of age.^[1]

As a result of various studies, tumoral characteristics, duration of recurrences, treatment response, and follow-up of young patients have been demonstratedly differed from adult

patient population; however, any definitive conclusions could not be made on this issue.^[2,3] Innovations in classification and staging systems have facilitated the evaluation of renal tumors in young patients. Although RCC is most frequently observed among young patients, its prognosis tends to be more favourable when compared with the older age group.^[4] It should be noted that 20% of the nephrectomized patients aged 17–45 years with the indication of renal mass may have a benign pathology.^[5]

The objective of our study is to evaluate differences between patients aged older and younger than 50 years, who were operated for a suspected malignant renal mass, with respect

to clinical, surgical, and pathological characteristics and also to investigate their correlations with literature findings.

Material and methods

A total of 129 cases who were nephrectomized (open radical, partial, and laparoscopic radical) in our clinic with the indication of suspect malignant renal masses were included in the study. The cases were divided and evaluated in two groups as those aged ≤ 50 and > 50 years. Data were retrospectively gathered and evaluated with respect to age and gender of the patients, tumor size, laterality, and pathological characteristics. The results were subsequently compared between the groups. Pathological classification was made based on the 2009 tumor, node, and metastasis (TNM) classification.^[6] The cases were evaluated during the preoperative period using physical examination findings, laboratory parameters, and computed tomographic (CT) data. Patients who had undergone cytoreductive nephrectomy, metastasectomies concurrently with nephrectomy, and preoperative biopsies were excluded from the study.

Statistical analysis

Statistical analyses were performed using Statistical Package for the Social Sciences 16.0 version (SPSS Inc. Chicago, IL, USA) and groups were compared with chi-square test. P values less than 0.05 were accepted as statistically significant.

Results

Study participants were divided into two groups as those aged ≤ 50 years (Group 1, $n=29$; 22.4%) and > 50 years (Group 2, $n=100$; 77.6%). Only 6 (4.6%) patients were aged ≤ 40 years. Group 1 patients underwent open radical nephrectomy ($n=23$; 79%), open partial nephrectomy ($n=4$; 14%), and laparoscopic radical nephrectomy ($n=2$; 7%). The median age of the cases was 43.1 years (23–49 years), with a male/female ratio of 19/10 (Table 1). The median diameter of the renal masses was 57.6 mm (20–120 mm). Histopathological analysis of the youngest patient was reported as angiomyolipoma, while malignant ($n=24$; 83%) and benign ($n=5$; 17%) renal masses were also detected. Other histopathological diagnoses included clear cell carcinoma ($n=19$, 67%), papillary RCC ($n=4$; 14%), malignant mesenchymal tumor ($n=1$; 3%), simple cysts ($n=2$; 7%), angiomyolipoma ($n=1$; 7%), hydatid cyst ($n=1$; 3%), and pyelonephritis ($n=1$; 3%) (Table 2). Preoperative CT of the simple cysts was reported as cystic RCC in one case and Bosniak type 3 RCC in another case; these patients were nephrectomized. However, final histopathological reports indicated the presence of benign masses. No significant difference was not found between female and male cases with respect to the age of the patients and tumor sizes; however, malignant histopathology was significantly encountered more

frequently among female patients (40% vs. 5%, $p<0.05$). Clinicopathological data of both groups are indicated in Table 1. A significant difference was not found between groups aged ≤ 50 and > 50 years with respect to gender of the patients, tumour sizes, laterality, surgical interventions applied, and histopathological characteristics. Clinicopathological features of this group of patients are summarized in Table 2. Stage pT1-2 tumors were encountered in 91% of the patients in the younger age groups, whereas they were encountered in 81% of the patients in all age groups.

Discussion

Renal cell carcinoma is the most fatal malignancy of the urogenital system which frequently appears in advanced ages.^[7] In the literature, many studies have investigated the incidence of renal malignancies in various age groups.^[1-6] In a large series

Table 1. Clinicopathological data of the operated cases with suspect renal mass

	Younger cases	Older cases
Age (years)	43.1 (23–49)	65.2 (51–78)
Gender		
Males, total, n (%)	19 (65)	63 (63)
Males with benign tumors, n (%)	1 (5)	7 (9)
Females, total, n (%)	10 (35)	37 (37)
Females with benign tumors, n (%)	4 (40)	3 (8)
Laterality, n (%)		
Right	18 (61)	44 (44)
Left	11 (39)	56 (56)
Tumor diameter, mm, n (%)		
<40 mm	9 (31)	32 (32)
40–70 mm	13 (44)	42 (42)
>70 mm	7 (25)	26 (26)
Median tumor diameter, mm	57.6 (20–120)	
Surgery		
Open radical nephrectomy, n (%)	23 (79)	68 (68)
Open partial nephrectomy, n (%)	4 (14)	21 (21)
Laparoscopic radical nephrectomy, n (%)	2 (7)	11 (11)
Fuhrman grading system (for only malignancies), n (%)		
1	1 (4)	4 (4)
2	10 (42)	41 (41)
3	9 (37)	31 (31)
4	4 (17)	14 (14)

Table 2. Classification of histopathological results according to age groups

	Cases aged ≤50 years	Cases aged >50 years
	n (%)	n (%)
Clear cell carcinoma	19 (67)	67 (67)
Papillary type	4 (14)	8 (8)
	-	5 (5)
Urothelial	-	6 (6)
Other malignant tumors	1 (3)	4 (4)
Oncocytoma	-	6 (6)
Angiomyolipoma	1 (3)	-
Pyelonephritis	1 (3)	1 (1)
Simple cyst	2 (7)	2 (2)
Hydatid cyst	1 (3)	1 (1)
Total (n)	29	100

consisting of 2710 cases, RCC was reported in 2164 cases; 4% of which comprised of patients aged between 20 and 40 years.^[8] In this study, the authors also indicated that because of radiological advances in recent years, an increased number of young patients were diagnosed with RCC. As indicated in many studies, the incidence rates of RCC ranged between 3.5% and 7.3% among young patients.^[4,9] Because patients aged ≤50 years were included in the “younger patient group” in our study, 22.4% the cases operated with the indication of suspected renal malignancies were categorized in this group. However, if we evaluate patients aged ≤40 years in the category of the “younger patient group,” then in compliance with the literature findings, malignancy rate drops to 4.6%. In a large-scale study performed in Pakistan, malignancy rate was indicated as 9%.^[1]

In the majority of the studies, the relationship between prognosis and some demographic characteristics such as age, stage, grade, tumor size, presence of symptoms, and anemia was investigated. It has been concluded that the grade of the tumor and lymph node metastasis are major prognostic factors.^[10,11] Although the significance of tumor grade is already known, some studies could not demonstrate its effect on prognosis of cases with metastasis.^[8] As an outcome of all these studies where tumour sizes, grades, and rates of metastasis have been investigated among younger and older patient groups, significantly lower tumor grades have been demonstrated in the young patient group ($p<0.05$).^[8] Gillett et al.^[9] detected pT1-2 tumor grade in a significantly higher (82.7%) percentage of patients aged 18–40 years ($p=0.02$). Similar incidence rates were also reported by Eggener^[5] and Abbou el Fettouh^[12] (89% and 75%, respectively). However, Sanchez-Ortiz^[13] could not find

any significant difference between younger and older patient groups with respect to tumor stage and grade, and the authors concluded that the most important prognostic factors were histopathological subgroups and the development pattern of the tumor. Gillett^[9] and Cao^[4] indicated that when compared with older patients, clear cell carcinoma was observed less frequently among young patients, and they emphasized the importance of histopathological subgroups. However, in our study, stage pT1-2 tumors were observed in 91% of young patients, whereas its incidence was 81% in the overall patient population, which was in compliance with the literature findings. Moreover, clear cell carcinoma was observed in 67% of the patients in both groups. Rodriguez et al.^[14] also demonstrated a lower incidence of clear cell renal carcinoma in younger patients than the older patient group (69% and 91%, respectively), and this outcome has been supported by many studies.^[1,4] In our study, papillary type RCC was the second most frequently observed tumour in the group with young patients (14%). Although literature reviews have reported incidence rates ranging between 9% and 50%, some studies reporting higher rates also included pediatric cases in their investigation.^[1,15]

The relationship between gender and tumor histopathology has also been investigated. Although distinct outcomes could not be obtained, Eggener et al.^[5] demonstrated a markedly higher number of female patients with histopathologically benign tumors (females, 36% and males, 9.5%; $p<0.01$), Siemer et al.^[8] and Cao et al.^[4] also reported similar rates in young female patients. As a result of these outcomes and a potentially higher incidence of histopathologically benign tumors, particularly in young women, the authors preferred performing organ-sparing surgery. Similarly, in our study, higher rates of histopathologically benign tumors were found in young female patients (females, 40%; males, 5%).

Oncocytoma and angiomyolipoma are the most frequently observed benign tumors. Mohsin et al.^[1] reported angiomyolipoma as the most frequently observed benign tumors with an incidence rate of 11%. In our study, 17% of our cases had histopathologically benign tumors; however, we did not encounter cases with oncocytoma.

Evaluation of the relationship between laterality of the tumor and prognosis did not yield significant results; bilateral renal tumors were detected in 2%–13% of the young cases.^[1,12] We have not observed bilateral renal tumors.

Smaller tumors frequently suggest organ-confined disease. In our study, 75% of the cases were found to be smaller than 7 cm and they were organ-confined. Previous studies detected organ confined-disease in approximately 70% of the cases.^[1,4,5]

Although the inadequate number of patients, retrospective design of the study, noncompliance to the follow-up protocol, and lack of survival analyses seem to be the limitations of our study, our outcomes are apparently similar to those obtained in the literature studies. Studies cited in the literature have frequently included patients aged ≤ 40 years in the “young patient category”; however, we considered 50 years of age as the cut-off value. Large-scale studies will be able to introduce new approaches to renal masses in young patients.

In conclusion, although the characteristics of renal tumors detected in cases aged ≤ 50 or > 50 years were nearly similar, their prognostic outcomes in the younger age group are more favourable. The possibility of detection of benign masses has been found to be increased, particularly in young female patients. Therefore, nephron-sparing surgery should be preferred in young female patients with suspect renal masses. Stage, grade, histopathological characteristics, laterality, and dimensions of the tumors were found to be similar in both age groups.

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Informed Consent: Written informed consent was obtained from patients who participated in this study.

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