

Screening of Renal Cell Carcinoma Cases in Pathology Reports

Renal Hücreli Karsinom Vakalarının Patoloji Raporlarında Taranması

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ABSTRACT

Objective: Renal cell carcinoma in the kidney accounts for 1-3% of all malignant tumors. Histologically, 80% of renal cell carcinomas are clear cell type. The Fuhrman grading system is related to the nucleus in renal cell carcinomas. Furthermore, it is a significant indicator in predicting prognosis. This study scanned the cases diagnosed with renal cell carcinoma between 2015 and 2022 from the hospital's digital environment from pathology reports and discussed the relationships between them together with the literature.

Material and Method: The hospital's digital environment had 318 renal cell carcinoma cases between January 2015 and January 2022. SPSS 15.0 for Windows program was used for statistical analysis. The ratios in independent groups were compared with the Chi-Square test. Statistical alpha significance level was accepted as $p < 0.05$.

Results: There were 318 cases of renal cell carcinoma, 213 were male, and 105 were female. 156 of the tumors were located on the left; whereas 155 were on the right side. The most common histological type was clear-type renal cell carcinoma, with 195 incidences (61.3%). Fuhrman grade 2 was the most common and the number was 137. Grading was performed in 190 of 195 clear cell renal cell carcinomas.

Conclusion: There were approximately twice as many cases in men as in women, with 213 men and 105 women. There was a statistically significant difference between Fuhrman grades in different histology types ($p=0.002$). Grade 1 was higher in clear papillary, grade 2 was higher in clear type and papillary renal cell carcinoma. According to histological subtypes, necrosis rates differed significantly ($p=0.043$).

Key Words: Renal cell carcinoma, Clear cell renal cell carcinoma, Prognosis

ÖZET

Amaç: Böbrekte görülen renal hücreli karsinom tüm malign tümörlerin % 1-3'ünü teşkil eder. Renal hücreli karsinomların histolojik olarak %80'ini berrak hücreli tip oluşturmaktadır. Renal hücreli karsinomlarda nükleus ile alakalı olan Fuhrman derecelendirme sistemi, prognozu tahmin etmede önemli bir belirteçtir. Bu yazıda 2015- 2022 yılları arasındaki böbrek hücreli karsinom tanılı vakalar patoloji raporları üzerinden hastane dijital ortamında taranmış elde edilen veriler ve aralarındaki ilişkiler literatür eşliğinde tartışılmıştır.

Gereç ve Yöntem: Ocak 2015- ocak 2022 yılları arasındaki 318 renal hücreli karsinom vakası hastane dijital ortamında taranarak belirlendi. İstatistiksel analiz için SPSS 15.0 for Windows programı kullanıldı. Bağımsız gruplarda oranlar Ki Kare testi ile karşılaştırıldı. İstatistiksel alfa anlamlılık seviyesi $p < 0,05$ olarak kabul edildi.

Bulgular: 213'ü erkek ve 105'i kadın olmak üzere 318 renal hücreli karsinom vakası vardı. Tümörlerin 156'sı sol; 155'i sağ tarafa yerleşmişti. Histolojik tiplerden en sık görüleni berrak tip böbrek hücreli karsinom olup sayısı 195 (% 61,3)'ti. En sık Fuhrman derece 2 görülmüş ve sayısı 137'ti. 195 berrak hücreli renal hücreli karsinomun 190'unda derece belirtilmişti.

Sonuç: 213'ü erkek ve 105'i kadın olmak üzere erkeklerde kadınlardan yaklaşık iki kat daha fazla vaka görüldü. Histolojik tiplerde Fuhrman derecelerinde istatistiksel olarak anlamlı fark tespit edildi ($p=0,002$). Grade 1 berrak papiller tipte daha yüksek, grade 2 ise berrak tip ve papiller renal hücreli karsinomda daha yüksekti. Nekroz oranlarında histolojik alt tiplere göre istatistiksel olarak anlamlı fark tespit edildi ($p=0,043$).

Anahtar Kelimeler: Renal hücreli karsinom, Berrak hücreli renal hücreli karsinom, Prognoz



INTRODUCTION

Renal cell carcinoma (RCC) is a fatal malignant tumor in urology. It accounts for 1-3% of all malignant tumors (1,2). Clear cell, papillary, and chromophobe RCCs comprise more than 90% of all RCCs (1). Although it is limited to the kidney in pathology reports, recurrence or distant metastasis can manifest in 30% of cases. Surgeons rely on pathology reports to predict tumor recurrence. In determining the prognosis, the Fuhrman rating has a predictive accuracy of 0.65. An increase in metastasis and a decrease in survival rate were present in patients with Fuhrman grade III or IV (3). In this research article, we wanted to present the data of 318 RCC cases diagnosed between January 2015 and January 2022 in the pathology department of Haseki Training and Research Hospital, in the light of the literature.

MATERIALS AND METHODS

Ethical permission has been granted by the Clinical Research Ethics Committee of Haseki Training and Research Hospital (Date: 06.04.2022; Decision No: 68-2022). RCC cases between January 2015 and January 2022 were determined by scanning in the hospital's digital environment. There were 318 cases of RCC, 213 males, and 105 females. The following information was scanned from the electronic system as predictors: Type of surgery (partial/ radical), age, gender, tumor location, tumor diameter, Fuhrman grade, perinephritic spread, renal sinus invasion, pathological tumor stage, presence of sarcomatoid differentiation, and the presence of necrosis.

SPSS 15.0 for Windows program was used for statistical analysis. In descriptive statistics; numbers and percentages for categorical variables, and mean, standard deviation,

minimum, maximum, and median for numerical variables. The ratios in independent groups were compared with the Chi-Square test. Statistical alpha significance level was accepted as $p < 0.05$.

RESULTS

The mean age was 59.1 years, and the median age was 60 years. Of the 318 patients, 207 (65%) were older than 55 years of age, of which 135 were male; 9 (2.8%) were younger than 35 years of age, of which five were male. 156 of the tumors were left; 155 were located on the right side, and the side was not specified in 7 partial nephrectomy cases. 101 males and 55 females had left-sided tumors, whereas 108 males and 47 females had right-sided tumors. While the largest diameter in tumor size was 22 cm, the smallest was 0.2 cm, and the median value was 4.5 cm, the mean and standard value was 5.58 ± 3.32 . The most common histological type is the clear cell RCC (ccRCC). Its incidence is 195 (61.3%). Other RCC types were 51 (16%) papillary; 48 (15.1%) chromophobe; 7 (2.2%) clear papillary; 5 (1.6%) multiloculated cystic kidney cell carcinoma, respectively. Of the 10 patients with sarcomatoid differentiation, 7 were ccRCC; two were chromophobe and one was unclassified RCC 12 (3.7%). The grade of the nucleus was determined as the Fuhrman grade. The most common Fuhrman grade 2 was seen and the number was 137, while the number of the others was grade 3 and the number was 62, respectively; degree 1 and number 42; degree

4 and number 13. The stage information was present in 313 patients. 136 male and 71 female patients were in the T1 stage, and three male patients were in the T4 stage. Since the subcategory of pathological staging was available in limited cases, the general category was included in the article. There were no female patients in the T4 stage. The relationship between stage, age, and grade is in Table 1. Although grading is not recommended in chromophobe renal cell carcinoma (chRCC), grading was performed in 9 of 48 cases. Grade was specified in 190 of 195 CRCCs. There was a statistically significant difference in Fuhrman grades in histological types ($p=0.002$). Comparison of grade, age, histological type is summarized in Table 2. Grade 1 was higher in clear papillary RCC, grade 2 was higher in ccRCC, papillary RCC (PRCC), and multiloculated cystic RCC; grade 3 was higher in chRCC. The relationship between perirenal fatty tissue infiltration, renal sinus invasion, gerato fascia invasion, necrosis and histological subtypes is summarized in Table 3, and a statistically significant difference was found in necrosis rates in histological types ($p=0.043$). In our screening, four cases had more than one focus, and one had ccRCC in both kidneys.

DISCUSSION

Renal cell carcinoma constitutes 85% of the cancers in the kidney and 2-3% of all body cancers (4,5). Most RCCs are diagnosed in the early stages (6). The gold standard in treating kidney tumors is radical or partial nephrectomy (7). It has been

Table 1: The relationship between stage, age, and grade.

Stage		T1		T2		T3		T4		p-value
		n	%	n	%	n	%	n	%	
Sex	Male	136	65.7	32	76.2	39	63.9	3	100	0.368
	Female	71	34.3	10	23.8	22	36.1	0	0	
Age	<35	6	2.9	3	7.1	0	0.0	0	0.0	0.274
	35-55 years	64	30.9	17	40.5	19	31.1	1	33.3	
	>55 years	137	66.2	22	52.4	42	68.9	2	66.7	
Grade	I	38	23.3	0	0.0	4	8.0	0	0.0	<0.001
	II	93	57.1	18	52.9	22	44.0	1	50.0	
	III	29	17.8	15	44.1	15	30.0	1	50.0	
	IV	3	1.8	1	2.9	9	18.0	0	0.0	

Table 2: The relationship between grade, sex, age, histological type.

		Grade 1		Grade 2		Grade 3		Grade 4		p-value
		n	%	n	%	n	%	n	%	
Sex	Male	27	15.6	93	53.8	47	27.2	6	3.5	0.182
	Female	15	18.5	44	54.3	15	18.5	7	8.6	
Age	<35 years	1	16.7	3	50.0	2	33.3	0	0.0	0.855
	35-55 years	15	17.6	43	50.6	24	28.2	3	3.5	
	>55 years	26	16.0	91	55.8	36	22.1	10	6.1	
Histological type	Clear	30	15.8	109	57.4	44	23.2	7	3.7	0.002
	Chromophobe	1	11.1	2	22.2	4	44.4	2	22.2	
	Papillary	6	16.7	20	55.6	10	27.8	0	0.0	
	Clear papillary	4	57.1	2	28.6	1	14.3	0	0.0	
	Multiloculated cyst	0	0.0	2	66.7	1	33.3	0	0.0	

Table 3: The relationship between PRI, renal sinus invasion, gerato fascia invasion, necrosis and histological subtypes.

		PRI		Sinus invasion		Gerato fascia invasion		Necrosis	
		n	%	n	%	n	%	n	%
Histological type	Clear	22	11.4	29	14.9	1	0.5	56	30.9
	Chromophobe	5	10.4	2	4.2	0	0.0	7	15.6
	Papillary	5	9.8	4	8.0	0	0.0	13	27.7
	Clear papillary	0	0.0	0	0.0	0	0.0	2	28.6
	Multiloculated cyst	0	0.0	0	0.0	0	0.0	0	0.0
	p-value	0.084		0.052		1.000		0.043	

*PRI: Perirenal fatty tissue infiltration.

approximately twice as common in males as in females in the literature, and the sex distribution is similar in our screening (5). In our study, 213 (66%) of 318 patients were male and 105 (34%) were female.

In the article of Uçar et al., 80% of RCCs were ccRCC, 10% were PRCC, and 5% were chRCC (8). Tumor rates in our patients were ccRCC in 195 of them (61.3%), PRCC in 51 (16%), and chRCC in 48 (15.1%), respectively.

In newly diagnosed RCC cases, the age range is mostly 60-79. Advanced age is associated with poor survival (9). It is reported in the literature that the risk for RCC increases between the ages of 50-70 (7). In our screening, there were 207 (65.1%) patients older than 55 years, and the mean age of all cases was 59.1 years. While there were 162 (51%) patients older than 60 years, the number of patients over 70 years was 58 (18%).

Nine patients were under 35 years of age, and there were no Fuhrman grade 4 and pathological stage 4 among them. Looking at Table 2, it is noteworthy that higher grades are seen in those older than 55 years of age. While the number of grade 2 cases between the ages of 35 and 55 is 43, 91 were in those over 55 years. While the number of grade 2 cases between the ages of 35 and 55 is 43, this is 91 cases in those older than 55 years. While the number of grade 4 patients between 35 and 55 is 3, it is 10 in those over 55 years. Andreiana et al. (10) screened 75 ccRCC cases; the rate of Fuhrman grade 2 was 42 (56%). Grade 2 incidence was more frequent in 190 ccRCC, and the ratio was similar 109 (57.4%) in our study.

The right and left sides were almost equal, although 7 cases were not reported, including partial (PN) and total nephrectomy (RN). Alanee et al. (11) reported that left RN was 51.01%, left PN was 50.46%, whereas right RN was 48.83% and PN was 49.36%.

TNM classification does not include capsular invasion and is based on the invasion of adipose tissue around the kidney. Turun et al. (3) reported in their retrospective study that RCC would progress significantly in patients with capsule invasion. Perinephric adipose tissue invasion (PRI) was present in 32 (11.6%) of our cases, of which 22 (11.4%) were ccRCC. Renal sinus invasion (RSI) manifested in 35 (11.9%) cases, of which 29 (14.9%) were ccRCC. In the literature, RSI has been reported to be more common than PRI invasion, and although there is no fibrous barrier between the renal sinus and parenchyma, there is a fibrous barrier between the perinephric adipose tissue and the parenchyma (12). As is known, tumor infiltration in both regions indicates that the universe is pT3a (13). In our screening, PRI and RSI were not present in patients younger than 35.

Rating systems related to the nucleus in RCC, such as the Fuhrman system, are considered a significant indicator in predicting prognosis and are compatible with ccRCC. The nuclear grade is not recommended in chRCC (14). In our scan, a directly proportional relationship between histological grade and pathological tumor stage was present (<0.001).

In a study based on the tumor size of 7 cm, the researchers found that Fuhrman grade and necrosis and renal vascular invasion were more likely to occur in cases where the tumor was large (15,16). Again, in this study, there was no difference between tumor sizes below and above 7 cm in RSI (15). In our cases, a direct correlation was present between tumor diameter and pathological tumor stage (<0.001). There was no relationship between diameter and age, and diameter and grade. There are 91 cases larger than 7 cm. 137 cases were smaller than 4 cm, while 37 cases were larger than 10 cm. The mean tumor diameter is 5.58. The median value is 4.5 cm.

In a retrospective study of 37 patients diagnosed with RCC with vascular invasion, vascular invasion was associated with high mortality in RCC (17). We had a case of lymphovascular invasion. The histological type of this case was in the ccRCC and pT3 stages and included adipose tissue invasion and necrosis around the kidney.

Tumor necrosis is one of the factors of interest in predicting prognosis. It is assumed to occur with chronic hypoxia. According to a meta-analysis, tumor necrosis had a weak association with cancer-specific survival, overall survival, recurrence-free survival, and progression-free survival (2). In our study, a statistically significant difference was present between necrosis and histological types (p=0.043). Necrosis was present in 83 cases, and 56 were ccRCC.

Sarcomatoid differentiation is not a separate histological subtype in RCC and is classified according to the epithelial component. In a meta-analysis, sarcomatoid differentiation showed a low recurrence-free, general, and progression-free survival (6). In our screening, 8 of the 10 cases with sarcomatous differentiation had necrosis; eight had stage pT3, and 5 of 7 cases, except for chromophobe and unclassified RCC, had Fuhrman grade 4. Sarcomatoid differentiation can indicate a poor prognosis considering the stage, grade, and necrosis.

As a result, the limited number of our cases, the pathological tumor stage and Fuhrman grade, were not mentioned in some reports; and the fact that we did not include the survival times of the patients in the screening were among the limitations of our study. Multicenter screening is likely to yield more meaningful results. The factors mentioned in our reports remain essential regarding the patient's prognosis.

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Ethics: This research is approved by the Clinical Research Ethics Committee of Haseki Training and Research Hospital (Date: 06.04.2022; Decision No: 68-2022).

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