ANALYSIS

24(101), January - February, 2020

ISSN 2321–7359 EISSN 2321–7367

Medical Science

A study of clinicopathological patterns of renal tumors among a Kurdish population in Kermanshah province, Western Iran

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Article History
Received: 01 September 2019
Reviewed: 04/September/2019 *to* 19/October/2019
Accepted: 21 October 2019
Prepared: 24 October 2019
Published: January - February 2020

Citation
Babak Izadi, Somayeh Jalilian, Mazaher Ramezani, Masoud Sadeghi, Sedigheh Khazaei. A study of clinicopathological patterns of renal tumors among a Kurdish population in Kermanshah province, Western Iran. *Medical Science*, 2020, 24(101), 127-134

ABSTRACT

Introduction: Renal tumor is a serious public health problem which has been steadily increasing and varies in different regions. We purposed to check the clinicopathological features of renal tumors in Kermanshah (west of Iran). *Materials and Methods:* The

population under this cross-sectional study consisted of 172 cases of histologically diagnosed renal tumors. Specimens were obtained from Imam Reza hospital in Kermanshah (west of Iran) between March 2008 and March 2017. Histological reports and frequency of different renal tumors were documented. *Results:* A total of 172 cases of renal tumors were collected that their mean age was 54.3 years. The frequency of renal cell carcinoma as the most common cell type was found to be 89.5%. The frequency of clear cell renal cell carcinoma (RCC), papillary RCC, and chromophobe RCC were 61%, 19.7%, and 8.2%, respectively. Other tumors included oncocytoma (5.8%), malignant lymphoma (2.3%), squamous cell carcinoma, Wilms tumor (1.2% from each), and sarcomatoid RCC (0.6%). The mean tumor size was 5.2 cm. *Conclusions:* The differences in the prevalence of renal cancer in the world maybe owing to differences in the distribution of risk factors, socioeconomic levels, early detection, and treatment availability. It is necessary to perform etiological studies to explore the risk factors for renal cancer in this region.

Keywords: Renal neoplasm, Clinicopathological pattern, Kurdish population

1. INTRODUCTION

Cancer is the leading reason of mortality in the world, and the mortality rate is further increasing year by year. The renal tumor is the 13th most common cancer globally in both genders (Chow and Devesa, 2008; Setiawan et al., 2007; Siegel et al., 2013). Malignant tumors of the renal have been reported to account for 2% to 3% of the cancers in adults worldwide (Czene and Hemminki, 2003). The metastatic renal tumor is one of the most treatment-resistant malignancies with a five-year relative survival rate of 12.3% at the time of diagnosis (Sanfilippo et al., 2014). This cancer is one of the public health problems in the USA, in which the incidence of this cancer has been reported in various ethnic groups. There are about 65,000 new cases and about 14,000 deaths from renal cell carcinoma (RCC) each year in the USA (Siegel et al., 2013). Despite multiple studies, many clinicopathological issues about renal tumors remain contentious. The incidence and mortality of renal cancer are different in various countries. Difference between countries is due to the different risk factors according to their lifestyles (Siegel et al., 2013; Chow et al., 2010; Motzeret al., 2017). Smoking, obesity, diet and hypertension are the main risk factors found in epidemiologic studies on the renal tumor. Studies have demonstrated that the developing countries have higher rates of mortality than the developed countries (Znaor et al., 2015). Clear cell RCC (CCRCC) is the most common renal parenchymal malignancy that is followed by papillary and chromophobe RCC (PRCC and CRCC), (Eble et al., 2004). RCC diagnosis accounts for about 3.9% of new cancers. Approximately 70% to 75% of renal tumors reported are of clear cell type. CCRCC is well-known for its metastasis to unusual sites (Eble et al., 2004; Linehan et al., 2003). PRCC is a morphologically, clinically, and genetically distinct subtype and second in frequency to clear cell carcinoma. The importance of RCC in patients is the increased risk of bladder and prostate cancers (Czene and Hemminki, 2003). PRCC frequently contains necrosis (Moch, 2013). CRCC accounts for about 5% of surgically excised renal epithelial neoplasms (Cheng et al., 2009). It has been suggested that liver metastasis is more frequent in CRCC (Moch, 2013). Although the histopathologic subtypes of renal tumor have been shown to be different in clinical features and genetic factors, epidemiological data on subtypes of renal tumor are sparse and have not shown consistent patterns. Furthermore, the pathologic characteristics of renal tumors are important. Pathologic diagnosis can help in the primary treatment, better planning for prevention, and further studies. Therefore, we proposed to check the epidemiology and clinicopathological features of renal tumors in Kermanshah (a city in the west of Iran with a Kurdish population), which will support clinicians to develop better diagnostic and therapeutic methods.

2. MATERIALS AND METHODS

The present study was approved by the Ethics Committee of Kermanshah University of Medical Sciences, Kermanshah, Iran (ethical code: IR.KUMS.REC.1396.420). The population under this cross-sectional study consisted of 172 cases of clinicopathological renal tumors. Samples were obtained from Imam Reza hospital in Kermanshah (Iran) between March 2008 and March 2017. This hospital is the main training center of pathology in the west of Iran. Histological reports were screened for renal tumor. Different renal tumors included malignant tumors (CCRCC, PRCC, CRCC, sarcomatoid RCC (SRCC), malignant lymphoma, and Wilms tumor in children) and benign tumors such as oncocytoma. All cases were registered based on age and gender and histological characteristics, including tumor type, tumor size, capsular invasion, and vascular invasion. These divisions were done according to the National Comprehensive Cancer Network (NCCN) guidelines for patients: (Available online at NCCN.org/patients).

Data were analyzed by SPSS software (version 16.0) using Pearson correlation and chi-square tests to assess the epidemiological and clinicopathological features. P-value < 0.05 was considered to be statistically significant.

3. RESULTS

A total of 172 cases of renal tumors were investigated. The mean age (±standard deviation or ±SD) of the individuals with renal tumors was 54.3 (± 15.8) years with minimum and maximum ages of 1 and 84 years, respectively. Among them, 79 samples were women (45.9%) and 93 were men (54.1%). The characteristics of the patients are shown in Table 1.

Table 1 Characteristics of patients with renal tumors (n=172)

Variable	Value
Age, year	
Mean ± SD	54.3 ± 15.8
Range	1-84
Sex	
Male	93 (54.1%)
Female	79 (45.9%)
Histological type	
Renal cell carcinoma	154 (89.5%)
Oncocytoma	10 (5.8%)
Malignant lymphoma	4 (2.3%)
Squamous cell carcinoma	2 (1.2%)
Wilm's tumor	2 (1.2%)
Tumor size, cm	5.2 ± 3.4
Mean ± SD	0.2-21
Range	89 (51.7%)/66
<5.5-10/>10	(38.4%)/17
	(9.9%)
Laterality	
Right	74 (46.5%)
Left	85 (53.5%)
NA	13
Lymph node involvement	
Yes	10 (5.8%)
No	162 (94.2%)
Vascular invasion	
Yes	18 (10.5%)
No	154 (89.5%)
Capsular invasion	
Yes	61 (36.7%)
No	105 (63.3%)
NA	6

Abbreviation: NA, not available.

The most prevalent renal tumors in Kermanshah (Iran) between March 2008 and March 2017 were obtained in 2015 (17%), 2016 (14.5%) and 2017(13%), respectively. In this study, the prevalence of the main bulk of tumors was 89.5% (154/172) in RCC. The most common cell type of RCC was CCRCC (61%), followed by PRCC (19.7%) and CRCC (8.2%). Other tumors included oncocytoma (5.8%), malignant lymphoma (2.3%), squamous cell carcinoma, Wilms tumor (each 1.2%), and SRCC (0.6%) (Figure1).

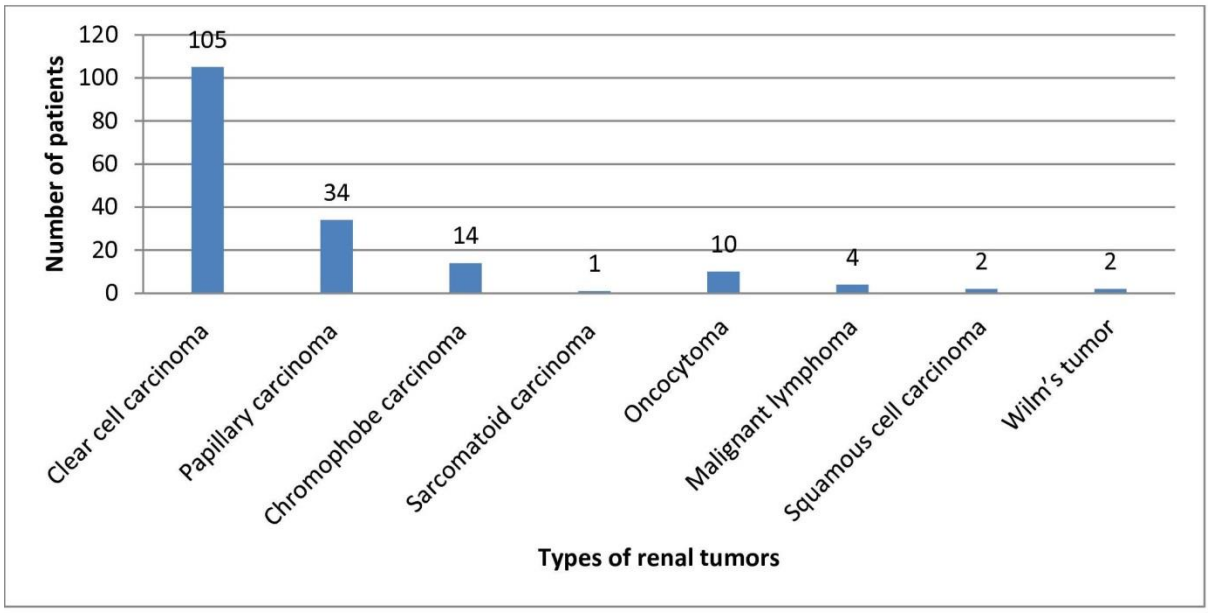

Figure 1 Prevalence of renal tumor patients based on types

All the renal tumors were divided into different age groups. There was a high rate of renal tumors in the age group of 50-70 years. A similar pattern of age distribution was observed in all subtypes of renal cancers (Figure 2).

Table 2 Comparison of distribution of renal cell carcinoma (RCC) types by variables

Variable	Clear cell carcinoma (n=105)	Papillary carcinoma (n=34)	Chromophobe carcinoma (n=14)	Sarcomatoid carcinoma (n=1)	P-value
Age, year Mean ± SD	54.2 ± 14.4	59.1 ± 12.0	55.8 ± 16.0	48.0	0.347*
Sex Male Female	55 (52.4%) 50 (47.6%)	23 (67.6%) 11 (32.4%)	4 (28.6%) 10 (71.4%)	0 (0%) 1 (100%)	0.059#
Tumor size, cm Mean ± SD	4.7 ± 2.9	5.9 ± 4.0	7.1 ± 5.3	10	0.022*
Laterality, (n=143) Right Left	50 (51.5%) 47 (48.5%)	12 (37.5%) 20 (62.5%)	4 (30.8%) 9 (69.2%)	1 (100%) 0 (0%)	0.215#
Lymph node involvement Yes No	4 (3.8%) 101 (96.2%)	2 (5.9%) 32 (94.1%)	3 (21.4%) 11 (78.6%)	1 (100%) 0 (0%)	<0.001#
Vascular invasion Yes No	10 (9.5%) 95 (90.5%)	5 (14.7%) 29 (85.3%)	2 (14.3%) 12 (85.7%)	0 (0%) 1 (100%)	0.805#
Capsular invasion, (n=148) Yes No	29 (29%) 71 (71%)	14 (42.4%) 19 (57.6%)	14 (100%) 0 (0%)	1 (100%) 0 (0%)	<0.001#

* One-Way ANOVA test. # Chi-Square test

The mean tumor size (±SD) was 5.2 (±3.4) cm with minimum and maximum sizes of 0.2 and 21 cm, respectively. Of the 172 renal tumors, 89 cases (51.7%) were <5.5cm, 66 cases (38.4%) were between 5.5-10 cm, and 17 cases (9.9%) were >10 cm. The main size range of renal tumors was <5.5cm [Table 1 and Figure 2].

The capsular invasion was observed in 36.7% of cases. The most prevalent capsular invasion was seen in CRCC and SRCC (100%). The characteristics of renal cell carcinoma subtypes are compared in Table 2.

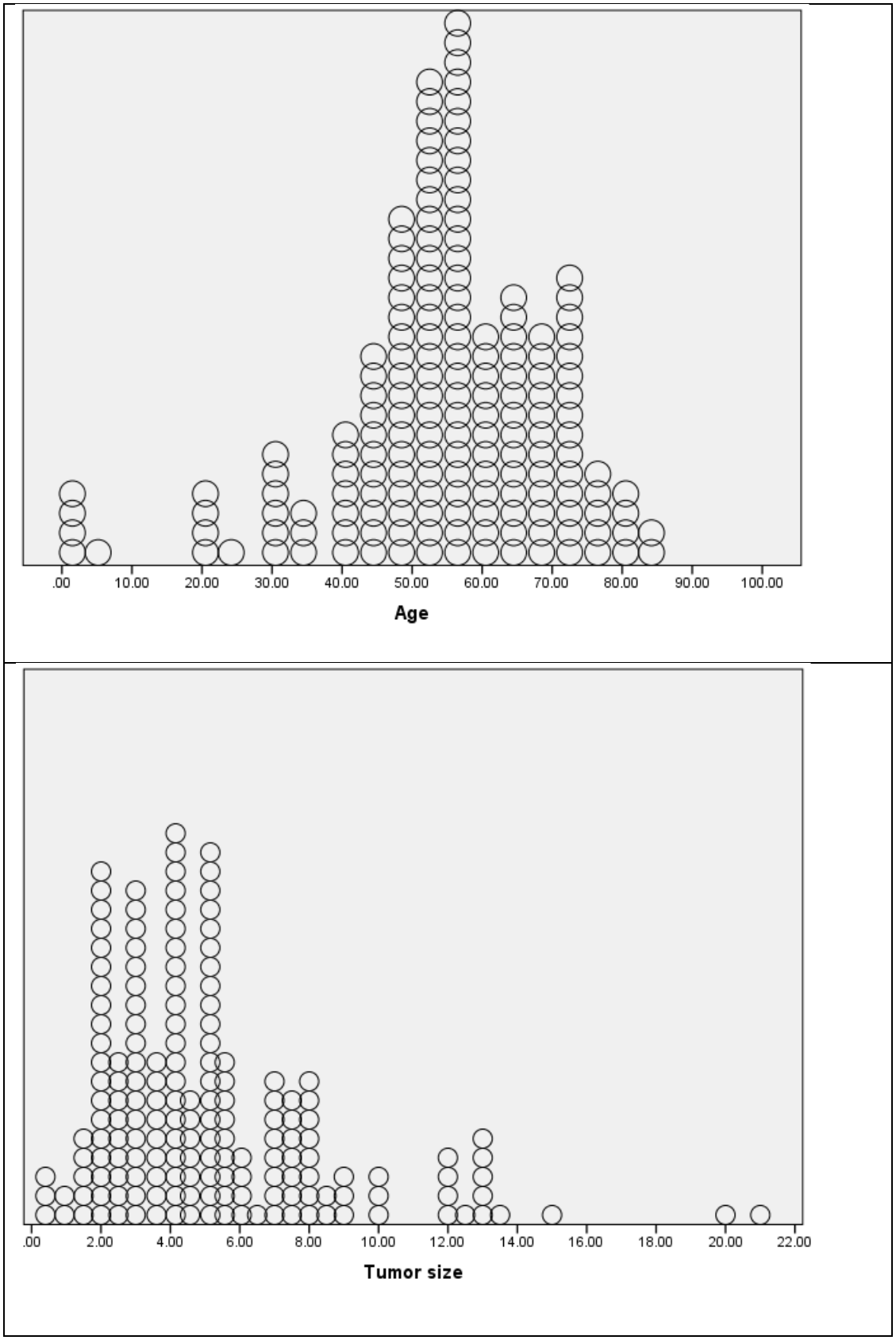

Figure 2 Prevalence of renal tumor patients based on age and tumor size

4. DISCUSSION

Renal cancer is the 16thcause of cancer death globally. The frequency of renal tumor is substantially different worldwide and is specifically increasing in most developed countries (Motzer et al., 2017). There are studies indicating that the frequency of renal tumors is higher in the developed than the developing countries. In addition, renal tumors are one of the most common urological cancers in Asia and Iran (Chow et al., 2010; Akbari et al., 2008; Reddy et al., 2012). The frequency of *RCC* is different in various geographical areas of the world. It seems detailed histopathologic evaluation of RCC cases is essential for the prognosis and management of the disease. Therefore, we proposed to explore the epidemiological and clinicopathological features of renal cancers in a Kurdish population in the west of Iran. The most significant risk factors for RCC include obesity, hypertension, smoking, diabetes mellitus, and exposure to occupational carcinogens (Moore et al., 2005; Benichou et al., 1998).

In the current study, clear cell RCC (61%) and PRCC (19.7%) were the most frequent tumors in the patients. RCC was the most common type of renal cancer, which is consistent with the results of other studies around the world (Znaor et al., 2015). According to the reports, South America, Africa, and Southeast Asian countries have the lowest frequency of RCC compared to African Americans and Caucasians (Chow et al., 2010). The high frequency of RCC was detected in Europe, North America and Australia (Chow et al., 2010). On the other hand, the results of the present study showed a slow increase in the frequency of RCC during the study period.

In this study, the frequency of renal tumors was also higher in males than in females. It is in agreement with the findings of other studies done in Iran and other countries (Akbari et al., 2008; Mirzaei et al., 2015; Wong et al., 2017). Higher incidence maybe due to the fact that men are more commonly exposed to the risk factors of cancer than women. The mean age of the individuals with renal tumors was 54.3 years, which is consistent with the results of studies conducted in Pakistan and Malaysia from among the Asian countries (Singam et al., 2010; Hashmi et al., 2014). Table 3 compares the mean age and percentage of the histological subtypes of renal tumors among India, Pakistan, Lebanon and Iran (Reddy et al., 2012; Hashmi et al., 2014; Khafaja et al., 2015; Srivastava et al., 2004). It is interesting that the prevalence of RCC in our population was 89.5%, which is higher than the valued reported by the other studies (Srivastava et al., 2004). Further, the frequency rates of renal tumors detected in CCRCC, PRCC, and CRCC were almost equal to the results of studies in Pakistan, Lebanon and India (Hashmi et al., 2014; Khafaja et al., 2015; Srivastava et al., 2004). However, a study done in India in 2018 showed a frequency of 4.7% for PRCC, which is very lower than that of our study and those of the other studies mentioned above (Srivastava et al., 2004). The mean tumor size in the present study was 5.2 cm. Studies carried out in Pakistan and India showed the mean tumor sizes of 7.2cm and 9.2cm, respectively (Hashmi et al., 2014; Khafaja et al., 2015; Srivastava et al., 2004). Yet, it seems studies have shown a stable reduction in tumor size in the west (Cheng et al., 2009; Kane et al., 2008).

Table 3 The results of Asian studies about primary renal tumor patients (n=5)

Country, year	Mean age, year	Histological type, n								
		RCC	CCRCC	PRCC	CRCC	SRCC	Oncocytoma carcinoma	Squamous cell carcinoma	Wilm's tumor	References
India, 2018	-	75.2	90.6	4.7	NA	NA	NA	1.8	8.8	(14)
Lebanon, 2015	62.4	71	59.1	22.7	11.4	NA	NA	NA	NA	(21)
Pakistan, 2014	56.4	78	62	24	6	8	1.6	1.6	NA	(20)
India, 2004	55.7	NA	64.02	27	7.86	NA	NA	NA	NA	(22)
The present study	54.3	89.5	61	19.7	8.2	0.6	5.8	1.2	1.2	-

Abbreviation: NA, not available; CCRCC, clear cell renal cell carcinoma; PRCC, papillary renal cell carcinoma; CRCC, chromophobe renal cell carcinoma; SRCC, sarcomatoid renal cell carcinoma.

Capsular invasion is a prognostic factor of localized RCC. In the present study, the prevalence of capsular invasion was 36.7%, which was almost similar to the reports of other studies (Süer et al., 2008; Cho et al., 2009; Jeong et al., 2006) reported the frequency of renal capsular invasion was 35.5%, which had a statistically significant relationship with age, tumor size, stage, and microvascular invasion.

5. CONCLUSION

There were differences in the prevalence of renal cancers around the world based on the results of this study and other studies mentioned above. This may be owing to differences in the distribution of risk factors, socioeconomic levels, early detection, and treatment availability. On the other hand, different environmental and genetic factors are involved in the frequency of cancer and the management of the disease. It is necessary to perform etiological studies to examine the risk factors associated with renal cancer in this region.

Acknowledgment

The authors would like acknowledge Vice-Chancellor for Research and Technology, Kermanshah University of Medical Sciences and the Clinical Research Development Center of Imam Reza Hospital in Kermanshah.

Financial support and sponsorship

The authors gratefully acknowledge the Research Council of Kermanshah University of Medical Sciences (Grant Number: 96461) for financial support.

Authors' Contributions

Babak Izadi & Mazaher Ramezani: designing the study and carrying out experimental research. Mazaher Ramezani: preparation of the article for printing. Somayeh Jalilian & Sedigheh Khazaei: collecting the data. *Masoud Sadeghi: Editing the article and* analysis of the data. *All authors* approved and revised the final version of the article.

Conflict of interest

The authors do not have any conflict of interest to be declared in the present study.

Abbreviations

RCC: Renal cell carcinoma
CCRCC: Clear cell renal cell carcinoma
PRCC: Papillary renal cell carcinoma
CRCC: Chromophobe renal cell carcinoma
SRCC: Sarcomatoid renal cell carcinoma
NCCN: National Comprehensive Cancer Network

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