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Prevalence of Renal Cell Carcinoma in Samples Sent to the Pathology Department of Kabul University of Medical Sciences and City Medical Laboratory

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Abstract

Background: Renal cell carcinoma (RCC) is the most common malignant tumor of the kidney. This tumor originates from the epithelial cells of the renal tubules and is located mainly in the cortical region of the kidney. It constitutes approximately 90% of all kidney malignancies and 2% of all cancers in adults.
Objectives: The present study was conducted to determine the prevalence of RCC and its histological subtypes in samples sent to the Pathology Department of Kabul University of Medical Sciences and City Laboratory.
Methods: This is a retrospective cohort study of 81 nephrectomy and partial nephrectomy samples registered in the laboratory of the Pathology Department of Kabul University of Medical Sciences and City Medical laboratory database from March 2016 to August 2020.
Results: A total of 81 samples were included in this study. The mean and standard deviation (SD) age of the patients was 44.4 ± 20.5. Of 81 samples, 62 (76.6%) were malignant kidney tumors, 13 (16.0%) were inflammatory kidney disease, 4 (4.9%) were polycystic kidney disease, and 2 (2.5%) were benign kidney tumors. Among 62 cases of malignant kidney tumor, 53 (85.48%) were RCC. The high incidence of RCC was in the age group of 56 to 65 years with a mean of 52.2 years; 56.60% of RCC cases were male and 43.39% were female. Based on the histological studies, 75.47% were clear cell renal cell carcinoma (ccRCC) type, followed by 18.86% papillary renal cell carcinoma (PRCC), and 6% chromophobe renal cell carcinoma (ChRCC).
Conclusions: Most common malignant tumor of the kidney in the samples included in this study was RCC in the age group of 56 to 65 years and it was more frequent among men compared to women, whereas the most common histological subtype was ccRCC. The findings are in concordance with international literature.

Keywords: Kidney, Carcinoma, Renal Cell Carcinoma, Malignant Kidney Tumor, Kabul

1. Background

Renal cell carcinoma (RCC) is the most common malignant tumor of the kidney (1). This tumor originates from the epithelial cells of the renal tubules and is located mainly in the cortical region of the kidney (2). According to GLOBOCAN 2018 statistics, about 403 000 cases of renal neoplasm are diagnosed in the world annually, of which approximately 25 4500 cases were registered in men compared to 148 0000 in women, and 175 000 resulted fatality from the disease, of which approximately 114 000 were men and 61 000 were women (1). RCC accounts for about 90% of all malignant kidney tumors and 2% of all cancers in adults (3). Risk factors include aging, sex, smoking, high blood pressure, obesity, chronic hemodialysis, genetic factors, and those who are more functionally in contact with cadmium and asbestos (4). These malignant kidney tumors were more prevalent in the 60s and 70s, and men are affected twice as women (5). The most common histological subtypes of RCC are clear cell renal cell carcinoma (ccRCC), papillary renal cell carcinoma (PRCC), and chromophobe renal cell carcinoma (ChRCC). Among the histological subtypes of renal cell carcinoma, ccRCC is the most common type and makes 75% of cases (6). Grossly ccRCC is generally large, spherical in shape, and has a cross-sectional area of golden yellow or orange or even gray to white, which has cystic and hemorrhagic areas and microscopically the cells show clear or granular cytoplasm due to the presence of fat and glycogen (2). PRCC makes up 10% to 15% of the histological subtype of RCC; as its name sug-

gests, the development of cancer cells is papillary. According to Gross, these tumors have cystic nature and yellow necrotic tissue areas (7). ChRCC makes 5% of the histological subtype of RCC that has cells with sharply defined plant-like cell bonders, raisinoid nuclei, and perinuclear halos (8).

2. Objectives

The present study was conducted to determine the prevalence of RCC and its histological subtypes in samples sent to the Pathology Department of Kabul University of Medical Sciences and City Laboratory.

3. Methods

This is a retrospective cohort study of 81 nephrectomy and partial nephrectomy samples registered in the Pathology Department of Kabul University of Medical Sciences and City Medical laboratory database from March 2016 to August 2020. The slides were reviewed by Professors at the Pathology Laboratory of Kabul University of Medical Sciences. Information regarding variables (age, gender, a disease diagnosed in samples, histological forms of malignant kidney tumors, and histological subtype of RCC) was collected from the patient's pathology reports and medical records. Finally, the data were analyzed by IBM SPSS Statistics 21. Categorical variables are presented in numbers and percentages, and descriptive statistics are presented as range, mean, and standard deviation (SD). This research was conducted in the Department of Pathology, Kabul University of Medical Sciences.

All ethics were taken into consideration, including the privacy of the patient's name, profile, or photo.

4. Results

A total of 81 samples (nephrectomy and partial nephrectomy) were sent from different hospitals of Kabul to the laboratory of the Pathology Department of Kabul Medical University of Medical Sciences and City Medical Laboratory from March 2016 to August 2020. The patients were in the range of 0.6 to 76 years with a mean ± SD of 44.4 ± 20.5. Out of 81 cases, 62 (76.6%) were malignant kidney tumors, 13 (16.0%) were inflammatory kidney disease, 4 (4.9%) were polycystic kidney disease, and 2 (2.5%) were benign kidney tumors. Based on the histological forms of malignant kidney tumors, RCC is the most common one (Table 1). Out of 62 cases of the malignant renal tumors, 53 (85.48%) were RCC, 7 (11.29%) were Nephroblastoma (Wilms tumor), 1 (1.61%) was papillary transitional cell carcinoma, and 1(1.61%) was renal sarcoma.

Table 1. Disease in Kidney Samples (Nephrectomy and Partial Nephrectomy) and Histological Forms of Malignant Kidney Tumors

Characteristics	No. (%)
Disease	
Malignant kidney tumor	62 (76.54)
Inflammatory kidney disease	13 (16.04)
Polycystic kidney disease	4 (4.93)
Benign kidney tumor	2 (2.47)
Total	81 (100)
Histological forms of malignant kidney tumors	
Renal cell carcinoma	53 (85.48)
Nephroblastoma (Wilms tumor)	7 (11.29)
Papillary transitional cell carcinoma	1 (1.61)
Renal sarcoma	1 (1.61)
Total	62 (100)

Of the 53 RCC, 21 (39.6%) were in the right kidney and 32 (60.37%) were in the left kidney. And tumor sizes were in the range of 1.2 cm to 16 cm and the mean tumor size was 5.91 cm.

Out of 53 RCC, the majority (17; 32.1%) of cases were in the age group of 56 to 65 years (mean SD = of 59.94 ± 3.15), followed by 46 to 55 years (10; 18.9%) and by 66 to 75 years (9; 17.0%). The prevalence of RCC in males was more compared to females (Table 2). out of 53 RCC cases, 30 (56.6%) were male and 23(43.4%) were female. Based on the histological subtype of RCC, ccRCC was the most common; of 53 RCC, 40 (75.47%) were ccRCC, 10 (18.86) were PRCC, and 3 (5.66%) were ChRCC (Table 2).

5. Discussion

This is the first study on the prevalence of RCC in Kabul, Afghanistan. There is limited information on the prevalence of RCC in Afghanistan. This study will demonstrate which histological subtype of RCC is the most common type in Kabul, Afghanistan, and also it will give an idea about the incidence of RCC based on age and gender. This study can be a good source or reference for other researchers.

Kidney cancer incidence is different in various countries mainly because of the distribution of different risk factors such as obesity, hypertension, smoking, diet, gender, and age. Studies have shown that age-standardized incidence rates per 100 000 and the proportion of deaths to incidence per 100 000 in are 2.3 and 0.62 in West Asia, 2.4

Table 2. Age, Gender, Tumor Size and Histological Subtype of Cancer Distribution in Patients with Renal Cell Carcinoma (N = 53)

Characteristics	No. (%)
Gender	
Male	30 (56.60)
Female	23 (43.39)
Total	53 (100)
Histological subtypes of RCC	
Clear cell renal cell carcinoma (ccRCC)	40 (75.47)
Papillary renal cell carcinoma (PRCC)	10 (18.86)
Chromophobe renal cell carcinoma (ChRCC)	3 (5.66)
Total	53 (100)
Tumor size	
< 6.5 cm	35 (66.03)
6.5 - 12 cm	12 (22.64)
> 12 cm	6 (11.32)
Total	53 (100)
Age group	
16 - 25	3 (5.7)
26 - 35	5 (9.4)
36 - 45	8 (15.1)
46 - 55	10 (18.9)
56 - 65	16 (32.1)
66 - 75	10 (17.0)
> 75	1 (1.9)
Total	53 (100)

and 0.36 in East Asia, 1 and 0.7 in Central and South Asia, and 1.9 and 0.68 in Southeast Asia, respectively (9).

The present study reveals that out of 62 cases of malignant renal tumor, 53 (85.48%) were RCC cases. Most cases were in the age group of 56 to 65 years (mean ± SD = 59.94 ± 3.15). Of the 53 RCC, 30 (56.60%) were male and 23 (43.39%) were female, and histologically, 75.47% were ccRCC, 18.86% were PRCC, and 5.66% were ChRCC.

A study conducted in Pakistan on 68 kidney tumors showed that 78% of adult kidney tumors were RCC. The mean age of patients was 56.4 years. Histologically, 78% of the cases were RCC, of which 62% were ccRCC, 24% were PRCC, and 6% were ChRCC (10). A study was conducted in Iran on 172 kidney tumors, of which 89.5% were RCC and, histologically, 61% were ccRCC, 19.7% were PRCC, and 8.2% were ChRCC (11). A Study in Lebanon on 124 malignant kidney tumors found 71% RCC, of which 59.1% were ccRCC, 22.7% PRCC, and 11.4% were ChRCC; the mean age of the patients were 62.4 years (12). The findings of this study are similar to research done in Pakistan, Iran, and Lebanon according to the prevalence of RCC based on gender, age, and histological subtypes.

Another study conducted In China in 2017 on 2 491 cases of RCC showed that the mean age of patients was 56 years; 67.7% of the patients were males and 32.3% females and, histologically, 88.9% were ccRCC, 4. 7% were PRCC, and 6.3% were ChRCC (13). A study was conducted in Saudi Arabia in the Pathology Department of King Fahad Hospital in 2017 on 42 cases of kidney tumors in adults. RCC accounted for 85.5% of the cases with 66.6% male and 33.3% female and the mean age of 54.5 years (14). A study conducted in India indicated that the prevalence of RCC was 75.2%, of which 90.6% were ccRCC, and 4.7% were PRCC (15). The findings of this research are similar to research in China, Saudi Arabia, and India according to the prevalence of RCC based on gender and age. However, there are differences in the histological subtypes, which may be due to differences in risk factor distribution.

The limitations of this study include the lack of information about the history and consequences of the disease. Moreover, etiological studies are required to find the risk factors associated with renal cancer in this region. On the other hand, the sample size is small, which may not show the actual picture of the disease in Afghanistan.

5.1. Conclusions

This study reveals that the most prevalent malignant kidney tumor in Kabul, Afghanistan, is RCC, which is more frequent in the age group of 56 to 65 years. Males are more affected with RCC compared to females and the most prevalent histological form of RCC is ccRCC.

Footnotes

Authors' Contribution: Mohammad Ibrahim Kamal developed the original idea, and the protocol, abstracted and analyzed data. Romal Seddiqui and Hashmatullah Yousufi wrote the manuscript, contributed to the development of the protocol, abstracted data, and prepared the manuscript.

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