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Original Article

Renal cancer epidemiologic and pathologic characteristics in Lebanon: A ten years' experience in a tertiary center

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Abstract

Background: Kidney cancer accounts for 5% of all malignant tumors in men. Worldwide, 90% of kidney malignancies are renal cell carcinomas, while only less than 10% are transitional cell carcinomas. To our knowledge, only one small study conducted in Lebanon on 124 cases found that more than 20% of the renal cancers were of urothelial pathology, larger epidemiological studies are warranted.

Methods: We retrospectively analyzed 1708 renal tissues including 499 renal malignant tumors from the data collected at the pathology department in Hotel–Dieu de France University hospital, a Lebanese tertiary hospital, over a ten–year period going from 2008 to 2018, based on the WHO classification of 2016.

Results: Among 499 renal cancer patients, the mean age was 60.3 years with a median of 62 [18–90], with 68% being men and 32% women. The three most common histology types were the conventional renal cell carcinoma in only 46.7%, followed by the urothelial carcinoma in 18.2%, then the papillary renal cell carcinoma in 15.5%.

Conclusions: Compared to the literature, similar age average and sex ratio were found, however, the Lebanese population seems to have a specific histologic pattern of distribution such as a high percentage of transitional cell type and a relatively low percentage of clear cell carcinoma.

Keywords: Renal Cancer, Urothelial Carcinoma, Renal Cell Carcinoma, Cancer Epidemiology, Lebanese Population

Introduction

Kidney and renal pelvis cancer accounts for 5% of all malignant tumors in men and 3% for women, while being the 6th most common cancer worldwide in men and the 8th cancer in women. [(1)]. In adults, renal cancer is composed of malignant cells originating from either the renal parenchyma (the renal cell carcinomas) in more than 90% of cases, 80% of which are clear cell tumors[(2)], or from the renal pelvis in only 7% of tumors in the world[(3)]. Notably, in Lebanon, renal cancer is the

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third most common urological cancer [4]. An analysis of data of the national cancer registry in Lebanon from 2005 to 2016 in comparison with the world incidence of renal cancer, by Assouad E et al. published in 2021, revealed an overall age–standardized rate (ASR) of 3.54 per 100 000 and specifically an ASR of 4.80 per 100 000 for men and 2.27 per 100 000 for women [5]. Within the same study, kidney cancer ranked 10th in prevalence among men and 19th among women [5].

In 2015, a small Lebanese study was published by our team on 124 cases of patients with renal cell carcinoma, between 2010 and 2011, with the aim of establishing the characteristics of renal cancers in Lebanon. In contrast to global results, this study has shown that renal pelvis urothelial cancer forms the quarter of renal tumors in Lebanon [6]. Since these results were contradictory to the world literature, we saw the importance of extending this study to a larger scale and over a longer period. Moreover, the purpose of this study is to establish solid epidemiological and histological characteristics of renal cancers in Lebanon.

Methods

This is a retrospective descriptive study conducted on renal tumors in a Lebanese tertiary center (Hôtel Dieu de France University hospital, HDF) between 2008 and 2018. The data was collected from the files of the department of pathology of patients having undergone kidney biopsy or nephrectomy. The confidentiality of patients was strongly respected. The study received the agreement of the HDF ethics committee.

The included records are those of adult patients (at least 18 years of age) with malignant tumors. The exclusion criteria are pediatric records, benign tumors, surgical revisions and repeated biopsies. 1708 renal tissues of patients were consulted, of which 639 had renal tumors. 113 benign tumors and 27 pediatric tumors. The study ended up with a total of 499 tumors to analyze (see Figure 1). The histological classification of kidney cancer types is based on the 2016 WHO classification [7]. The statistical data were recorded on Excel file and analyzed on the SPSS software version 25.

Results

The average age of our 499 patients was 60.3 years, with a median age of 62 and a range extending from 18 to 90 years. The sex ratio M/W was 2.1/1 with 68% men and 32% women.

The histologic review showed that 80.2% of the cases were renal cell carcinomas (RCC) representing 400 cases out of 499, compared to 18.2% of urothelial carcinoma

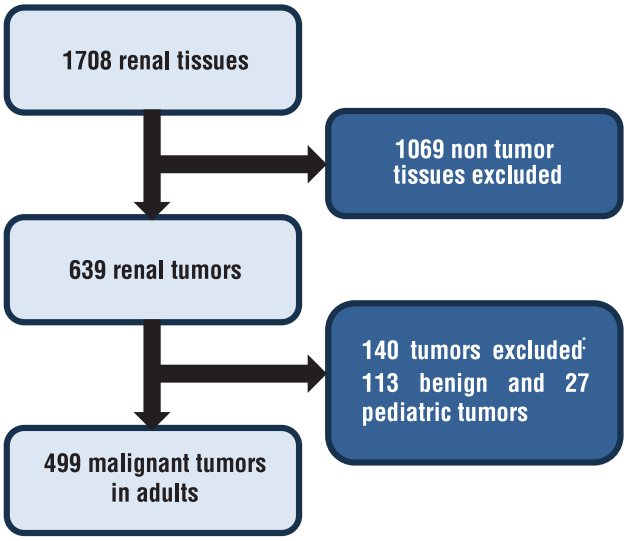

Figure 1: Study flowchart of the selection of records

(91 cases), 1.4% of metastatic secondary lesions (7 cases) and 0.2% of lymphomas (1 case) (see Table 1).

Of the 400 cases of renal cell carcinoma, 233 were cases of conventional clear cell RCC (46.7% of the total of malignant kidney tumors and 58.3% of the RCC), 77 cases of papillary carcinoma (19.3% of RCC), 40 cases of chromophobe cell carcinoma (10% of RCC), only 7 cases of collecting duct carcinoma, and 5 cases of squamous carcinoma.

Concerning the mixed tumors: 4 cases were bifocal tumors, and 7 cases were clear cell papillary by nature. We found 17 cases of unclassified renal cell carcinomas. Note the presence of 10 rare adult renal cell carcinomas such as: Tubulocystic renal cell carcinoma (4 cases), neuroblastoma (2 cases), nephroblastoma (1 case), liposarcoma myxoid (1 case), mucinous tubular and spindle cell carcinoma (1 cases) and renal carcinoma associated with a translocation of the MiT family (1 case) (See figure 2).

Only 12% of papillary renal cell carcinoma were women (sex ratio 7.6/1), and more women (57%) than men had clear cell papillary renal carcinoma. All the subtypes of renal cancer had an average age at diagnosis between 50 and 65 years, except from the case of renal lymphoma which was diagnosed at 29 years (see Table 1).

Discussion

This is the first study to approach the characteristics of renal cancer in Lebanon over 10–year period, while evaluating almost 500 renal malignant tumors, in a referral tertiary center such as Hotel–Dieu de France.

The average age of our population of 60 years is close to that of the global population with kidney cancer with

Histological type of malignant renal tumors	% (N)	Mean age (years)	Sex ratio M/F
Renal parenchyma (renal cells malignancies) :	80.2 (400)	58.4	2.1/1
1– Clear cell renal cell carcinoma	46.7 (233)	57.9	1.8/1
2– Papillary renal cell carcinoma	15.5 (77)	62.6	7.6/1
3– Chromophobe renal cell carcinoma	8 (40)	53.3	1.4/1
4– Collecting duct carcinoma (Bellini)	1.4 (7)	64.6	1.3/1
5– Clear cell papillary renal cell carcinoma	1.4 (7)	55.7	0.75/1
6– Renal medullary carcinoma (squamous)	1 (5)	65.4	4/1
7– Bifocal tumor	0.8 (4)	56.3	3/1
8– Unclassified	3.4 (17)	60.4	3.3/1
9– Others (rare tumors)°	2 (10)	–	–
Renal pelvis (urothelial)	**18.2 (91)**	**69.5**	**2.1/1**
Metastasis	**1.4 (7)**	**53.4**	**6/1**
Lymphoma	**0.2 (1)**	**29**	**1/0**

Table 1: Distribution and characteristics of the different histological types of renal malignancies.

°Others include: Tubulocystic renal cell carcinoma, tubulo–mucinous and fusocellular carcinoma, neuroblastoma, nephroblastoma, myxoid liposarcoma, and renal carcinoma associated with a translocation of the MiT family.

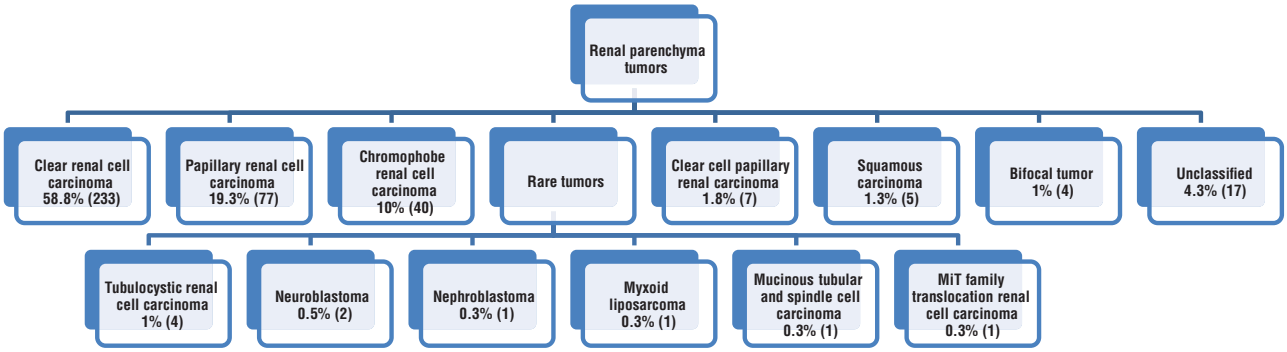

Figure 2: Distribution of histological types on the 400 cases of renal cell epithelial malignancies

an average age of 64 years [14]. Similarly, to international data, the sex ratio M/W in our study is 2.1/1 [15].

Conventional clear cell carcinoma represented only 46.7% of the tumors, whereas renal urothelial carcinoma was 18.2%. According to the literature, the percentage of urothelial kidney cancer is much higher than elsewhere compared with 7% worldwide [2]. Moreover, this rise comes at the expense of conventional clear cell carcinoma since its share in our population is 46.7% against 65% in the world, and papillary carcinoma which falls in 3rd place in our study (15.5%) whereas it is the second most common type of kidney cancer in the world at 18.5% [8]. (see Table 2)

Compared to specific countries in different continents in the world, we found that our population is unique in its pathological distribution of the kidney tumors. In Saudi Arabia and India, only 2.6% and 4.2% of kidney malignancies are urothelial in nature [11, 12]. In addition to that, in those two countries and the United States, the clear cell renal carcinoma accounts for more than 60% of the renal cancers, in contrast with our results where the conventional subtype forms less than 50% of renal cancers [11, 12, 13].

Results obtained in this study compared to the previous Lebanese study in 2015 by Khafaja S et al. revealed some similarities to be discussed [6]. With a median age of 62.4 years and a range from 18 to 86 described by Khafaja S et al., this study's findings were similar, with a median age of 62 years [18–90] [6]. In terms of the sex ratio M/F, a decrease was noted from 3/1 in 2015 to 2.1/1 in this study [6]. Regarding the histopathological distribution

	Our study	Worldwide (2,8,9,10)	Saudi Arabia (11)	India (12)	Pennsylvania – USA (13)
Renal pelvis (urothelial)	18.2%	7% (2,9)	2.6%	4.2%	–
Clear cell renal cell carcinoma	46.7%	65–70% (8)	59.9%	80.8%	63.9%
Papillary renal cell carcinoma	15.5%	18.5% (8)	10.8%	13.3%	15.1%
Chromophobe renal cell carcinoma	8%	5 to 7% (8)	15.6%	–	4.6%
Clear cell papillary renal cell carcinoma	1.4%	1 to 3% (10)	–	–	–

Table 2: Comparison between the epidemiological divisions of the histology of renal cancer in our study, worldwide studies, Saudi Arabia, India and the USA.

of renal cancers, clear cell carcinoma revealed a lower prevalence in our study (46.7%) compared to the previous study (59.1%), and the urothelial histology's prevalence in our study (18.2%) was revealed to be slightly lower (25.8% in 2015) [6]. However, both values of urothelial cancer revealed a higher prevalence compared to other countries worldwide (see table 2).

A previous study by Ghosn et al. in 2019 reported on metastatic renal cell carcinoma in the Middle East and North Africa (MENA) region. In this OSSMAR study, the median age of diagnosis of metastatic renal cancer is 58.7 years [16.1–91.2], lower than the median of 62 years in our study [16]. However, M/F sex ratio accounting for 2.8/1 in the OSSMAR study was revealed slightly higher than ours (2.1/1) [16]. Around 85.8% of the metastatic patients presented clear cell renal carcinoma whereas a significant lower proportion of patients (46.7%) had clear cell carcinoma in our study, including metastatic and non–metastatic renal cell carcinoma [16]. Nevertheless, only 24.6% of the patients in the OSSMAR study were from Lebanon, presenting the second highest proportion after Egypt (24.9%) which could explain these disparities[16].

Lebanon represents the highest incidence of bladder cancer in the world according to GLOBOCAN 2018 [17], with an incidence of 25 new cases per 100,000 Lebanese[4]. Thus, one can related this high incidence of renal urothelial cancer to bladder urothelial cancer. On common grounds, the exposure to the tobacco smoke is a risk factor for transitional cell carcinoma in both the bladder and the renal pelvis, with an increase in the relative risk from 2.5 to 7 [18]. The consumption of tobacco (cigarette or waterpipe) smoking among the Lebanese population has been massive for over a decade, with Lebanon placed at the third rank in the world by the WHO in 2019 [19]. Nevertheless, other reasons, beside tobacco, could be behind this increase in incidence of urothelial cancer in the bladder and in renal pelvis and needs further studies or evaluation for a possible genetic predisposition.

The limitation of our study is that it is carried out in a single tertiary center. Nevertheless, the fact that our sample is fairly large with 499 patients and that the study is spread over a period of 10 years makes our study reproducible on the entire Lebanese population. As a result, this study could serve as a solid reference for further studies, especially since the prevalence of renal cancer was 247 in 2016 according to the newest version of our National cancer registry [4].

In conclusion, our study conducted on more than 1,700 cases and included nearly 500 patients with malignant kidney tumors confirmed the specific results of a previous small study published in 2015 [6]. It showed a unique pattern of distribution since the two most common histologic types of kidney cancer were conventional clear cell carcinoma with 46.7% compared low to the world literature, and 18.2% of renal urothelial carcinoma compared very high to the known literature.

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This article received no external funding. The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. The hospital's ethics committee approved the study design and ensured compliance with ethical standards. The findings and interpretations in this paper are solely the authors' and do not reflect the views of the hospital or any other associated institutions.

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