**Introduction**

Kidney cancer is the third most frequent urologic cancer after prostate and bladder cancer, accounting for 1.5% of all diagnosed cancers. In this paper, we report the histologic characteristics and distribution of kidney cancer, never described in Lebanon or the Middle East. Many risk factors are incriminated in the development and aggressiveness of this cancer including tobacco and metabolic syndrome. Malignant cell proliferation originates either from the renal parenchyma or from the renal pelvis. The majority of renal pelvis cancers have urothelial cells origin, representing less than 10% of all kidney cancers, while the Renal Cell Carcinoma (RCC) developed from the renal parenchyma represents more than 90%. The most frequent histologic subtype of RCC is the clear cell carcinoma of the kidney, representing 75% of these tumors. Many risk factors are incriminated in the development and aggressiveness of this cancer including tobacco and metabolic syndrome. Malignant cell proliferation originates either from the renal parenchyma or from the renal pelvis. The majority of renal pelvis cancers have urothelial cells origin, representing less than 10% of all kidney cancers, while the Renal Cell Carcinoma (RCC) developed from the renal parenchyma represents more than 90%. The most frequent histologic subtype of RCC is the clear cell carcinoma of the kidney, representing 75% of these tumors. The M/F sex ratio is 2, with a mean age of 64 years at diagnosis.

According to the Lebanese National Cancer Registry results of 2008, the incidence of kidney cancer represents 1.48% (138/9,292 cases) of all diagnosed cancers in Lebanon (Lebanese National Cancer Registry 2008). To our knowledge, literature is lacking any report dealing with renal cancer epidemiology and histological distribution in Lebanon.

**Materials and Methods**

This is a descriptive retrospective study evaluating histologically confirmed kidney cancer diagnosed over the past 2 years (2010-2011) in Hôtel Dieu de France and Saint Joseph hospitals in Beirut, Lebanon. The data was collected from the pathology department database of the two hospitals. Benign tumors and pediatric kidney cancer were excluded. Malignant tumors originating from renal parenchyma or renal pelvis were included.

The epidemiologic characteristics analyzed in this study were age, gender and histologic type. Histologic classification was based on the WHO 2004 classification, revised in 2009. The epidemiologic characteristics of the urothelial carcinoma of the pelvis, a subtype non-mentioned in the WHO classification were also evaluated since they were included in many other papers discussing the histologic subtypes of kidney cancer.

All the results were analyzed using the SPSS version 20.

**Results**

124 cases of kidney cancer were diagnosed during the two year period in these two hospitals, with a mean age of 62.44, (range: 18 to 86). 75% (93 cases) of the patients...
Table 1. Summarizes All the Histologic Types of Kidney Cancer with their Proportions, Mean Age with Extremes and M/F Sex Ratio

| Histologic Type                  | N (%) | Mean Age (extremes) | Sex Ratio M/F |
|----------------------------------|-------|---------------------|---------------|
| Urothelial carcinoma             | 32 (25.8%) | 70.8 (30-86) | 2.5           |
| Renal cell carcinoma             | 88 (71%)   | 60.3 (18-85)  | 3.4           |
| Clear cell                       | 52 (59.1%)  | 61.0 (37-85)  | 2.7           |
| Papillary                        | 20 (22.7%)  | 61.1 (43-75)  | 19            |
| Chromophobe                      | 10 (11.4%)  | 54.8 (38-76)  | 2.3           |
| Collecting ducts of Bellini      | 3 (3.4%)    | 56.7 (18-81)  | 5             |
| Unclassified                     | 3 (3.4%)    | 62.4 (52-75)  | 2             |
| Renal Metastasis                 | 2 (1.6%)    | 42.5 (26-59)  | 1             |
| Lymphomas                        | 2 (1.6%)    | 50.5 (38-73)  | 1             |
| Renal Cancer                     | 124 (100%)  | 62.4 (18-86)  | 3             |

Table 2. Summarizes the Differences in CRR Subtypes Distribution in the Lebanese Studied Population and the WHO Classification 2004-2009.

| CRR subtypes | Lebanese CRR | WHO CRR classification 2004-2009 (%) |
|--------------|--------------|-------------------------------------|
| Clear cell   | 59.1%        | 75%                                 |
| Papillary    | 22.7%        | 10%                                 |
| Chromophobe  | 11.4%        | 5%                                  |
| Collecting ducts of Bellini | 3.4%   | 1%                                  |
| Unclassified | 3.4%         | 4 to 6%                             |

were women and 25% (31 cases) men. (Table 1) 25.8% (32 cases) of kidney cancers were transitional cell carcinomas, 71% (87 cases) were renal cell carcinomas, while kidney metastases and lymphomas were encountered in 2 patients each (1.6%). Among the 87 patients with RCC, subtype distribution was the following: 59.1% (52) were clear cell, 22.7% (20) papillary, 11.4% (10) chromophobe, 3.4% (3) collecting ducts of Bellini and 3.4% unclassified. All the results are summarized in Table 1.

Mean age of patients having urothelial carcinoma was 70.37 years with a range from 30 years to 86 years. 71.8% (23) were men and 28.1% (9) were women. The patients with RCC had a mean age of 60.28 years, with a range from 18 to 85 years and a male predominance reaching 77.3%(68).The patients diagnosed with clear RCC had a median age of 60.96 years, 73.1% were men and 26.9% were women. The patients having papillary RCC were mainly men (95% (19)) and had a mean age of 61.15 years. The chromophobe RCC were the youngest patients when compared to the other subtypes with a mean age of 54.8 years and a male predominance reaching 70%. All the histologic subtypes of RCC with their mean age, extreme ages and sex distribution are reported in Table 1.

Discussion

This study was conducted in two different hospitals in Beirut during two years 2010-2011, analyzing for the first time in Lebanon and the Middle East the epidemiological characteristics and histologic subtypes of 124 patients with kidney cancer. The results of this paper can be extrapolated to the national level and be considered representative of the Lebanese population, since 130 to 140 cases of kidney cancer are diagnosed every year in Lebanon. Hence, this means that around 50% of all diagnosed kidney cancers in Lebanon are reported in our study.

The mean age at diagnosis of patients with kidney cancer in Lebanon is 62.44 years, which is comparable to the results published in the literature. In fact, this number is very close to the mean age reported in the SEER 2006-2010 (National Cancer Institute 2014), which is 64 years. However, the mean age of renal cancer was lower in other Asian countries, it doesn’t exceed the 56.4 years in Pakistan (Hashmi et al., 2014) and 57.1 years in Malaysia (Singam et al., 2010). The M/F sex ratio in our studied population representing the Lebanese population is 3. It is comparable to a French study reporting that 68% of patients having kidney cancers are men (Belot et al., 2008). However, the sex ratio in the SEER program 2006-2010 is 2.5.

The first specific feature of our studied population is the percentage of urothelial carcinoma of the renal pelvis representing 25.8% of all kidney cancer, which exceeds by far the percentages reported in the literature. Chow et al (Chow et al., 2010) mentioned that the urothelial carcinoma of the renal pelvis represents less than 10% of all kidney cancer. Korkes et al (Korkes et al., 2006), in a Brazilian study, reported that this number is 11.4% 8, while this percentage was near the 20% of all kidney cancer in a study published by Motzer et al (Motzer et al., 1996). In a Pakistani study, this percentage doesn’t exceed the 12.5% (Hashimi et al., 2014). This high percentage of urothelial carcinomas of renal pelvis requires further research to identify its cause. As a first impression, this percentage can be attributed to the high incidence of bladder cancer, which represents the third most frequent cancer in Lebanon (Lebanese National Cancer Registry, 2008). According to our results, the mean age of urothelial carcinoma at diagnosis is 70.37 years with male predominance of 71.8%. These results are close to those reported by Korkes et al showing a median age of 65 years in Pakistan (Hashmi et al., 2014) and 57.1 years in Malaysia (Singam et al., 2010). However, the sex ratio in the SEER program 2006-2010 is 2.5.

The high proportion of urothelial carcinoma also means a low percentage of RCC in Lebanon, which represents only 71% of diagnosed kidney cancer in our study. According to SEER program 2002-2006, RCC represents more than 90% of all kidney cancers diagnosed in the United States (Chow et al., 2010).

The second specific feature of our findings is a different histologic subtype distribution of RCC (Table 1). A low percentage of clear cells RCC and a high percentage of papillary and chromophobe RCC is reported in this population.

The main limitation of this study is the sampling bias, since the patients of only two Lebanese hospitals were included. However, the fact that the sample size represents nearly half of all patients diagnosed with kidney cancers in Lebanon can overcome the mentioned bias.

This study is the first paper discussing the epidemiology and histologic subtype distribution of kidney cancer in Lebanon and the Middle East. Compared to others, the Lebanese population shows some specific features and...
characteristics of kidney cancer that may affect in the future the therapeutic approach, the prognosis and survival of patients diagnosed with kidney cancer. Further studies and evaluations are necessary to find a correlation with a Lebanese specific risk factor or genetic mutation that can explain these differences.

In conclusion, compared to the literature, histologic subtype distribution of kidney cancers seems different in Lebanon, according to two medical center records. Next to the high percentage of urothelial tumors of renal pelvis, clear cell carcinoma represents only 59.1% of RCC compared to 75% in the WHO classification of 2004-2009. More studies are necessary to find a potential cause, risk factor or genetic mutation that can explain these specific Lebanese characteristics of kidney cancer.

References

Belot A, Grosclaude P, Bossard N, et al (2008). Cancer incidence and mortality in France over the period 1980-2005. Rev d’Épidémiologie et de Santé Publique, 56, 159-75.

Cancer of the Kidney and Renal Pelvis-SEER Stat Fact Sheets. Bethesda, MD: National Cancer Institute.

Charles T, Lindner V, Matau A, et al (2010). Cancer du rein. EMC-Urol, 3, 1-30.

Chow W-H, Dong LM, Devesa SS (2010). Epidemiology and risk factors for kidney cancer. Nat Rev Urol, 7, 245-57.

Hashmi AA, Ali R, Hussain ZF et al (2014). Clinicopathologic patterns of adult renal tumors in Pakistan. Asian Pac J Cancer Prev, 15, 2303-7.

Korkes F, Silveira TS, Castro MG et al (2006). Carcinoma of the renal pelvis and ureter. Int Braz J Urol, 32, 648-55.

Lebanese Ministry of Public Health. National Cancer Registry 2008 [Internet]. Octobre 25, 2013.

Lopez-Beltran A, Carrasco JC, Cheng L, et al (2009). 2009 update on the classification of renal epithelial tumors in adults. Int J Urol, 16, 432-43.

Lopez-Beltran A, Scarpelli M, Montironi R et al (2006). 2004 WHO classification of the renal tumors of the adults. Eur Urol, 49, 798-805.

Motzer RJ, Bander NH, Nanus DM (1996). Renal-cell Carcinoma. N Engl J Med, 335, 865-75.

Ozbek E, Otuncetemur A, Sahin S et al (2013). Renal cell carcinoma is more aggressive in Turkish patients with the metabolic syndrome. Asian Pac J Cancer Prev, 14, 7351-4.

Singam P, Ho C, Hong GE, et al (2010). Clinical characteristics of renal cancer in Malaysia: a ten year review. Asian Pac J Cancer Prev, 11, 503-6.

Washio M, Mori M, Mikami K, et al (2013). Cigarette smoking and other risk factors for kidney cancer death in a Japanese population: Japan collaborative cohort study for evaluation of cancer risk (JACC study). Asian Pac J Cancer Prev, 14, 6523-8.