RESEARCH COMMUNICATION

Clinical Characteristics of Renal Cancer in Malaysia : A Ten Year Review

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Abstract

Renal cancer is rare and its incidence is 1.9 per 100,000 in the Malaysian population, which consists of three major ethnic groups (Malay, Chinese and Indians). A retrospective study was her conducted to identify clinical characteristics and ethnic background influences on presentation. The study included all renal cancer patients from a single medical institution over ten years, with a total of 75 cases. Seventy-three patients underwent surgery while 2 received only radiotherapy or chemotherapy. The male to female ratio was 2.75:1. Incidence was equal among the Malay (49.3%) and Chinese ethnic groups (45.3%). Mean age of patients were 57.1 (18-93) years old. There were 26 (37.4%) patients with Stage I disease, 14 (18.7%) at Stage II, 23 (30.7%) at Stage III and 12 (16%) at Stage IV. The Chinese race presented at mean older age (p= 0.02) and later stage of disease (p= 0.046). Patients above 40 years old had more advanced stage disease (p= 0.023). Tumour histology were clear cell (72%), urothelial cell (13.3%), sarcomatoid cell and nephroblastoma each contributed 2.7%. The mean tumour size was 8.1 (2-20) cm. There was substantial agreement between the pre and post operative staging (kappa 0.691). In conclusion we observed significant influences of age and race in the clinical presentation of renal cancer in our institution based population. There was larger male to female ratio and mean tumour size as compared to previous epidemiology studies.

Keywords: Epidemiology - ethnic groups - kidney cancer - malaysia - renal cancer

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Introduction

The incidence of renal cancer in Malaysia was 1.7 per 100,000 in 2003 and 1.9 per 100,000 in the year 2006 respectively (NCR, 2003; 2006). It constitutes only the 14th and 20th commonest cancer among the Malaysian male and female gender respectively. However among ethnic groups, it is the ten commonest cancers among Chinese and Indian males (NCR, 2006). In Singapore, whom we share the same ethnic background, kidney cancer has never been the ten commonest cancer among gender or between ethnic groups since 1968-2002 (SCR, 2006).

Current epidemiology data on renal cancer in Malaysia is superficial with emphasis on its racial and gender distribution, age specific incidence and yearly incidences. There is sparse data on its clinical and histological characteristics. The objective of this study was to provide detailed data on the clinical presentation, ethnic group influences and histological variation of renal cancer to better understand the disease characteristics and to serve as a source for future reference.

Materials and Methods

A retrospective study of renal cancers treated in Universiti Kebangsaan Malaysia Medical Center (UKMMC) over a ten year period (2000-2009) was undertaken. Patients' data and tumour characteristics were obtained from electronically stored database information system accessible in UKMMC.

All patients had a registration number in which data pertaining to age, gender, race, imaging and histopathology reports were available. Tumour staging was based on the widely accepted 2002 TMN classification (Sobin and Wittekind, 2002).Operating data were obtained from a Microsoft Access program in which information of all urological surgeries from 1999 to current date were available.

All data were entered into a Microsoft Excel datasheet and analyzed using the commercially available Statistical Package Service Solution (SPSS) version 12.0 software. The Chi Square test was performed where it was considered necessary and p value of less than 0.05 was taken as significant.

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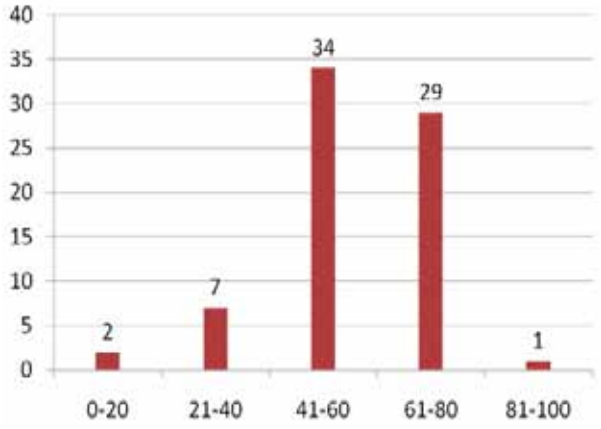

Figure 1. Number of Cases in Age Groups

Results

There were 84 reported cases of renal cancer from 2000-2009. Nine cases were excluded as they had grossly incomplete data from operative notes or via the hospital computerized database. Out of the remaining 75 cases, seventy three patients had nephrectomies as part of their treatment while 2 patients received only either radiotherapy combined chemotherapy.

There were 55 male to 20 female patients with a male-to female ratio of 2.75:1.

The mean age of patient was 57.1 years old (18-93 years). The number of cases was highest in the age group of 41-60 years old (Figure 1).

The incidence of renal cancer was marginally higher for the Malay ethnic group compared to the Chinese. The mean age of presentation for Indians was younger (46.5 years) than of the other ethnic groups. The Chinese population had significantly older mean age than the Malays at presentation. Table 1 illustrates the breakdown of races according to gender and mean age.

The median size of the tumour was 8.0cm (2-20cm). Majority of tumour was left sided. Characteristics of renal cancer are presented in Table 2.

There was upstaging of tumour stage post operatively. These occurred in cases of stage I and II pre operatively whom were upstaged to stage III post operatively. The causes of this was mainly findings of positive regional lymph node involvement by tumour, presence of perinephric fat infiltration and vein wall infiltration on histopathology analysis. However using measurement of agreement with multilayered Kappa, there was substantial agreement between the pre and post operative stage of tumours. Table 3 illustrates these findings.

Table 1. Racial Distribution by Mean Age and Gender

Race	Malay	Chinese	Indian	P value	
Mean Age (years)	53.1	62.7	46.5	0.02	
Male	27	24	4		
Female	10	10	0		
Total	37	34	4		75

Table 2. Clinical Features of 75 Cases of Renal Cancer

Features	No. (%)
Sex (no)	
Male	55 (73%)
Female	20 (27%)
Male-to-female ratio	2.75:1
Age (years)	
Min	18
Max	93
Mean	57.1
Size (cm)	
Median	8 (2-20)
Mean	8.12 (SD 4.227)
Laterality	
Left	43 (52.3%)
Right	32 (42.7%)
Tumour Stage (post operation)	
I	26 (37.4%)
II	14 (18.7%)
III	23 (30.7%)
IV	12 (16.0%)

SD: Standard Deviation

Table 3. Pre and Post Operative Stages of Tumour

		Post Operative Stage				Total
		I	II	III	IV	
Pre Operative Stage	I	26	0	9	0	35
	II	0	14	8	0	22
	III	0	0	6	12	6
	IV	0	0	0	12	12
Total		26	14	23	12	75

Measurement of agreement Kappa 0.691, substantial agreement

Table 4. Frequency of Various Histological Types of Renal Cancer

Histology Types	No	Percentage
Clear Cell	54	75.1%
Urothelial Cell	10	13.9%
Nephroblastoma	2	2.7%
Sarcomatoid	2	2.7%
Collecting Duct Cell	1	1.4%
Papillary	1	1.4%
Squamous Cell	1	1.4%
Chromophobe	1	1.4%
Total	72	100%

+ Three cases were excluded due to absent data on histology

Table 5. Race, Age and Gender according to Cancer Stage

Cancer stage	Localized	Advanced	P value
Race			
Chinese	13	21	
Malay	25	12	
Indian	2	2	p=0.046
Age(years)			
< 40	8	1	
>40	32	34	p=0.023
Gender			
Male	29	26	
Female	11	9	p= 0.861

The histology of renal cancer studied was renal cell carcinoma (54 cases) followed by transitional cell tumour (10 cases). Breakdown of the histology types of renal tumour is presented in Table 4.

Almost two thirds of patient underwent open nephrectomy with or without additional procedures such as pancreatectomy, splenectomy or inferior vena cava thrombectomy. The other one third of patients had either laparoscopic or hand assisted laparoscopic surgeries. The conversion rate from laparoscopic to open surgery was 66%.

Renal cancers were further subdivided into early localized cancer (stage I and II) and advanced cancer (stage III and IV). Based on these criterias, it was found that the Chinese ethnic group and older age (> 40 years) patients presented with more advance tumours.

Discussion

The incidence of renal cancer among Asian countries is less compared to Western countries. The age adjusted incidence per 100,000 ranges from 9.3 to 11.6 in the Western population compared to 1.1 to 6.0 among the Asian population from 1993-1997 (SCR, 2004).

Due to this rarity, it ranks only among the top twenty cancers diagnosed in Malaysia (NCR 2002; 2006). It demonstrates preference in certain ethnic groups in which it is tenth commonest cancer among Indian Malaysian males. This trend is however not seen in neighboring Singapore which shares the same ethnic diversity among its population. Renal cancer cases were never among its ten common cancer throughout the period of 1968-2002, nor among its different ethnic groups (SCR, 2004).

In our study population, the distribution of renal cancers among the ethnic groups were similar to the reported Malaysian cancer registry whereby there was equal numbers of Chinese and Malay patients. We however had less than expected Indian patients, which probably represents the distribution of patient population seen in UKMMC.

It was found that the Chinese population had significantly more advance staged (III and IV) cancers and their mean age of presentation was significantly older than Malay population (62.7 versus 53.1 years). The cause for this phenomenon is not known as yet. Such observation among different ethnic groups was also seen among the western population, where black patients had a significantly higher presentation of localized cancers and with a younger median age compared to white patients (Helen et al., 2008).

Our study population had a younger mean age at presentation (57.1 years) compared to other reports which mean age ranged between 62-66 years. However a younger mean age group of 53 years was also noted among the South Koreans (Haeryoung et al., 2004; Ganesh et al., 2008; Keng et al., 2008; Yasuhisa et al., 2008; Patrick et al., 2009). We also found that patients above 40 years old had significantly more advanced tumours. This could reflect on the cultural background and beliefs of the older generation whom would seek alternative therapy first and consult modern medical treatment only after general health worsens.

The male to female ratio in our study was 2.75:1. This is higher than previous reported Malaysian male to female ratio of 1.8-1.9:1 in the years of 2003 and 2006 (NCR, 2002; 2006). Our figures was however similar to the Korean population ratio of 2.4:1 but differs from the Singapore and USA where the ratio is about 1.6-1.7:1 (Haeryoung et al., 2004; SCR, 2004; Jeffrey et al., 2008; Nalan et al., 2009). This trend unlikely represents the difference between the socio-economy status of a country but rather the lifestyle, environmental influences and dietary background. The female gender is hypothesized to have lower incidences from less risk factors like smoking and occupational exposures. Differences in sex hormone levels have not found to correlate with cancer incidences and therefore have no importance in renal cancer as compared to breast cancer (Jeffrey et al., 2008). We did not find significant difference between genders in stage of disease. In the USA, the female gender had significantly early staged cancers and better survival outcome (Haeryoung et al., 2004; SCR 2004; Jeffrey et al., 2008)

The histology types in this study had shown similar patterns of frequency compared to reported Western and Asian population, in which clear cell was the dominant histology types (75.1% and 13.9% respectively) (Haeryoung et al., 2004; SCR 2004; Patrick et al., 2009). However unlike the other studies where papillary and chromophobe cell was the second and third commonest, we saw more transitional cell, nephroblastoma and sarcomatoid subtypes. This difference could be explained by the small number of cases in our study.

The mean size of tumours in our study population was 8.12 cm (2- 20 cm). They are generally larger than reported mean sizes which range from 4.7-6.3cm (Haeryoung et al., 2004; Ganesh et al., 2008; Yasuhisa et al., 2008). This accounts for 65% of our patients being diagnosed in stage II or more. Prevalence of metastasis is reportedly higher, while cancer specific and disease free survival is lower with increasing size of tumor at presentation (Changhee et al., 2008; Mike and Inderbir, 2009). Thus we could postulate the majority of our patients to present later with metastasis or disease recurrence during follow up. However data for this is currently not available yet.

The larger size of mean tumour size also explains the choice for open and hand assisted surgery rather than laparoscopic surgery. However with increasing surgical skills and training it is hoped that the numbers of laparoscopic surgeries will increase and become the standard practice as in other established urological centers.

In evaluating the pre operative staging, we commonly employ the use of computer tomography scans of thorax, abdomen pelvis as well as bone scans. Based on the analysis, we found substantial agreement between pre operative and post operative staging. Therefore the imaging tools used gives accurate assessment of the cancer stage and this allows surgeons to prognosticate the patients' survival and expected course of disease. This also allows decisions for less radical surgical approach or alternative therapies to be used in cases of small tumours or in patients deemed not fit for general anaesthesia.

The weakness in this study is the small number of patients available for analysis. As this is relatively new medical institution of 13 years in origin, the small number is expected. Despite this, epidemiological data on renal cancer in Malaysia is sparse. We hope with this study, basic information of renal cancer on a Malaysian based population with its diverse ethnic background, would be established to serve as reference, to spur more research and involve collaboration of multiple institutions to better understand this disease.

Based on a small cohort of Malaysian renal cancer patients from a single institution, we found that there was significant ethnical group difference in median age and stage of tumour presentation. Generally our patients presented 5 years younger (57 versus 62 years) than internationally quoted figures and the male patients had higher than expected ratio of developing renal cancer. Young patients (< 40 years) presented significantly more in localized stage of disease. We had larger tumour size than previous reported studies (mean of 8.12 versus 6.3 cm) but the tumour histology was accordance to expected. The results of the pre operative imaging yielded accurate and reliable information on stage of the renal cancer.

Further research looking into the above risk factors influence and to identify other factors on renal cancer is needed in this country. This can be established with a larger patient population with involvement and collaboration of multiple centers.

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