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CLINICOPATHOLOGICAL ASSESSMENT OF KIDNEY TUMORS IN SAMPLE OF ADULT IRAQI PATIENTS

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ABSTRACT

Introduction: Kidney neoplasms are benign and malignant. Renal cell carcinoma (RCC), the worst urologic malignancy, accounting for 2% to 3% of adult malignant neoplasms. Adults develop RCC. More than 90% of RCC cases are clear cell, papillary, or chromophobe, and the male-to-female ratio of adult RCC is 2:1. Adult benign kidney neoplasms vary in histology and clinicobiology. Imaging shows most benign kidney tumours as solid enhancing masses, similar to RCCs. To evaluate the histological diagnosis of kidney tumours in adult Iraqi patients in connection to clinicopathological factors (Age, Gender, Associated clinical symptoms, Size, Side, Site, Gross discovery, Tumour histopathological subtypes, Grade, and pathological stage). **Method:** The Teaching Laboratory of Al-Imamain Al-Kadhimain Medical City, Pathology Departments of Ghazi Al-Harreri Surgical Specialties Hospital, and private laboratories collected 100 randomly selected kidney tumour patients from January 2019 to May 2022 for a retrospective study. Histopathological reports and slides were gathered and retrospectively analysed for each patient. Patient admission case sheets and pathology reports included clinical information such as age, gender, related clinical characteristics, size, side, location, gross discovery, tumour subtypes, grade, and stage. The data were statistically analysed using SPSS version 23 using CHI square test at 0.05 to determine association associations. **Results:** The study included a sample aged 18-80 years (mean 52.2 ± 12.2 SD), with a male to female ratio of 1.5:1. The majority of tumors were malignant (91%), with clear cell carcinoma as the most common type (66%). The tumor size ranged from 1.5-20.0 cm (mean 6.3 ± 3.3 SD), and most were <7cm (61%). Hematuria, loin pain, and mass were the most common symptoms among symptomatic patients. **Conclusion:** Most adult kidney tumours in this research are malignant. Most renal cell carcinomas have clear cell histology. Most kidney malignant tumours are big and advanced stage and nuclear grade, indicating late disease development. Rare benign neoplasms. Females had more oncocytomas and angiomyolipoma.

KEYWORDS: Clinicopathological, Assessment, Kidney, Tumors, sample, adult, Iraqi, patients.

INTRODUCTION

Malignant neoplasms, such as renal cell carcinoma (RCC) and urothelial carcinomas of the calyces and pelves, are of great clinical importance in the kidney, with RCC being the most common and lethal of all urologic cancers.[1] RCC accounts for 2-3% of adult malignant neoplasms, and the widespread use of modern imaging techniques, such as ultrasonography, computed tomography, and magnetic resonance imaging, has led to increased detection of renal tumors, many of which are small or benign.[2] Clear cell, papillary, and chromophobe RCC subtypes make up over 90% of RCC cases.[3] Adult RCC typically affects individuals aged 55-60 years, with a male to female ratio of 2:1 and a 1% incidence of bilaterality. Common presenting symptoms include hematuria (59%), flank pain (41%), and loin mass (45%), though only 9% of patients experience all three.[4] Factors predisposing to RCC include polycystic adult kidney disease, von Hippel-Lindau syndrome, horseshoe kidney, and acquired renal cystic disease in end-stage renal disease patients. Treatment primarily involves radical nephrectomy, with adjunctive radiation and chemotherapy for improved survival.[5] Benign renal neoplasms in adults are a diverse group of tumors with distinct histology and clinicobiologic profiles. The World Health Organization (WHO) classification system categorizes benign renal neoplasms based on

histogenesis and histopathology, including renal cell, metanephric, mesenchymal, and mixed epithelial and mesenchymal tumors. While some benign kidney tumors (e.g., angiomyolipomas, mixed epithelial and mesenchymal tumors, leiomyomas, and hemangiomas) have characteristic imaging findings and regional distribution, most benign renal tumors appear as solid enhancing masses, making them difficult to distinguish from malignant neoplasms like RCCs. Biopsies can help confirm diagnoses and potentially avoid aggressive treatments.[6] This research examines the histological diagnosis of kidney tumours in adult Iraqi patients in connection to clinicopathological criteria (Age, Gender, Associated clinical symptoms, Size, Side, Site, Gross finding, Tumour subtypes, Grade, and pathological stage).

METHODS

Study design: A cross-sectional study was conducted from January 2019 to May 2022, involving a retro-prospective analysis of 100 randomly selected patients with kidney tumors. The samples were collected from the Teaching Laboratory of Al-Imamain Al-Kadhimain Medical City, Ghazi Al-Harreri Surgical Specialties Teaching Hospital Pathology Departments, and private laboratories. Histopathological reports and slides were reexamined and reviewed retrospectively. Clinical parameters such as age, gender, clinical features, size, side, site, gross findings, tumor subtypes, grade, and pathological stage were extracted from patient admission case sheets and pathology reports.

The practical work included

1. Collection of 100 histopathological reports and slides from nephrectomy specimens.
2. Slide inspection and re-evaluation by the study's supervising pathologist at the College of Medicine/Al-Nahrain University Pathology Department. The study lasted one year, from January 2022 to January 2023.

Inclusion Criteria: Adults with nephrectomy operations for kidney tumors.

Exclusion criteria

1. Recurrent tumors.
2. Prior treatment before surgery.
3. Tumor of renal pelvis.

3.3.1. Tissue sectioning: Tissue sections were cut to 4-micrometer thickness with a rotary microtome for microscopic examination. The tissue was flattened in a warm water bath before placing it on a glass microscope slide.

3.3.2. Staining: Routine Hematoxylin and Eosin Stain was applied following a standard procedure of deparaffinization, hydration, staining, differentiation, rinsing, counterstaining, dehydration, clearing, and mounting.

3.3.3. Image Capture: H&E stained slides were examined using a light microscope (Leica, Germany) at 10x and 40x magnifications to identify histopathological features. Photomicrographs were taken with an iPhone X [12 MP wide-angle camera, f/1.8 aperture].

3.2. Statistical methods: Collected data were analyzed using SPSS version 23. Data were plotted as bar charts and pie charts for better visualization. Contingency tables and Chi-squared tests were used to assess the correlation between investigated variables, with p-values less than 0.05 considered statistically significant.

RESULTS

A total number of 100 patients were included in the study sample. The age of the studied sample ranged from 18-80 years with a mean of (52.2 years ± 12.2 SD). Most of the studied sample were ≥50 years (64.0%) as illustrated in table (1). Regarding gender distribution, the male to female ratio was 1.5:1.

Table (1): Age and gender of the studied sample.

Age and gender	Frequency	Percentage
Age		
<50 years	36	36.0
≥50 years	64	64.0
Total	100	100.0
Gender		
Male	60	60.0
Female	40	40.0
Total	100	100.0

A statistically significant association was detected between gender and histopathological diagnosis (P value = 0.002); as clear cell type carcinoma and papillary renal cell carcinoma type I were significantly more common in males; as illustrated in table (2).

Table (2): Association between gender and histopathological diagnosis.

Histopathology	Gender		Total
	Male	Female	
Clear cell type carcinoma	43	23	66
	43.0%	23.0%	66.0%
Papillary renal cell carcinoma type I	11	1	12
	11.0%	1.0%	12.0%
Papillary renal cell carcinoma type II	0	3	3
	0.0%	3.0%	3.0%
Chromophobe renal cell carcinoma	4	3	7
	4.0%	3.0%	7.0%
Cystic renal cell carcinoma	1	0	1
	1.0%	0.0%	1.0%
Renal oncocytoma	1	4	5
	1.0%	4.0%	5.0%
Angiomyolipoma	0	4	4
	0.0%	4.0%	4.0%
Sarcomatoid type renal cell carcinoma	0	2	2
	0.0%	2.0%	2.0%
Total	60	40	100
	60.0%	40.0%	100.0%
P value = 0.002*			

* Statistically significant

A statistically significant association was detected between staging and histopathological diagnosis (P value = 0.012); as most cases of clear cell type carcinoma were of stage III; as illustrated in table 3.

Table (3): Association between histopathological type of malignant tumors and staging.

Histopathology	Tumor stage				Total
	Stage I	Stage II	Stage III	Stage IV	
Clear cell type carcinoma	26	6	33	1	66
	28.6%	6.6%	36.3%	1.1%	72.5%
Papillary renal cell carcinoma type I	6	2	4	0	12
	6.6%	2.2%	4.4%	0.0%	13.2%
Papillary renal cell carcinoma type II	0	1	2	0	3
	0.0%	1.1%	2.2%	0.0%	3.3%
Chromophobe renal cell carcinoma	2	2	3	0	7
	2.2%	2.2%	3.3%	0.0%	7.7%
Cystic renal cell carcinoma	1	0	0	0	1
	1.1%	0.0%	0.0%	0.0%	1.1%
Sarcomatoid type renal cell carcinoma	0	0	1	1	2
	0.0%	0.0%	1.1%	1.1%	2.2%
Total	35	11	43	2	91
	38.5%	12.1%	47.3%	2.2%	100.0%
P value = 0.012*					

* Statistically significant

A statistically significant association was detected between tumor grade and histopathological diagnosis (P value < 0.001); as most cases of clear cell type carcinoma were of grade II; as illustrated in table (4).

Table (4): Association between histopathological type of malignant tumors and tumor grade.

Histopathology	Tumor grade				Total
	Grade I	Grade II	Grade III	Grade IV	
Clear cell type carcinoma	4	40	15	7	66
	4.4%	44.4%	16.7%	7.8%	73.3%
Papillary renal cell	5	5	1	1	12

carcinoma type I	5.6%	5.6%	1.1%	1.1%	13.3%
Papillary renal cell carcinoma type II	0	0	2	1	3
	0.0%	0.0%	2.2%	1.1%	3.3%
Chromophobe renal cell carcinoma	0	4	1	1	6
	0.0%	4.4%	1.1%	1.1%	6.7%
Cystic renal cell carcinoma	1	0	0	0	1
	1.1%	0.0%	0.0%	0.0%	1.1%
Sarcomatoid type renal cell carcinoma	0	0	0	2	2
	0.0%	0.0%	0.0%	2.2%	2.2%
Total	10	49	19	12	90
	11.1%	54.4%	21.1%	13.3%	100.0%
P value < 0.001*					

* Statistically significant

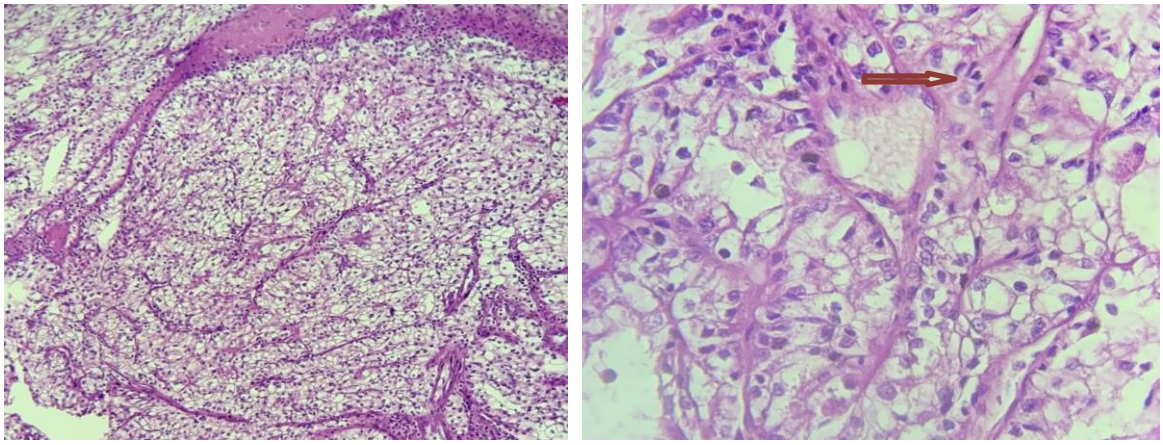

Figure 1: Section of clear cell type renal cell carcinoma showing: grade 2, clear cytoplasm of tumor cells which have a solid, trabecular and tubular patterns, separated by slight vasculature with absent nucleoli at 10x, H&E (A), but at 40x, H&E magnification the nucleoli are conspicuous and slight eosinophilic (arrow) (B).

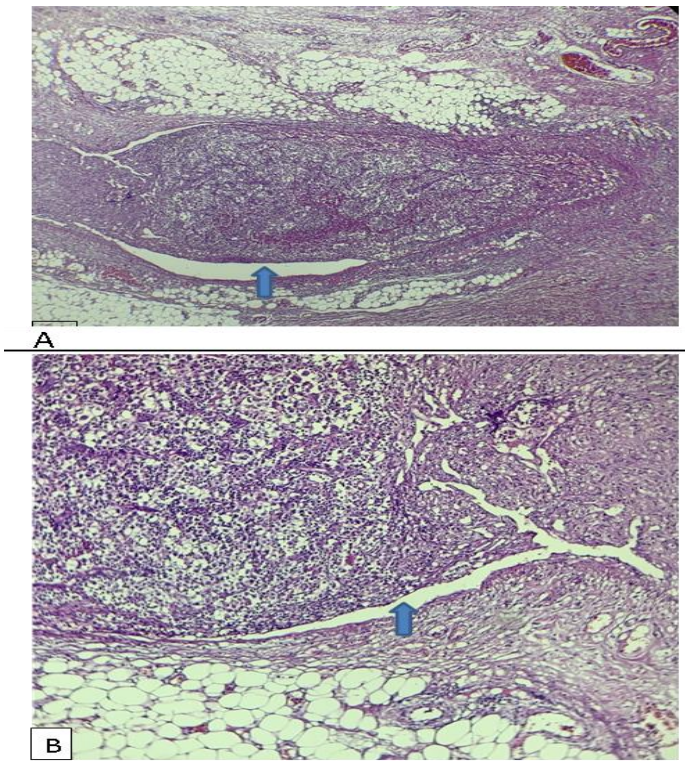

Figure 4.9: Section of clear cell type renal cell carcinoma showing extension into renal vein (arrow), (A,4x and B,10x, H&E).

DISCUSSION

The mean age of patients in the present study was 52.2 years, similar to the Indian study by Datta B et al. (2015)[7] and the Saudi Arabia study by Abdulkader M. Albasri et al. (2017)[8], but higher than the Nigerian study by TA Badmus et al. (2008)[9] and the Pakistani study by Latif et al. (2011).[10] The age was considerably lower compared to the study by Sarah Khafaja et al. (2015) in Lebanon.[11] The differences may be attributed to sample size, inclusion/exclusion criteria, and geographical areas. Age has prognostic significance in RCC, with a more favorable prognosis in younger patients possibly due to a lower stage at diagnosis.[12] According to Gre´gory Verhoest et al. (2007)[13], sex ratio was more balanced in younger patients, and the likelihood of organ-confined tumors decreased with age. Low-grade tumors were more common in patients under 60 years, and the proportion of clear-cell carcinomas decreased in patients over 40 years, while papillary and chromophobe carcinomas increased. The male to female ratio in the current study was 1.5:1, similar to Rehman et al. (2015) in Pakistan[14], but lower than Datta et al. (2016) and Latif et al. (2011) in India[7,10], and Abdulkader M. Albasri et al. (2017) in Saudi Arabia.[8] It was higher than the ratio reported by Takure et al. (2013) in Ibadan.[15] RCC is more common in men, who typically have larger tumors and higher stage and grade than women.[16] Factors such as smoking habits, tumor biology, occupational risks, and sex steroid hormones may contribute to these disparities.[16] A Cleveland Clinic study found women less likely to have malignant lesions (72.7% vs 85.5% in men)[17], with hormone-related factors potentially playing a role.[18] The current study reported 91% malignant tumors, similar to Yong-Hong Xiong et al. in China[20], and Bashir N et al. in India.[21] Compared to studies from Pakistan and Ghana, Latif et al. (2011) reported 87.2% RCC in adult renal tumors[10], Mathew Y Kyei et al. (2015) reported 85.5% histologically confirmed malignant cases[22], and Hashmi AA et al. (2014) found 78% RCC in adult renal tumors.[23] The high malignancy rate in the current study may be due to sample size, inclusion/exclusion criteria, geographic distribution, and patient education and awareness.[24] The most common RCC subtype was clear cell (72.5%), followed by papillary type I (13.5%), chromophobe (7.5%), and sarcomatoid (2.5%).[8,10,11] The mean tumor size was 6.3 cm (± 3.3 SD), with most tumors <7cm (61.0%).[23,24] Larger RCC tumors are associated with a higher probability of metastases and worse survival.[25] Left-side predominance (56.0%) was observed, with the upper pole most affected (32.0%).[26] Tumor location in the kidney showed 15.0% occupying the entire kidney, and 32.0%, 25.0%, and 25.0% occupying the upper, middle, and lower poles, respectively.[10] The most common clinical presentation was hematuria (43.7%), followed by loin pain (33.3%), mass (19.5%), and incidental finding (13%).[27] Most malignant tumors were grade II (53.8%), followed by grade III (20.9%).[28] Fuhrman grade is a key determinant of RCC-specific survival, with median 5-year survival rates of 94%, 86%, 59%, and 31% for grades I, II, III, and IV, respectively.[29] The grading system is validated for clear cell and papillary RCC but not for chromophobe RCC.[30] The most frequent RCC stage in the current study was stage III (47.3%).[31] Stage IV RCC had the least frequency in the present study (2.2%), which was lower than rates reported in Malaysia (16.0%).[32] The findings suggest a late presentation of patients in advanced stages compared to Western countries, where RCC is diagnosed incidentally and earlier. Perinephric fat invasion (45.1%) and renal vein invasion (16.5%) rates were higher than those reported in Canada (16%)[24], the study by Song Turun S. (27%).[33] These differences may be due to the high percentage of stage III cases in the current study. Patients with concomitant perinephric fat and renal vein invasion had lower cancer-specific survival[34], with renal vein invasion associated with worse survival than perinephric fat invasion.[35] Tumor necrosis was present in 52.7% of cases, higher than rates reported in previous studies.[36] Histologic tumor necrosis is associated with more aggressive tumor behavior.[37] Benign tumors accounted for 9% of cases, with renal oncocytoma (55%) and angiomyolipoma (45%).[24] Younger age groups and women were more likely to have benign lesions.[24] Smaller renal tumors were also more likely to be benign[38], with sizes ranging from 2-11 cm in the current study, compared to 0.8-9.5 cm in the study by Schlomer et al.[38] This difference could be attributed to more incidentally found renal lesions in Western countries.

CONCLUSION

1. In the current study, most renal tumors in adults are malignant.
2. Clear cell renal cell carcinoma is the predominant histologic subtype, with papillary and chromophobe renal cell carcinomas also occurring at rates comparable to those in the published literature.
3. A small number of renal tumors in our patients were diagnosed incidentally, which contrasts with the higher rates of incidental diagnoses in developed countries.
4. The majority of malignant kidney tumors in our patients were large, presented at advanced stages, and had higher nuclear grades, indicating late presentation after disease progression.
5. Benign neoplasms are uncommon, with a higher prevalence in females and younger age groups. Oncocytomas are the most frequent subtype, followed by angiomyolipomas.

REFERENCES

1. Ameen IH. RETROSPECTIVE STUDY OF RENAL TUMOR IN SULAIMANIYA GOVERNORATE. Basrah Journal of Surgery, 2005; 11(1).
2. Prasad SR, Surabhi VR, Menias CO, Raut AA, Chintapalli KN. Benign renal neoplasms in adults:

cross-sectional imaging findings. American Journal of Roentgenology, 2008 Jan; 190(1): 158-64.
3. DATTA, B., et al. Histopathological evaluation of surgically treated adult renal tumors: Report from a tertiary care center in India. Indian Journal of Cancer, 2016; 53.1: 124.
4. ALBASRI, Abdulkader M., et al. Clinicopathologic patterns of adult renal tumors. Saudi Journal of Medicine & Medical Sciences, 2017; 5.3: 242.
5. BADMUS, T. A., et al. Malignant renal tumors in adults: A ten-year review in a Nigerian hospital. Saudi Journal of Kidney Diseases and Transplantation, 2008; 19.1: 120.
6. Latif F, Mubarak M, Kazi JI. Histopathological characteristics of adult renal tumours: a preliminary report. JPMA-Journal of the Pakistan Medical Association, 2011 Mar 1; 61(3): 224.
7. Khafaja S, Kourie HR, Matar D, Sader-Ghorra C, Kattan J. Kidney cancer in Lebanon: a specific histological distribution?. Asian Pacific Journal of Cancer Prevention, 2015; 16(1): 363-5.
8. Karakiewicz PI, Jeldres C, Suardi N, Hutterer GC, Perrotte P, Capitanio U, Ficarra V, Cindolo L, de La Taille A, Tostain J, Mulders PF. Age at diagnosis is a determinant factor of renal cell carcinoma–specific survival in patients treated with nephrectomy. Canadian Urological Association Journal, 2008 Dec; 2(6): 610.
9. Verhoest G, Veillard D, Guillé F, De La Taille A, Salomon L, Abbou CC, Valéri A, Lechevallier E, Descotes JL, Lang H, Jacqmin D. Relationship between age at diagnosis and clinicopathologic features of renal cell carcinoma. european urology, 2007 May 1; 51(5): 1298-305.
10. Rehman RA, Ashraf S, Rahim J, Hussain N, Jamil MN, Tahir MM. Clinical presentation of renal cell carcinoma. Journal of Ayub Medical College Abbottabad, 2015 Jun 20; 27(2): 326-8.
11. Takure AO. Renal cell carcinoma in Ibadan: A 5-year clinicopathologic review. African journal of medicine and medical sciences, 2013; 42(3): 239-43.
12. Lucca I, Klatte T, Fajkovic H, De Martino M, Shariat SF. Gender differences in incidence and outcomes of urothelial and kidney cancer. Nature Reviews Urology, 2015 Oct; 12(10): 585-92.
13. DeRoche T, Walker E, Magi-Galluzzi C, Zhou M. Pathologic characteristics of solitary small renal masses: can they be predicted by preoperative clinical parameters?. American journal of clinical pathology, 2008 Oct 1; 130(4): 560-4.
14. Cho E, Adami HO, Lindblad P. Epidemiology of renal cell cancer. Hematology/Oncology Clinics, 2011 Aug 1; 25(4): 651-65.
15. Mohan BP, Krishnan SK, Deepa S, Pothen L. Pattern of Renal Tumors: A Tertiary Care Center Experience over a decade.
16. Xiong YH, Zhang ZL, Li YH, Liu ZW, Hou GL, Liu Q, Yun JP, Zhang XQ, Zhou FJ. Benign pathological findings in 303 Chinese patients undergoing surgery for presumed localized renal cell carcinoma. International Journal of Urology, 2010 Jun; 17(6): 517-21.
17. Bashir N, Bashir Y, Shah P, Bhat N, Salim O, Samoon N, Bashir H, Hussain S, Angmo D, Geelani T, Khan D. Histopathological study of renal tumors in resected Nephrectomy specimens-An experience from teritary care centre. Nat J Med Res., 2015; 5(1): 25-9.
18. Kyei MY, Klufio GO, Mensah JE, Gyasi RK, Gepi-Attee S, Ampadu K. Nephrectomy in adults: Experience at the Korle Bu Teaching Hospital, Accra, Ghana. Saudi Journal of Kidney Diseases and Transplantation, 2015 May 1; 26(3): 638.
19. Hashmi AA, Ali R, Hussain ZF, Faridi N. Clinicopathologic patterns of adult renal tumors in Pakistan. Asian Pacific Journal of Cancer Prevention, 2014; 15(5): 2303-7.
20. Violette P, Abourbih S, Szymanski KM, Tanguay S, Aprikian A, Matthews K, Brimo F, Kassouf W. Solitary solid renal mass: can we predict malignancy?. BJU international, 2012 Dec; 110(11b): E548-52.
21. Shin TY, Kim J, Koo KC, Lim SK, Kim DW, Kang MW, Rha KH, Choi YD, Ham WS. Assessing the anatomical characteristics of renal masses has a limited effect on the prediction of pathological outcomes in solid, enhancing, small renal masses: results using the PADUA classification system. BJU international, 2014 May; 113(5): 754-61.
22. Simmons MN, Ching CB, Samplaski MK, Park CH, Gill IS. Kidney tumor location measurement using the C index method. The Journal of urology, 2010 May; 183(5): 1708-13.
23. Tayib AM. Renal tumors in adults: The clinical experience of 124 patients. JKAU Med Sci., 2011 Jan 4; 18: 15-22.
24. Aiman A, Singh K, Yasir M. Histopathological spectrum of lesions in nephrectomy specimens: A five-year experience in a tertiary care hospital. Journal of the scientific Society, 2013 Sep 1; 40(3): 148.
25. Rioux-Leclercq N, Karakiewicz PI, Trinh QD, Ficarra V, Cindolo L, de la Taille A, Tostain J, Zigeuner R, Mejean A, Patard JJ. Prognostic ability of simplified nuclear grading of renal cell carcinoma. Cancer: Interdisciplinary International Journal of the American Cancer Society, 2007 Mar 1; 109(5): 868-74.
26. Bhatta R, Pandey G, Jha NK, Bastakoti S, Dhungana I, Upreti S. Histopathological pattern of adult renal tumours in a tertiary cancer center. Journal of Pathology of Nepal, 2022 Mar 31; 12(1): 1929-32.
27. Eissa A, Abdil Sattar H. Prognostic Value of CD44 and Ki-67 in Renal cell carcinoma. Med J Babylon, 2014; 12: 274-282.
28. Singam P, Ho C, Hong GE, Mohd A, Tamil AM, Cheok LB, Zainuddin Z. Clinical characteristics of renal cancer in Malaysia: a ten year review. Asian Pac J Cancer Prev, 2010 Jan 1; 11(2): 503-6.

29. Turun S, Banghua L, Zheng S, Wei Q. Is tumor size a reliable predictor of histopathological characteristics of renal cell carcinoma?. Urology annals, 2012 Jan; 4(1): 24.
30. Novara G, Ficarra V, Antonelli A, Artibani W, Bertini R, Carini M, Cunico SC, Imbimbo C, Longo N, Martignoni G, Martorana G. Validation of the 2009 TNM version in a large multi-institutional cohort of patients treated for renal cell carcinoma: are further improvements needed?. European urology, 2010 Oct 1; 58(4): 588-95.
31. Zhang Z, Yu C, Velet L, Li Y, Jiang L, Zhou F. The difference in prognosis between renal sinus fat and perinephric fat invasion for pT3a renal cell carcinoma: a meta-analysis. PLoS One, 2016 Feb 18; 11(2): e0149420.
32. Sidharth M, Luitel BR, Gupta DK, Maskey P, Chalise PR, Sharma UK, Gyawali PR, Shrestha GK, Sayami G, Joshi BR. Pattern of Renal Cell Carcinoma–A Single Center Experience in Nepal. Kathmandu University Medical Journal, 2011; 9(3): 185-8.
33. Mohsin R, Hashmi A, Sultan G, Shehzad A, Mubarak M, Ghazanfar N, Tunio MA, Naqvi SA. Renal tumors in young adults: a single-center experience from a developing country. Urology Journal, 2012 Jan 1; 9(1): 373-80.
34. Schlomer B, Figenshau RS, Yan Y, Venkatesh R, Bhayani SB. Pathological features of renal neoplasms classified by size and symptomatology. The Journal of urology, 2006 Oct; 176(4): 1317-20.