

A HISTOPATHOLOGICAL STUDY OF NON-NEOPLASTIC AND NEOPLASTIC LESIONS OF KIDNEY FOR A PERIOD OF TWO YEARS

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ABSTRACT

BACKGROUND

Nephrectomy is a common procedure in surgical practice. There are many indications for nephrectomy, non-neoplastic and neoplastic conditions. The common conditions being chronic pyelonephritis and renal tumours. A detailed and meticulous histopathological examination is essential to establish the diagnosis of lesions of kidney.

MATERIALS AND METHODS

It is a retrospective study for a period of two years from January 2015 to December 2016 at a tertiary care centre. 34 cases of nephrectomy specimens were analysed and data recorded.

RESULTS

Non-neoplastic lesions were constituting 47.05% (16) of cases and 52.94% (18) cases were neoplastic lesions. Lesions were more common in females with male:female ratio of 1:1.4. Both the lesions were common in age group of 41-50 years.

CONCLUSION

The prevalence of neoplastic lesions was more common than non-neoplastic lesions. The commonest indication for nephrectomy was chronic pyelonephritis followed by renal tumours. Histopathological examination in correlation with clinical and radiological features plays a great role in subcategorisation of lesions accurately to ensure better therapy.

KEYWORDS

Nephrectomy, Non-Neoplastic Lesions, Neoplastic Lesions, Renal Cell Carcinoma.

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BACKGROUND

Non-neoplastic lesions are often identified in nephrectomy specimens removed for renal neoplasms. Non-neoplastic lesions are seen in 90% of nephrectomy specimens removed for renal neoplasms.¹ Chronic pyelonephritis is the most common non-neoplastic lesion. Xanthogranulomatous pyelonephritis is a relatively rare form of chronic pyelonephritis.² In adults, renal cell carcinoma accounts for 85% of malignant kidney tumours;³ frequent histological types being clear cell, papillary and chromophobic. Multilocular cystic renal cell carcinoma is uncommon with incidence of 1-4% of renal cell carcinoma and it has excellent prognosis.^{4,5} The 2016 WHO recommends the term

multilocular cystic renal neoplasm of low malignant potential.⁶

Aims and Objectives- This study was conducted to know the prevalence of non-neoplastic and neoplastic lesions of kidney and to know the histological variants. The aim of present study is to know the prevalence of non-neoplastic and neoplastic lesions in the nephrectomy specimens received with emphasis on histological patterns.

MATERIALS AND METHODS

A total of 34 nephrectomy specimens received in the Department of Pathology for a period of 2 years from January 2015 to December 2016 were analysed. The clinical details were recorded. After thorough grossing, sections were given based on standard procedure. The tissue was subjected to routine paraffin embedding tissue processing and stained with haematoxylin and eosin. The results were tabulated.

RESULTS

In our study, 34 nephrectomy specimens were analysed. Out of these, 34 cases, 16 (47.05%) cases were non-neoplastic, 18 (52.94%) cases were neoplastic (Table 1).

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Males constituted 41.4% (14 cases), females 58.8% (20 cases). The M:F ratio being 1:1.4 (Table 1). The highest percentage of patients in both non-neoplastic and neoplastic categories belonged to the age group of 41-50 years (Table 4 and 5). The youngest patient was 15 days old (15/12), the oldest patient was 70 years. A majority of cases were that of chronic pyelonephritis (Figure 1), which were seen in age group 41-50 years. Maximum number of renal cell carcinoma fell into the age group of 40-60 years. In our study, out of 12 renal cell carcinomas, 8 (66.7%) were clear cell RCCs (Figure 2, 3, 4), one case of clear cell carcinoma with focal sarcomatoid differentiation (8.3%) (Figure 5), one case was papillary RCC (8.3%), one case of multilocular cystic renal cell carcinoma (8.3%) (Table 6). Grossly, multilocular cystic renal cell carcinoma appeared as multilocular cystic spaces in kidney filled with brown-coloured fluid and focal small yellowish solid areas (Figure 6).

One case of anaplastic carcinoma (8.3%) (Figure 7) and one case of high-grade transitional cell carcinoma of renal pelvis (8.3%) (Figure 7) were encountered (Table 6). All cases of Wilms tumours (Figure 8, 9) were in patients below the age of 5 years (Table 5).

Two cases of tuberculous pyelonephritis were encountered. One xanthogranulomatous pyelonephritis case was seen in male patient 58 years belonged to the age group of (51-60). A greater number of non-neoplastic lesions were observed in females. Malignant lesions were observed in males and females equally (Table 2).



Figure 1. Gross Photograph of Chronic Pyelonephritis showing Loss of Kidney Architecture and Dilated Pelvicalyceal System



Figure 2. Gross Photograph of Renal Cell Carcinoma showing Circumscribed Mass Measuring 8 x 7 cm in the Upper Pole showing Variegated Appearance

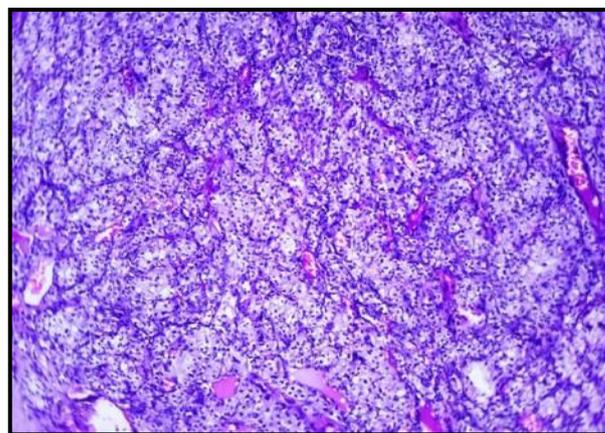


Figure 3. Photomicrograph of Clear Cell Carcinoma showing Tumour Cells Arranged in Tubules (H and E, 40X)

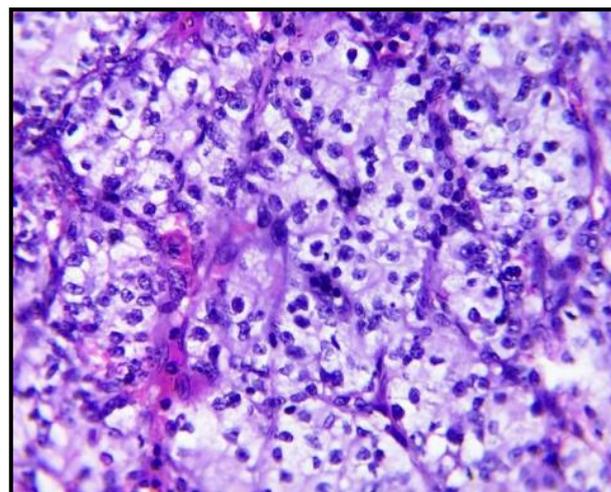


Figure 4. Photomicrograph showing Clear Cell Carcinoma (Tumour Cells having Round to Polygonal Cells with Abundant Clear to Granular Cytoplasm and Vesicular Nucleus (H and E, 400X)

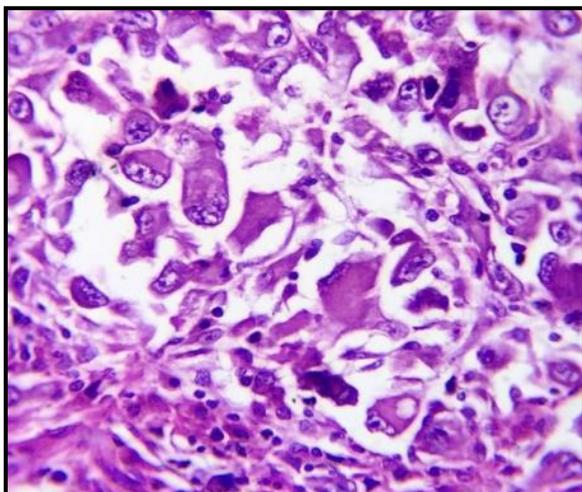


Figure 5. Photomicrograph showing Renal Cell Carcinoma with Sarcomatoid Differentiation with Pleomorphic Tumour Cells showing Abundant Oeosinophilic Cytoplasm, Vesicular Nucleus and Prominent Nucleolus (H and E, 400X)



Figure 8. Gross Photograph of Wilms Tumour showing Large, Solitary, Well-Circumscribed, Homogenous Mass with Tan to Gray Appearance and Foci of Haemorrhage



Figure 6. Gross Photograph of Multilocular Cystic Renal Cell Carcinoma showing Multiple Cystic Spaces Filled with Brown-Coloured Fluid and Focal Small Yellowish Solid Areas

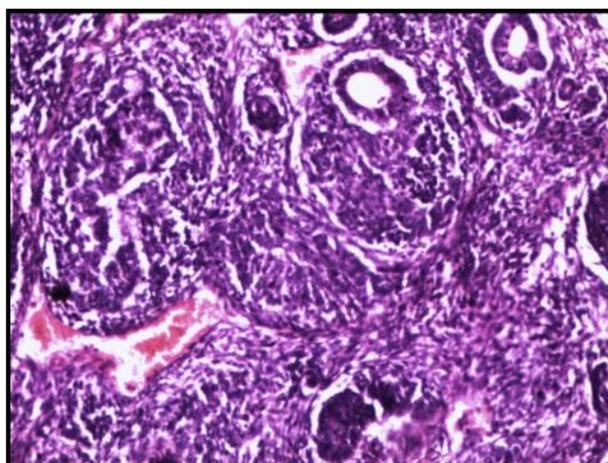


Figure 9. Photomicrograph of Wilms Tumour showing Blastemal Component and Abortive Tubules (H and E, 100X)

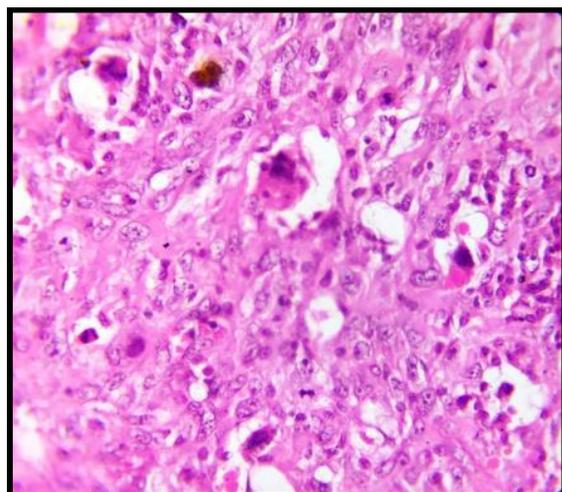


Figure 7. Photomicrograph showing Renal Cell Carcinoma with Anaplastic Differentiation showing Severe Degree of Pleomorphism and High Mitotic Activity (H and E, 100X)

Lesions	Males	Females
Non-neoplastic	5	11
Neoplastic	9	9
Total	14	20

Table 1. Gender Wise Distribution of Non-Neoplastic and Neoplastic Lesions

Lesions	Number of Cases	Percentage
Chronic pyelonephritis	13	81.25
Xanthogranulomatous pyelonephritis	1	6.25
Tuberculous pyelonephritis	2	12.5

Table 2. Prevalence of Various Non-Neoplastic Lesions of Kidney

Lesions	Number of Cases	Percentage
Renal cell carcinoma	12	66.66
Wilms tumour	5	27.75
Transitional cell carcinoma of pelvis	1	5.55

Table 3. Prevalence of Various Neoplastic Lesions of Kidney

Lesions	0-10	11-20	21-30	31-40	41-50	51-60	61-70
Chronic pyelonephritis	1	0	2	3	4	1	2
Xanthogranulomatous pyelonephritis	0	0	0	0	0	1	0
Tuberculous pyelonephritis	0	1	0	0	0	1	0

Table 4. Age Wise Distribution of Non-Neoplastic Lesions

Lesions	0-10	11-20	21-30	31-40	41-50	51-60	61-70
Renal cell carcinoma	0	0	0	1	6	4	1
Wilms tumour	5	0	0	0	0	0	0
Transitional cell carcinoma of pelvis	0	0	0	0	1	0	0

Table 5. Age Wise Distribution of Neoplastic Lesions

Histological Type	Number of Cases	Percentage
Clear cell renal cell carcinoma	8	66.7
Papillary renal cell carcinoma	1	8.3
Renal cell carcinoma, unclassified (anaplastic)	1	8.3
Renal cell carcinoma (sarcomatous)	1	8.3
Multilocular cystic renal neoplasm of low malignant potential	1	8.3

Table 6. Histological Variants of Renal Cell Carcinoma

DISCUSSION

Kidney can be affected by both non-neoplastic and neoplastic conditions that require nephrectomy .The number of nephrectomy specimens received during the period was 34. Out of these 34 cases, 16 cases were non-neoplastic (47.02%) and 18 cases were neoplastic (52.94%). This is in accordance with Aiman et al⁷ and Ghalayini study.⁸

14 cases were seen in males and 20 cases were seen in females giving a male:female ratio of 1:1.4. Female predominance was also seen in Aiman et al⁷ (1:2.8), Abdulghfoor et al⁹ (1:1.1), Rafique¹⁰ (1:1.5).

Non-Neoplastic Lesions of Kidney- Mahjabeen Salma et al,¹¹ analysed 50 nephrectomy specimens, non-neoplastic lesions constituted 78% of cases. These lesions occurred commonly in the age group of 41-50 years with male preponderance. Chronic pyelonephritis was the commonest non-neoplastic lesion (50%). Non-neoplastic lesions were more common on left side (58.98%). The commonest symptom was pain abdomen in the flank area, fever and malaise.

Schwartz and Cotran et al,¹² analysed 95 nephrectomy specimens, 11.57% were diagnosed as chronic pyelonephritis. Stewart JF et al¹³ documented 8% cases of chronic pyelonephritis in 317 nephrectomy specimens.

Kincaidsmith et al¹⁴ analysed 147 nephrectomy cases, out of which, 20% were chronic pyelonephritis. Aiffa Aiman et al⁷ documented 62.8% cases of chronic pyelonephritis in 140 nephrectomies. In the studies by Popat et al,¹⁵ Adanson et al,¹⁶ EL Malik et al,¹⁷ Ghalayani et al,⁸ Shifa Seyed Ibrahim,¹⁸ chronic pyelonephritis was the commonest indication for nephrectomy. In the study by Mohammad Rafique et al,¹⁰ in 20% cases, the indication for nephrectomy was chronic pyelonephritis and 53.3% cases were renal stones.

In the present study, the most common indication for nephrectomy was chronic pyelonephritis (38.2), which presented with flank pain and dysuria.

In the study by Salma et al,¹¹ xanthogranulomatous pyelonephritis constituted 8% of cases, which presented as mass abdomen in 67% of cases and flank pain in 67%.

Malek et al¹⁹ reported xanthogranulomatous pyelonephritis in 6% of cases. In the study by Parson et al,²⁰ xanthogranulomatous pyelonephritis presented as renal mass (60%), renal pain (80%) and hypertension in 40% of cases. Majority of patients had renal calculi.

Aiman et al⁷ reported 5.7% of cases of xanthogranulomatous pyelonephritis. Popat et al¹⁵ observed 2.5% of cases. D'costal et al²¹ observed 10% of cases with female preponderance. Majority of patients 62.5% belonged to the age group of 41-60 years followed by 25% in the age group 21-40 years. 75% of patients presented with flank pain, burning micturition and recurrent urinary tract infection.

In the present study, we reported one case of xanthogranulomatous pyelonephritis (2.9%), which presented with renal mass and pain in the flank and clinical diagnosis was renal tumour.

In the study by Salma et al,¹¹ tuberculosis pyelonephritis was seen in 3 cases with female preponderance and non-functioning kidney.

In the study by Mahmud Rafique et al,¹⁰ renal tuberculosis was documented in 9 cases (7.6%), patients with renal tuberculosis are uncommon in developed countries, as many as 15% to 20% of tuberculosis patients in the developing countries are diagnosed with tuberculosis, a major health problem in India.

In the present study, 2 cases were documented with renal tuberculosis, one case occurring at 12 years of age and another at 55 years.

Neoplastic Lesions of Kidney- In the study by Salma et al,¹¹ the prevalence of neoplastic lesion in nephrectomy specimens was 22% with 63.64% of cases being renal cell carcinoma, 18.19% Wilms tumour and 7% being squamous cell carcinoma from renal pelvis and 7% being transitional cell carcinoma. There is male preponderance with ratio of 2.5:1 and age range being 4th to 7th decade of life. George

Linden et al²² documented 87.77% cases of renal cell carcinoma. Lynch et al²³ documented 75% cases of renal cell carcinoma. Kanter et al,²⁴ Motzer RS et al³ both showed male preponderance with ratios being 2:1 and 2.3:1, respectively. 70-80% of cases presented with haematuria and palpable mass with incidence of 80%.

In the study by Seyed Ibahim et al,¹⁸ the incidence of renal cell carcinoma was 44.44%. Clear cell papillary renal cell carcinoma was the commonest histopathology with low nuclear Fuhrman grading. Clear cell renal carcinoma constituted 11% of cases.

In contrast to the studies, incidence of clear cell renal cell carcinoma was 97% in Rafique M study, 51% in Lopez et al,²⁵ 80% in Aiman et al⁷ and 76% in Eggener et al²⁶ study.

In the study by Aiman et al,⁷ 22.5% of cases were malignant lesions, commonest being renal cell carcinoma (53.1%). Popat et al¹⁵ recorded 70% of malignant lesions as renal cell carcinoma with male preponderance. In the study by Ibrahim Fathi Ghalayini,⁸ malignant tumours were seen in 29.6% of cases with renal cell carcinoma being the commonest tumour (72.8%), 4.8% were urothelial carcinoma with male preponderance.

In the study by Nusrat Bashir et al,²⁷ the prevalence of malignant tumours was 89.12% and mostly presented in the 4th to 5th decade, RCC clear cell type was the commonest (60.8%), upper pole was involved in 50.5%, lower pole 29.3% and whole kidney in 20% of cases with Fuhrman grading 2 in 51.4% of cases.

In the present study, 5 cases of Wilms tumours (27.75%) were seen. All were below the age 10 years. Microscopically, all the 5 cases were triphasic Wilms tumours, one case showing predominant blastemal component.

In the study by Mahjabeen Salma et al,¹¹ Wilms tumour is one of the most common solid tumours of childhood with 75% of cases diagnosed between 1-5 years. 90% of cases occurring in children before 7 years with peak incidence between 2-4 years. In the study by Aiman et al,⁷ the preoperative diagnosis was confirmed histopathologically in 91.6% cases of Wilms tumour.

In the present study, 1 case (5.55%) of transitional cell carcinoma of pelvis was encountered, which occurred in 50-year-old male patient.

In the study by Mahjabeen Salma et al,¹¹ renal pelvic tumours constitute 7% of renal tumours. More than 90% of these tumours are transitional cell carcinoma only. Renal pelvic tumours occur most often during 4th to 7th decade of life.

CONCLUSION

Out of 34 nephrectomy specimens, 16 (47.05%) cases were non-neoplastic lesions, 18 (52.94%) cases were neoplastic lesions. The non-neoplastic lesions were more (11) in females and neoplastic lesions were equal (9) in both sexes. The commonest indication for nephrectomy was chronic pyelonephritis followed by renal tumours. Histopathological examination in correlation with clinical and radiological

features plays a great role in subcategorisation of lesions accurately to ensure better therapy.

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