ORIGINAL RESEARCH PAPER

Histopathology

KEY WORDS: Non neoplastic lesions, Neoplastic Lesions, Hydronephrosis, Renal Cell Carcinoma.

HISTOPATHOLOGICAL SPECTRUM OF LESIONS IN NEPHRECTOMY SPECIMENS: A ONE YEAR EXPERIENCE IN TERTIARY CARE HOSPITAL

Dr. Prashant R. Patel Assistant Professor, Dept Of Pathology, Gmc, Surat.

Dr. Hemali J. Tailor Assistant Professor, Dept Of Pathology, Gmc, Surat.

Dr. Ankita S. Kachiya* 2nd Year Resident Doctor, Dept Of Pathology, Gmc, Surat. *Corresponding Author

Dr. Vaishali K. Chaudhari 1st Year Resident Doctor, Dept Of Pathology, Gmc, Surat.

ABSTRACT

Introduction - Kidneys are one of the major organs of the human body that serve several essential functions. **Objectives -**This study aimed to investigate and understand the various morphological patterns exhibited by renal diseases, as well as to assess their distribution across different age groups and genders. **Materials and Methods -** The present study was conducted at Department of Pathology, Department of pathology, Government Medical College, Surat. A total of 24 nephrectomy specimens were studied. **Results -**The study shows, male to female ratio is 1:1.4 with female preponderance and among 24 nephrectomy specimens 15 were non-neoplastic and 9 were neoplastic. Non- Neoplastic lesions constitute about 15 cases with hydronephrosis (4 cases) being the most common cause leading to nephrectomy. Among 9 Neoplastic cases most common cause being renal cell carcinoma (6 cases). In the age group between 5th to 6th decades, maximum number of non-neoplastic lesions and neoplastic lesions were seen and least was observed in between 1st to 2nd decade. **Discussion -**In the present study the most common findings of nephrectomy was hydronephosis and renal cell carcinoma. A rare case of lymphoproliferative disorder- B cell lymphoma with plasmacytic differentiantion also seen. **Conclusion -** These findings provide valuable insights into the histopathological patterns and the incidence of neoplastic and non-neoplastic lesions of kidney requiring nephrectomy in this institution.

INTRODUCTION

Kidneys are one of the major organs of the human body that serve several essential functions. Their main function is to regulate the balance of electrolytes in the blood, along with maintaining pH homeostasis. They also remove waste products of metabolism from blood and produce erythropoietin to maintain hematopoiesis and an important enzyme, renin to maintain blood pressure.[1]

Kidneys are affected by various non-neoplastic and neoplastic pathological processes. Common clinical indication for nephrectomy is symptomatic chronic infections, obstruction, calculus disease, and severe traumatic injury to renal cell carcinomas.[2,4,5,6,7]

Both benign and malignant tumors occur in the kidney. The kidneys are affected by different malignant tumors: 99 % of renal neoplasms are malignant, with renal cell carcinoma being the most common.[3]

Renal cell carcinoma (RCC) accounts for 2% of all cancers globally and is the cause of 2% of cancer deaths. In 2020, there were 271 249 new cases in men (age-standardized rate of 6.1 cases per 100 000 population) and 160 039 cases in women (age-standardized rate of 3.2 cases per 100 000 population). The M:F ratio was 1.58:1.[8]

Objectives of the current study are to investigate and understand the various morphological patterns exhibited by renal diseases, as well as to assess their distribution across different age groups and genders.

MATERIALS AND METHODS

Type of Study: Retrospective study.
Duration of study: January 2022 to December 2022.

Place of study: Department of pathology, Government Medical College, Surat.

Inclusion criteria: Nephrectomy Specimen of any age and sex having non neoplastic or neoplastic (benign and malignant) lesions that undergone histopathological examination following surgery was included in this study.

Exclusion Criteria: The patients who underwent core needle biopsies from their renal masses were excluded.

Method of collection of data

Detailed clinical data of the patient like age, sex, clinical diagnosis along with radiological details like USG and CT was taken.

All nephrectomy specimens were fixed in 10% formalin and then subjected to gross examination, noting the size, appearance, external surface and cut surface.

Sections were cut at 5-6 microns thickness, processed and stained with routine Haematoxylin and Eosin stain in the department of pathology, Government Medical College, Surat. All sections were studied and Histopathological evaluation of nephrectomy specimens were done.
Tumors were further classified according to 2016 WHO classification.

RESULTS

A total of 24 cases of nephrectomy specimens were studied. Out of which Neoplastic lesions were 9 (37%) and non-neoplastic lesions were 15(63%) in number.

In the present study the youngest patient is 9 years female while oldest patient is of 72 year male and most common age group affected is between 5th to 6th decades. Male to female ratio is 1:1.4with female preponderance.

Maximum cases of hydronephrosis in nonneoplastic lesions and renal cell carcinoma in neoplastic lesions were seen in the age group of 51-60 years.

Table 1: Age and gender distribution in Nephrectomy specimens

Age	Male	Female	Total cases	Percentage
1-10	0	1	1	4.16%
11-20	0	1	1	4.16%
21-30	0	2	2	8.33%
31-40	2	3	5	20.83%
41-50	3	1	4	16.66%
51-60	2	4	6	25%
61-70	2	2	4	16.66%
71-80	1	0	1	4.16%
Total	10	14	24	100

Table 2: Distribution of Non-neoplastic and Neoplastic lesions in nephrectomy specimens

Type of lesions	No. of cases		Percentage
	Male	Female	
Non Neoplastic	6	9	63%
Neoplastic	4	5	37%
Total	10	14	100%

Non-neoplastic lesions in nephrectomy specimens

The non-neoplastic lesions constitute about 15 cases with hydronephrosis (4 cases) being the most common cause leading to nephrectomy.

Hydronephrosis (4 cases) majority of them showed enlarged kidneys with depressed scars, multiple cyst and loss of corticomedullary differentiation. The microscopy showed periglomerular fibrosis with thyroidization of tubules, fibrosis and interstitial inflammation.

Chronic pyelonephritis (3 cases) cases showed pelvicalyceal system was dilated and distorted. Microscopy showed varying degrees of glomerular sclerosis, periglomerular fibrosis, tubular atrophy and thyroidization along with interstitial inflammation, fibrosis and thickened blood vessels.

Table 3: Distribution of various Non-neoplastic Lesions in nephrectomy specimens.

Type of lesion	No. of cases		Percentage
	Male	Female	
Chronic pyelonephritis	1	2	20%
Hydronephrosis	2	2	27%
Xanthogranulomatous pyelonephritis	0	2	13%
Renal amyloidosis	1	0	7%
Pyonephrosis	0	1	7%
Inflammatory renal disease	1	0	7%
Acute pyelonephritis	0	1	7%
Renal injury	1	1	13%
Total	6	9	15(100%)

Xanthogranulomatous Pyelonephritis (2 cases) grossly showed yellow nodules and microscopic examination showed sheets of macrophages and interstitial inflammation.

Neoplastic Lesions

Out of 9 cases of neoplastic lesion, most common cause was renal cell carcinoma (6 cases). From 6 cases of renal cell carcinoma 3 cases were Clear cell Renal cell carcinoma, 2 cases papillary renal cell carcinoma and 1 case chromophobe renal cell carcinoma.

Two cases of benign neoplasm – oncocytoma were noted.

cells with plasmacytoid features. Neoplastic cells arranged in diffuse and interstitial patterns.

Table 5: Distribution of various neoplastic Lesions in nephrectomy specimens.

Type of lesion	No of cases		Percentage
	Male	Female	
ONCOCYTOMA	0	2	22.22%
PAPILLARY RCC	1	1	22.22%
CLEAR CELL RCC	1	2	33.33%
CHROMOPHOBE RCC	1	0	11.11%
LYMPHOPROLIFERATIVE DISEASE - B CELL LOW GRADE LYMPHOMA WITH PLASMACYTIC DIFFERENTIATION	1	0	11.11%
Total	4	5	9(100%)

The male female ratio in neoplastic lesions was 1:1.25 with female preponderance. In the age group between 5th to 6th decades maximum number of neoplastic lesions were seen.

Clear cell renal cell carcinoma- maximum diameter of primary tumor was 13.5cm and least was 3.5cm and yellowish in color. Accordingly maximum number of cases were within pT1 consisting of 2 cases (67%) with 1(33%) case in pT3- clear cell carcinoma with sarcomatoid changes.

Papillary carcinoma-Out of 2 cases 1 case suggestive of papillary carcinoma with sarcomatoid differentiantion.

Lymphoproliferative disorder- B cell low grade lymphoma with Plasmacytic differentiation -Grossly showed loss of cortico-medullary differentiation and solid diffuse firm growth involving upper, middle and lower pole of kidney. Microscopically neoplastic proliferation of lymphoid.

DISCUSSION

In the present study, out of the 24 Nephrectomy specimens studied, 63% had non neoplastic lesions and 37% had neoplastic lesions. Thus, non-neoplastic lesions comprised the vast majority of the cases in our study. A similar predominance of benign lesions was observed in the other studies which were done by Aiffa, kuldeep and Mir.[2] and Dr Prachi and co-workers.[3]

Majority of patients belonged to the age group of 5th to 6th decade, similar finding was observed in the study done by Shireesha, Sushma and Shruthi.[6]

Female predilection was noted in both non neoplastic and neoplastic lesions in this study which was in discordance with other studies.

Non-neoplastic lesions in nephrectomy specimens

The non-neoplastic lesions constitute about 15 cases with hydronephrosis (4 cases) being the most common cause leading to nephrectomy which was similar to study done by Dr. Ajay, Renuka and Bimla et al. followed by CPN (02 cases) and with two cases of Xanthogranulomatous pyelonephritis.[1]

Globally the incidence of xanthogranulomatous pyelonephritis is 0.6 to 1% with female preponderance. It was encountered with two cases in female patient, this is similar to study done by Dr. Ajay, Renuka and Bimla.[1]

The male female ratio in non-neoplastic lesions is 1:1.5 with female preponderance.

Neoplastic Lesions

Nephrectomy is a standard treatment offered to patients who present with benign as well as malignant mass lesions in the kidney. Most common malignant tumor in adults is renal cell carcinoma (RCC) and Wilms tumor in childhood.[1]

In the present study, a total of 7 (67%) malignant lesions were observed out of this vast majority comprised renal cell

carcinomas 6 cases (67%). This was similar to the findings of Aiffa Aiman, Kuldeep Singh, Mir Yasir [2] who observed that the majority of malignant neoplasms of the kidney were renal cell carcinomas. their study, found that 78% of malignant lesions were accounted for by renal cell carcinomas.

Second most malignant lesion in this study was a rare case of B cell low grade lymphoma with plasmacytic differentiation.

CONCLUSION

These findings provide valuable insights into the histopathological patterns and the incidence of neoplastic and non-neoplastic lesions of kidney requiring nephrectomy in this institution.

A wide range of lesions are encountered on histopathology of nephrectomy specimens, many of which may be misdiagnosed clinically and radiologically; therefore, it is mandatory that every nephrectomy specimen be subjected to a detailed histopathological examination for a clinico-morphological correlation to ensure proper management.

Most common affected age group was 51- 60 years and the most common indication for nephrectomy was Hydronephrosis and clear cell carcinoma was the most common adult malignancy.

REFERENCES:

(1) Dr. Ajay Singh Thakur, Dr. Renuka Gahine, Dr. Bimla Banjare. A Histopathological spectrum of nephrectomy specimens in a tertiary hospital of Raipur city (C.G.) India. Tropical Journal of Pathology & Microbiology September 2019/Vol 5/ Issue9
(2) Aiffa Aiman, Kuldeep Singh, Mir Yasir. Histopathological spectrum of lesions in nephrectomy specimens: A five-year experience in a tertiary care hospital. Journal of the Scientific Society, September-December 2013, Vol 40 / Issue 3.
(3) Dr Prachi Hansdah, Dr Shambhavi, Dr B C Adhikari, Dr Ratna Choudhary. Histological Spectrum of Lesions in Nephrectomy Specimen - A Tertiary Care Hospital Experience. International Journal of Science and Research, May 2020, Volume 9 Issue 5.(4) Dipika Basnet, Ramesh Makaju, Rachana Dhakal, Binita Lama, Nikita Gautam. Histomorphological Spectrum of Lesions in Nephrectomy Specimen. Journal of College of Medical Sciences-Nepal, Apr-Jun 2021, Vol-17, No 2.
(5) Vinay KS and Sujatha Siddappa. Histopathological Spectrum of Nephrectomy Specimens: Single Center Experience. Biomedical Journal of Scientific & Technical Research, 2018.06.001350.
(6) Shireesha M, Sushma Yalavarthi, Shruthi Deshpande and GV Saikumar. Histopathological spectrum of lesions of kidney: A morphological study. International Journal of Clinical and Diagnostic Pathology 2023; 6(2): 13-16.
(7) Deepthi. K. N, Shilpa Karamchedu* and Apurva. Histomorphological Spectrum of Renal Diseases: A Prospective Study for A Period of Two Years. Pacific group of e- journals in Annals of Pathology and Laboratory Medicine, August 2020/Vol 7/ Issue 8.
(8) WHO Classification of Urinary and male genital Tumors- 5th Edition.