

Histological Spectrum of Lesions in Nephrectomy Specimen - A Tertiary Care Hospital Experience

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Abstract: *Background:* Nephrectomy is the common surgical procedure done for variety of neoplastic and non-neoplastic diseases. It is indicated in patients with wide range of clinical conditions ranging from symptomatic chronic infections, obstruction, calculus disease, end stage renal disease and severe traumatic injury to renal cell carcinomas. This study was conducted to find out the histopathological spectrum of diseases. *Materials and Methods:* This retrospective and prospective comparative study was carried on nephrectomy specimen received over the period of 3years (February 2017– January, 2020) in department of pathology, Rajendra Institute of Medical Sciences, Ranchi, Jharkhand. *Results:* A total of 52 nephrectomy specimens were received. Male constituted 28 cases (53.8%) and females 24cases (46.2%). Age ranges from 20 months to 70 years. Non neoplastic (31 cases) were most common followed by malignant (21cases). Chronic pyelonephritis (12 cases) was the most common. Among malignant tumour, renal cell carcinoma (11 cases) was most frequent. *Conclusion:* Non neoplastic lesions were more common than neoplastic lesion. Renal cell carcinoma was most common among the malignant tumours.

Keywords: nephrectomy, tuberculous pyelonephritis, hydatid cyst, angiomyolipoma, renal cell carcinoma

1. Introduction

Kidney can be involved in various pathological processes, some of which may require its surgical removal. Nephrectomy is a common procedure. Both benign and malignant tumors occur in the kidney. Simple nephrectomy is indicated for patient with irreversibly damaged kidney resulting from symptomatic chronic infections, obstruction, calculous disease or severe traumatic injury. Nephrectomy is also done for treatment of renovascularhypertension, in severe parenchymal damage resulting from nephrosclerosis, pyelonephritis, vesicouretric reflux and congenital dysplasia. It is the treatment of choice for Renal cell carcinoma.^[1]The kidney are affected by different malignant tumors: 99 percent of renal neoplasm are malignant with renal cell carcinoma and wilm's tumor being the most common.^[2]

2. Material and Methods

This study was conducted in all nephrectomy specimens received in the department of pathology, Rajendra Institute of Medical sciences, Ranchi, Jharkhand. The study included a retrospective 2 years and a prospective 1 year. A total of 52 cases of nephrectomy specimen were studied during this period. For the retrospective period (February 2017 to January 2019) all nephrectomy cases were taken out from the records of the department and slides were reviewed. In the prospective period (February 2019 to January 2020), all resected specimen received were followed up. Each case was analysed with respect to age, clinical presentation and microscopic diagnosis. The tissue was processed as per standard procedure; 4- 5 microns thick sections were cut and stained by haematoxyline and eosin.

3. Results

During the study, we received a total of 52 nephrectomies. Numbers of male patients were 28 (53.8%) and numbers of

female patients were 24 (46.2%); hence the male to female ratio was 1.2:1. (Table. 1) The youngest patient was 20 months old and the oldest was 70 years old. Most common affected age group was 4th to 5th decade with 14 cases contributing 26.1% of total cases. (Table. 2)

Table 1: Gender distribution of nephrectomy specimen.

Lesion	Male (%)	Female (%)
Non Neoplastic	16	15
Neoplastic	12	09
Total	28 (55.8)	24 (46.2)

Table 2: Age distribution of nephrectomy specimen

Age (Years)	Total case	Percentage (%)
0-10	8	15.4
11-20	6	11.5
21-30	5	9.6
31-40	6	11.5
41-50	14	27.0
51-60	8	15.4
61-70	5	9.6

Number of non- neoplastic cases was 31 (59.6%) and neoplastic cases were 21 (40.4%) Neoplastic cases further included 5.8% of benign tumors and 34.6% of malignant tumors. Among the non-neoplastic inflammatory diseases affecting nephrectomies, most common lesions was chronic pyelonephritis (23.0%) and in neoplastic lesion, most common was renal cell carcinoma (21.2%). (Table. 3) WHO/International Society of Urologic Pathology (ISUP) revealed 45.5% of renal cell carcinoma showing Grade 3 nuclear grade followed by Grade 2 (27.3%) (Table. 4)

Table 3: Distribution of nephrectomy specimens according to histopathological lesion

Lesion	Total case	Percentage (%)
Non Neoplastic	31	59.6
Chronic Pyelonephritis (CPN)	12	23.0
CPN with calculi	03	5.8
Hydronephrosis with CPN	04	7.7
Xanthogranulomatous pyelonephritis	02	3.9
Tuberculous pyelonephritis	02	3.9
Multicystic renal dysplasia	01	1.9
Polycystic Kidney	06	11.5
Hydatid cyst in kidney	01	1.9
Neoplastic	21	40.4
Benign	03	5.8
Angiomyolipoma	02	3.9
Metanephric adenoma	01	1.9
Malignant	18	34.6
Renal cell carcinoma	11	21.2
Wilms tumour	07	13.4

Table 4: WHO/ISUP Nuclear grading system for Renal cell carcinoma

Nuclear grade	Total case (n=11)
Grade 1	02
Grade 2	03
Grade 3	05
Grade 4	01

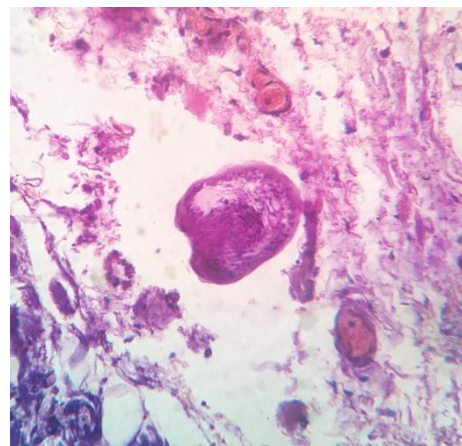
4. Discussion

Nephrectomy is a standard treatment offered to patients who present with benign as well as malignant mass lesions in the kidney. This present study consist of 52 nephrectomies cases were analysed. Majority of patients belonged to the age group of 4th to 5th decade. This is in concordance with the study done by Kotta Devender Reddy et al., and Dr Ajay Kumar where the maximum number of patients were in 4th decade.^[3, 4] Risk factors include tobacco intake, obesity, hypertension, unopposed estrogen therapy, exposure to asbestos, chronic renal failure, acquired cystic disease and tuberous sclerosis complex patient.^[5, 6] In the present study, the most common indication of nephrectomy was chronic pyelonephritis (23.0%) and renal cell carcinoma. (21.2%) Chronic pyelonephritis was the most common inflammatory conditions and the most common clinical indication in the studies by Popat et al.,^[7] and Adamson et al.,^[8] It was followed by polycystic kidney disease (11.5%), hydronephritis with CPN (7.7%), 3 cases of CPN with calculi, 2 cases of Xanthogranulomatous pyelonephritis and tuberculous pyelonephritis and 1 case of Hydatid cyst of kidney and Multicystic renal dysplasia.

Out of 31 non-neoplastic disorders, infective pathology formed a predominant subgroup of 23 cases. Here, there is a need to emphasize the importance of early diagnosis and proper management of urinary tract infections and nephrolithiasis.

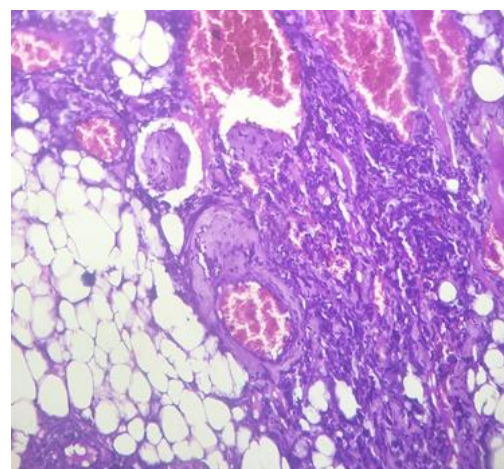
In our study, 2 cases of tuberculous pyelonephritis were seen. Granulomas with epithelial cells and giant cells are present in tuberculosis. 1 case of hydatid cyst of kidney. Human infection follows ingestion of eggs of *Echinococcus granulosus* passed by infected dogs. In about half the case of primary hydatid occurs in liver followed by

lungs and kidney. In kidney, hydatid cyst causes pain and hematuria. (Fig. 1)

**Figure 1:** Scolices of *Echinococcus* in kidney, H and E stain, x 40

There were 21 cases of renal tumours; out of which benign lesions constituted 3 cases (5.8%) and malignant was 18 cases. (34.6%) Most common benign lesion was angiomyolipoma: 2 cases (3.9%) followed by 1 case of metanephric adenoma. Angiomyolipoma has undergone a remarkable transformation, from a rare and rather pedestrian tumor type restricted to the kidney to a biologically fascinating and morphologically heterogeneous entity that can occur in a wide variety of extrarenal sites including liver, pelvic region, retroperitoneum, (unconnected to the kidney) uterus, somatic soft tissues, large bowel, nasal cavity and bone. The histology of angiomyolipoma varies according to relative proportions of fat, smooth muscle and blood vessels. (Fig. 2) 1 case of Metanephric adenoma was seen. Metanephric adenoma occurs at all ages, most commonly in the fifth and sixth decade, and 2:1 female preponderance is seen.^[9] It is the most common epithelial tumor found in the kidneys of children.^[10]

Malignant lesions constituted 34.6% among nephrectomy specimens. Renal cell carcinoma was the most common. (21.2%) cell carcinoma is a family of carcinoma that arise from the epithelium of the renal tubules.^[11]

**Figure 2:** Admixture of fat, smooth muscle and blood vessels in angiomyolipoma of kidney, H and E stain, x40

Renal cell carcinoma is almost exclusively a cancer of adults; approximately 30,000 new cases are diagnosed each year in the United States, and its frequency is increasing.^[12] In our study most common histological type was clear cell renal carcinoma (9 cases) followed by 2 cases of chromophobe type. (Fig. 3) Fuhrman grading system was replaced by WHO/International Society of Urologic Pathology (ISUP) grading system.^[13]

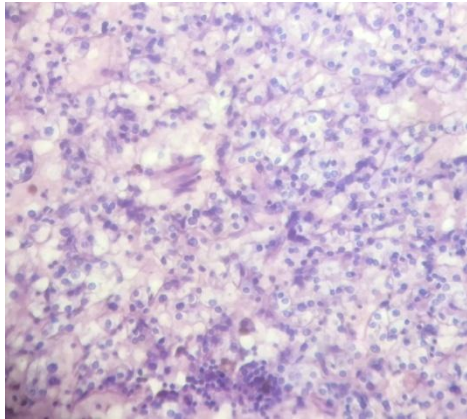


Figure 3: Clear cell renal carcinoma, H and E stain, x40

7 cases (13.4%) of Wilmstumor was found. Wilms tumor has a peak incidence between 2 year and 5 years of age, with 90% being diagnosed by age 6 year.^[14, 15] In our study, youngest patient was male child of 20 month old year. Most specimens exhibit triphasic appearance which includes cells of blastemal, stromal and epithelial lineage. (Fig. 4)

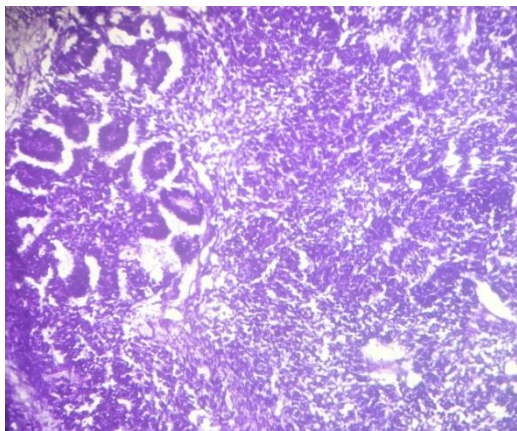


Figure 4: Blastemal, stromal and immature tubular formation in Wilmstumor, H and E stain, x20

5. Conclusion

The present study provides insight into histological pattern of lesions in nephrectomy specimens in our institution. Even though this is a tertiary care centre, patient undergoing nephrectomy is low. The study reflects the disease pattern of this region. Non neoplastic lesions were more common than neoplastic lesion. Chronic pyelonephritis was most common non neoplastic lesion. Renal cell carcinoma was most common malignant tumour. The detailed histological examination is essential to classify the lesion and grade of neoplastic lesion for further treatment protocol.

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