



## HISTOPATHOLOGICAL STUDY OF THIRTY NEPHRECTOMY SPECIMENS IN A TERTIARY CARE HOSPITAL IN NORTH TELANGANA

### Pathology

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### ABSTRACT

**Introduction:** The kidneys are paired retroperitoneal organs insulated by adipose tissue with Gerota's fascia. They extend from 12<sup>th</sup> thoracic vertebra to the 3<sup>rd</sup> lumbar vertebrae.

**Materials & Methods:** The present study is conducted in department of Pathology, Prathima Institute of Medical Sciences, during the period of January 2015 to May 2017. A total of 30 nephrectomy specimens were studied, among them 19 were non neoplastic and 11 were neoplastic lesions.

**Results:** In our study chronic pyelonephritis was the most common lesion observed and age group between 31-40 years constituted highest number of cases with male predominance. Other lesions include Xanthogranulomatous pyelonephritis, angiomyolipoma, cysts and Renal cell carcinomas (RCC) and its variants.

**Conclusion:** Chronic pyelonephritis was the commonest non neoplastic lesion and RCC was the most common neoplastic lesion observed in our study.

### KEYWORDS

Nephrectomy, Chronic pyelonephritis, Renal cell carcinoma, Angiomyolipoma

### INTRODUCTION

Kidney performs the following vital functions of the body like excretion of waste products, regulation of acid base balance, regulation of salt water balance and formation of renin and erythropoietin. Renal tumours comprise a diverse spectrum of neoplastic lesions with patterns that are relatively distinct for children and adults. A wide variety of both benign and malignant tumours arise from different components of the renal parenchyma, notably tubular epithelium.<sup>1</sup> Both benign and malignant tumours occur in the kidney, the latter being more common. These may arise from renal tubules (adenoma, adenocarcinoma), embryonic tissue (mesoblastic nephroma, Wilms tumour), mesenchymal tissue (angiomyolipoma) and from the epithelium of the renal pelvis (urothelial carcinoma)<sup>1</sup>.

### MATERIALS & METHODS

The present study is conducted in department of Pathology, Prathima Institute of Medical Sciences, during the period of January 2015 to May 2017. A total of 30 nephrectomy specimens were studied. All the Required clinical details were obtained from the hospital records and all the nephrectomy specimens were studied with clinical features, radiological findings, gross and microscopic features. Gross features, like size and weight of the kidney, location, colour of the tumour, cut surface of the tumour, extension of the tumour through the capsule, presence of normal kidney tissue, length of ureter, presence of capsule, external renal surface, tumor size and shape, perinephric fat, calyces and pelvis, invasion of ureter and vessel and presence of lymph node metastases were noted in all the cases. Parallel slices were cut without mutilating the specimen and fixed in formalin overnight. Multiple sections for histology of 2-3 mm thick were taken from the following sites – Tumor proper, adjacent normal renal tissue, pelvis, renal artery and vein and from Ureter. Lymph nodes were analysed if present.

### RESULTS

Out of 30 cases, 20 cases were non neoplastic lesions and 10 cases were neoplastic. Loin pain was the main common presenting complaint noted, followed by burning micturition and frequency of micturition. [Table 1]

Out of 20 cases of non neoplastic lesions 14 cases noted in males and 6 cases in females.

The peak age incidence was between 20 – 30 followed by 40 - 50 years. The total number of lesions were in the age range of 21-30 years, youngest patient was 11 months old and the oldest patient was 75 years old. Majority of cases of chronic pyelonephritis were seen in the age range of 31 -40 years. Majority of the cases of xanthogranulomatous pyelonephritis belonged to the age group of 40 – 60 years. In our study non-neoplastic lesions included chronic pyelonephritis (CPN), xanthogranulomatous pyelonephritis, cysts, granulomatous pyelonephritis, angiomyolipoma and hydronephrosis. Neoplastic lesions include Renal cell carcinoma and its variants and spindle cell sarcoma. [Table 2]

**Table 1: Showing the symptoms**

Sl No	Symptom	No of cases
1	Flank Pain	17
2	Burning micturition	05
3	Hematuria	02
4	Fever	02
5	Vomiting	02
6	Retroperitoneal mass	02

**Table 2: Showing Non neoplastic and Neoplastic lesions**

Sl no	Lesion	Number of cases
1	CPN	11
2	CPN with calculi	02
3	Xanthogranulomatous pyelonephritis	02
4	Granulomatous pyonephritis	02
5	Angiomyolipoma	01
6	Hydronephrosis	01
7	Cysts	01
8	Clear cell RCC	06
9	Papillary RCC	03
10	Sarcoma	01

### DISCUSSION

Chronic Glomerulonephritis also called as end stage kidney is the final stage of a variety of glomerular diseases which result in irreversible impairment of renal function. The conditions which may progress to CGN, in descending order of frequency are : rapidly progressive GN, membranous GN, membranoproliferative GN and acute post streptococcal GN. Grossly the kidneys are small and contracted. CPN can be divided into two forms: Reflux nephropathy and chronic obstructive pyelonephritis. Reflux nephropathy is more common form of CPN associated with scarring. Renal involvement in reflux nephropathy occurs early in childhood as a result of superimposition of a urinary infection on congenital vesicoureteral reflux and intrarenal reflux.<sup>2</sup>

Reflux may be unilateral or bilateral, thus the resultant renal damage either may cause scarring and atrophy of one kidney or may involve both and lead to chronic renal insufficiency. The characteristic changes of chronic pyelonephritis are seen on gross examination. The kidneys usually are irregularly scarred and contracted [Figure 1]

Xanthogranulomatous pyelonephritis is an unusual and relatively rare form of CPN characterized by accumulation of foamy macrophages intermingled with plasma cells, lymphocytes and occasional giant cells [Figure 2]. Xanthogranulomatous pyelonephritis is often associated with Proteus infections and obstruction, the lesions sometimes produce large, yellowish orange nodules that may be confused with renal cell carcinoma.<sup>3,4</sup>

Chronic obstructive pyelonephritis may be insidious in onset or may present with clinical manifestations of acute recurrent pyelonephritis with back pain, fever, frequent pyuria and bacteriuria. CPN associated with reflux may have a silent onset. These patients come to medical attention relatively late in the course of their disease because of the gradual onset of renal insufficiency and hypertension or because of the discovery of pyuria or bacteriuria on routine examination. Reflux nephropathy is often discovered when the etiology of hypertension in children is investigated. Radiographic studies show asymmetrically contracted kidneys with characteristic coarse scars and blunting and deformity of the calyceal system. Significant bacteriuria may be present, but it is often absent in the late stages<sup>5,6</sup>.

Although proteinuria is usually mild, some patients with pyelonephritic scars develop focal segmental glomerulosclerosis with significant proteinuria, even in the nephrotic stage, usually several years after the scarring has occurred and often in the absence of continued infection or persistent vesicoureteral reflux. The appearance of proteinuria and focal segmental glomerulosclerosis is a poor prognostic sign and patients with these findings may proceed to chronic or endstage renal failure<sup>7</sup>.

Angiomyolipoma is a benign tumour of kidney consisting of vessels, smooth muscle and fat. Angiomyolipomas are present in 25% to 50% of patients with tuberous sclerosis, a disease characterised by lesions of the cerebral cortex that produce epilepsy and mental retardation as well as a variety of skin abnormalities. Oncocytoma is another benign tumour of kidney composed of large eosinophilic cells having small, round, benign appearing nuclei that have large nucleoli. It is thought to arise from the intercalated cells of collecting ducts. It is not an uncommon tumour, accounting for approximately 5% to 15% of surgically resected renal neoplasms. Ultrastructurally, the eosinophilic cells have numerous mitochondria.

Renal cell carcinoma (RCC) also known as adenocarcinoma of the Kidney or Grawitz tumour or Hypernephroma represents about 1% to 3% of all visceral cancers and account for 85% of renal cancers in adults. There are 30,000 new cases per year and 12,000 death from the disease. The tumour occur most often in older individuals, usually in the sixth and seventh decades of life, showing a male preponderance in the ratio of 2 to 3:1. Because of their gross yellow colour and the resemblance of the tumour cells to clear cells of the adrenal cortex, they were at one time called hypernephroma. It is now clear that all these tumours arise from tubular epithelium and are therefore renal adenocarcinomas.

Tobacco is the most significant risk factor. Cigarette smokers have double the incidence of renal cell carcinoma than do non smokers and pipe and cigar smokers are also more susceptible. Other risk factors include obesity, hypertension, unopposed estrogen therapy and exposure to petroleum products, asbestos and heavy metals. There is also increased incidence in patients with chronic renal failure and acquired cystic disease and in tuberous sclerosis.

Among all the variants of RCC, clear cell RCC is the most common type accounting for 70% to 80% of renal cell cancers. On histologic examination, the tumours are made up of cells with clear or granular cytoplasm and are nonpapillary. They can be familial associated with Von Hippel-Lindau (VHL) syndrome, there is loss of sequences on the short arm of chromosome 3.

Papillary RCC accounts for 10% to 15% of renal cancers. It is characterised by a papillary growth pattern and also occurs in both familial and sporadic forms. This tumours are not associated with 3p deletions. The most common cytogenetic abnormalities are trisomies 7, 16 and 17 and loss of Y in male patients in the sporadic form and trisomy 7 in the familial form. Chromophobe RCC represents 5% of renal cell cancers and is composed of cells with prominent cell membranes and pale eosinophilic cytoplasm usually with a halo around the nucleus. They are, like the benign oncocytoma, thought to grow from intercalated cells of collecting ducts and have an excellent prognosis compared with that of the clear cells and papillary cancers. Collecting duct RCC represents approximately 1% or less of renal epithelial neoplasms. They arise from collecting duct cells in the medulla<sup>8</sup>.

RCC have a characteristic macroscopic appearance. The tumour may arise in any portion of the kidney, but more commonly, it affects the

poles, particularly the upper pole. Clear cell neoplasms arise most likely from proximal tubular epithelium and occur as solitary unilateral lesions. The yellow colour is a consequence of the prominent lipid accumulations in tumour cells. Papillary tumours, thought to arise from distal convoluted tubules can be multifocal and bilateral. Papillary carcinomas are the most common type of renal cancer in patients who develop dialysis associated cystic disease.

The three classic diagnostic features of renal cell carcinoma are costovertebral pain, palpable mass and hematuria, but these are seen in only 10% of cases. The most reliable of the three is hematuria, but it is usually intermittent and may be microscopic, thus the tumour may remain silent until it attains a larger size. In addition to the fever and constitutional symptoms mentioned earlier, renal cell carcinomas produce a number of paraneoplastic syndromes like polycythemia, hypercalcemia, hypertension, hepatic dysfunction, feminization or masculinization, cushing syndrome, eosinophilia, leukemoid reaction and amyloidosis. One of the common characteristics of this tumour is its tendency to metastasize widely before giving rise to any local symptoms or signs. The most common locations of metastasis are the lungs and bones followed in order by the regional lymph nodes, liver, adrenals and brain.

The average 5 year survival rate of patients with renal cell carcinoma is about 45% and upto 70% in the absence of distant metastases. With renal vein invasion or extension into perinephric fat, the figure is reduced to approximately 15% to 20%. Nephrectomy has been the treatment of choice, but partial nephrectomy to preserve renal function is being done with increasing frequency and similar outcome. Leukemic infiltration of the kidneys is a common finding, particularly in chronic myeloid leukemia. Kidney is a common site for blood-borne metastases from different primary sites, chiefly from cancers of lungs, breast and stomach.

## CONCLUSION

Radical or partial nephrectomy is the gold standard of treatment for renal tumours. Chronic pyelonephritis was the commonest non neoplastic lesion and renal cell carcinoma was the commonest neoplastic lesion in our study with male predominance. Thorough histopathological examination is required for final diagnosis to grade and stage the lesion.



Figure 1: Gross showing contracted kidney.



Figure 2: Cut section of kidney showing lipid changes [a]. Section showing chronic pyelonephritis with collection of foamy macrophages - suggestive of Xanthogranulomatous pyelonephritis [b]

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