

## A comparative histopathological study of neoplastic and nonneoplastic tumours conditions in nephrectomy specimens: An observational study

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### Abstract

**Background:** Nephrectomy and subsequent surgical interventions for renal diseases provided clinical information and histopathological insight that form the basis of current concepts of renal tumours. The purpose of study is to determine the spectrum of neoplastic and nonneoplastic disease processes that may be overlooked in tumour nephrectomies.

**Material and methods:** A hospital based study included 120 nephrectomy specimens received in the department of Pathology from January 2011 to 31 December 2013 were subjected for histopathological examination. Specimens were processed and stained with H&E and special staining.

**Results:** Out of 120 nephrectomy specimens 106 were neoplastic lesion and 14 were nonneoplastic lesion. In malignant epithelial neoplasms clear cell RCCs were 68 (56.7%), papillary RCC 8 (6.7%), squamous cell carcinoma 4 (3.3%), one each were chromophobe RCC, collecting duct RCC, sarcomatoid RCC and transitional cell carcinoma observed. Among 14 nonneoplastic tumourous conditions, 10 cases of renal tuberculosis and 4 cases of renal cystic disease were present. Most common site of metastasis was in perinephric fat. Mean age for male was 54.10 years whereas in female it was 44.55 years.

**Conclusion:** In conclusion, the present study provided a fair insight into the histological patterns of lesion in nephrectomy specimens. Most common incidence was of malignant neoplasms in which clear cell RCC constitutes largest group followed by nonneoplastic tumours conditions.

**Keywords:** Nephrectomy, Renal cell carcinoma, Nonneoplastic

### Introduction

Partial or total nephrectomy is most often performed to remove renal neoplasm. Nonneoplastic lesions are seen in most (90%) nephrectomy specimens removed for renal neoplasms<sup>1</sup>. Renal tumours are increasing in incidence throughout the world, partly as a result of widespread use of

cross sectional imaging modalities and ultrasonography. RCC is the most common primary malignant tumour of the kidney (85%) worldwide and constitutes 2-3% of all visceral malignancies in adults<sup>2-3</sup>. Renal tumours comprise a diverse spectrum of neoplastic lesion. A wide variety of both benign & malignant tumours arise from

different components of renal parenchyma, notably tubular epithelium<sup>4</sup>. The incidence varies between sex, age, races and geographic location around the world. Men have higher incidence than women (approximately 1.6:1) and vast majority are diagnosed after 65 yrs. of age<sup>5</sup>. The greatest risk factors for renal malignancies are smoking, obesity, hypertension, occupational exposure of some chemicals & long term uses of NSAIDS<sup>6</sup>. Primary malignant neoplasm of the renal parenchyma includes renal adenocarcinoma (70-80%), nephroblastoma & various sarcomas of different histologic type. Benign neoplasms are adenoma, oncocytoma & metanephric adenoma and angiomyolipoma. Epithelial tumours are the most common comprising about 58% of all renal tumours & 87% of all malignant renal neoplasms<sup>4</sup>. Wilm's tumour is one of the most common solid tumour of childhood. It is seen primarily in infants, 50% of the cases before the age of 3 years and 90% before the age of 6 years<sup>7</sup>. Nonneoplastic tumourous conditions include the maldevelopment, nonneoplastic cystic disease and inflammatory masses such as xanthogranulomatous pyelonephritis (XGP) renal malacoplakia and tuberculosis (TB)<sup>6</sup>. Common clinical presentations include pain, palpable mass and haematuria. Other constitutional symptoms are fever, weakness, weight loss & malaise<sup>8</sup>. The best tools currently available for detecting early state renal malignancy are routine investigation, IVP, USG, CT & MRI<sup>5</sup>. Treatment includes Immunomodulating therapies, such as cancer vaccine (Trovas), interleukin-2 (IL-2) and tyrosine kinase inhibitors. Cytoreductive nephrectomy, partial nephrectomy (nephron sparing surgery), radical nephrectomy<sup>9</sup>.

### **Materials and methods**

The study was hospital based prospective study, which was carried out in the

department of Pathology including all clinically suspected and microscopically verified cases of neoplastic and nonneoplastic tumourous conditions in nephrectomy specimens. Histopathological examination of surgical specimens and biopsies were carried out. A properly completed surgical pathology requisition form having patient's identification, age, sex, essential clinical data, findings, investigations such as CT scan, USG and other relevant investigations were also noted.

These biopsies were received in 10% formalin. Gross features of the specimens received, were recorded. Representative sections taken and after processing tissue was embedded in paraffin wax to make blocks after making section in microtome, staining was carried out with Haematoxylin and eosin (H & E) stain / or special stain when required.

### **Results**

Total 120 cases of neoplastic and nonneoplastic tumourous conditions in nephrectomy specimens were studied in relation to age distribution pattern, histopathological features and classified according to WHO classification. Age range of different cases are 1-85 years with mean age of  $50.85 \pm 18.25$  years. Peak incidence was seen in 41-60 years age group with 64 cases in this age group. The mean age for males was  $54.10 \pm 17.20$  years whereas for females mean age was  $44.35 \pm 18.99$  years. Malignant epithelial neoplasms are 73.3% of total renal neoplasms or epithelial neoplasms. Incidence of pediatric renal neoplasm is 6.7%. Incidence of benign mesenchymal neoplasm is 3.3% and incidence of mixed mesenchymal and epithelial neoplasm is 1.7% and benign epithelial neoplasm is 3.3% while nonneoplastic tumourous conditions constitutes 11.7%. Partial nephrectomy was performed for both benign

3.3% and malignant lesions 51.5% while only radical nephrectomy performed for malignant lesions (100%). In this study 6 cases were cystic, 60 cases were solid and 54 cases were variegated. There was spread of malignancy in relation to surrounding tissues i.e. Renal vein involvement in 4 (3.3%) cases, ureter involvement was in 4 (3.3%), perinephric fat invasion in 10 (8.3%) while lymph nodes involvement was present in 6 (5%) of cases.

### Discussion

Kidney involved in various pathological processes, some of which may require its surgical removal. Nephrectomy is a common procedure in surgical practice<sup>10</sup>. RCC is the most common primary malignant tumours of the kidney (85%) worldwide and constitutes 2-3% of all visceral malignancies in adults<sup>2,3</sup>. Renal cell carcinoma, the eighth most common malignancy affecting adults, accounts for between 3% and 4% solid tumours and approximately 85-90% of all parenchymal renal tumours.<sup>11</sup> Most tumours present in the fifth to seventh decade of life, with a median age at diagnosis of 66 years and median age at death of 70 years. The incidence is two to three times higher in men and is slightly more common in blacks than in whites<sup>12</sup>. There were an estimated 51,190 new cases of, and 12,890 deaths from, renal cancer in 2007 in the United States, accounting for 2.3% of all cancer deaths in the United States<sup>13</sup>. The incidence has steadily increased during the past 50 years in the United States and has occurred in 9.1/100,000 population in 1997, with a mortality rate of 3.5/100,000<sup>12,14,15</sup>. Worldwide incidence rates range from 0.6/100,000 to 14.7/100,000<sup>16</sup>. The incidence of renal tumours at autopsy is approximately 2%<sup>17</sup>.

In the present study maximum incidence is of malignant epithelial neoplasm (73.3%) which is comparable with study of Reddy et al (75.22%) and Gunes Mustafa et al

(78.3%). Latif et al had slight higher incidence (88%). Next frequent incidence is of nonneoplastic tumourous conditions (11.7%), which is higher than rest of studies. Incidence of pediatric renal neoplasms is (6.7%) which is comparable with study of Reddy et al (8.9%) and Gunes Mustafa et al (6.02%). Incidence of benign epithelial and mesenchymal neoplasm is equal (3.3%) in our study which is comparable with study of Latif et al. In rest of two studies incidence of benign epithelial neoplasms is higher. Incidence of mixed mesenchymal and epithelial neoplasm is (1.7%) which is almost equal to all these studies.

In present study maximum incidence of neoplastic and nonneoplastic tumourous conditions is in age group 51-60 years (31.7%). This finding is consistent with study of Reddy et al (27.43%). In pediatric age group incidence is 6.7% which is comparable with study of Reddy et al (8.85%) and Aimen et al. In the present study, out of the 120 nephrectomy specimens under study, 20% had benign neoplasm and 80% had malignant neoplasms. Thus malignant neoplasms comprised the vast majority of the cases in our study.

Incidence of both benign and malignant neoplasms is comparable with study of Gunes Mustafa et al and Isah et al while incidence of benign neoplasm is lower and malignant neoplasm higher in study of Latif et al and Reddy et al. In this study, mean age of neoplastic and nonneoplastic tumourous conditions is 50.85±18.25 years which is consistent with study of Dinesh Pradhan et al and Latif et al. In rest of three studies mean age is slightly higher in two studies i.e. Salvatore et al (69.8±8 years) and Gunes Mustafa et al (66 years) while mean age is lower (31.5 years) in Isah et al study. Prognostic factors for survival are age, stage, histology, grade, performance status, molecular markers, postoperative tumour

mass, lymph node status and newer molecular biological factors as VEGF, CD<sub>10</sub>, AMACR, KS – cadherin<sup>18</sup>.

### Conclusion

The present study provides a fair insight into the histological patterns of lesion in nephrectomy specimens. Most common incidence was of malignant neoplasms in which clear cell RCCs constitutes largest group, followed by nonneoplastic tumours conditions. Thus categorizing and histopathological examination for a clinic-morphological correlation helps us to know about clinical outcome, treatment and prognosis of patient.

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