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Original Research Article

Histopathological Spectrum of Nephrectomy Specimens: A Retrospective Study in a Tertiary Health Care Hospital

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Abstract

This study was aimed to assess the histopathological spectrum of non-neoplastic and neoplastic lesions of nephrectomy specimens. We also studied the age and sex distribution, neoplastic and non-neoplastic distribution of cases along with histomorphological features. This was a retrospective study conducted in the Department of Urology, S.C.B. Medical College and hospital, Cuttack, Odisha over a period of two years. A total 89 nephrectomy specimens were received. The clinical details, gross and histomorphological features were noted. Age of the patients ranged from 5 months to 72 years. Average age at the time of nephrectomy was 47.48 years. Amongst the 89 cases, 50 (56.18%) were males and 39 (43.82%) were females. Male to female ratio was 1.28:1. Non neoplastic lesions were 60 (67.42%) while neoplastic were 29 (32.58%). In non- neoplastic category, most common lesion was chronic pyelonephritis 16 (126.66%) whereas renal cell carcinoma 24 (82.75%) was the most common neoplastic lesion. Clear cell variant of renal cell carcinoma 8 (33.33%) was the most common, followed by chromophobe variant 7 (29.17%). Nephrectomy was indicated in both non- neoplastic and neoplastic renal pathologies, essentially as a therapeutic option; in many instances, histological assessment of the specimen can aid a definitive diagnosis and better characterization of the disease entity.

Keywords: Histopathology, Pyelonephritis, Nephrectomy, Renal Cell carcinoma.

Introduction

The kidneys are affected by various non-neoplastic and neoplastic lesions some resulting in permanent damage leading to surgical removal of the organ i.e. nephrectomy. Nephrectomy is of many types; simple, partial and radical nephrectomy. A simple nephrectomy is removal of the kidney and a section of the attached ureter. Partial nephrectomy involves removing a small portion of the kidney. Radical nephrectomy involves removing the entire kidney including adrenal gland and the fatty tissue surrounding the kidney [1].

Simple nephrectomy is the treatment of choice for irreversibly damaged, non-functioning kidneys. Partial nephrectomy or Nephron sparing surgeries is indicated in bilateral RCC or RCC involving a solitary functioning kidney and small RCC less than 4cm in size [2]. Radical nephrectomy is the treatment of choice for malignant tumors [3,4]. Accurate diagnosis of most renal tumors is not possible before surgery hence histopathological evaluation is essential. A detailed and meticulous histopathological examination of nephrectomy specimen is required to establish histological type and to record accepted histopathological prognostic determinants i.e. histological subtype, nuclear grade and stage in cases of malignant renal neoplasms [5].

Material and Method

This was a retrospective study conducted in the Department of Urology, S.C.B. Medical College and hospital, Cuttack, Odisha for a period of two years.

Inclusion Criteria: Simple, partial and radical nephrectomy specimens.

Exclusion Criteria: Renal biopsies.

A total 89 nephrectomy specimens were received. The clinical details were noted. Specimens were fixed in 10% buffered formalin. Gross features like

kidney size, weight, external surface; length of ureter, tumor site, size, shape, color, cut surface; any capsular, perinephric fat, vascular, lymphatic invasion were noted. Representative sections taken were processed according to standard operating protocol. Microscopic details were noted.

Result:

Amongst the total 89 cases, 60 (67.42%) were non neoplastic while 29 (32.58%) were neoplastic. Out of 29 neoplastic lesions, 24 (82.75%) were malignant while 5 (17.24%) were benign. Age of the patients ranged from 5 months to 72 years. Average age at the time of nephrectomy was 47.48 years. Amongst the total 60 non neoplastic lesions, maximum number of cases (36 cases) were seen between 41- 60 years of age followed by 17 cases between 41 -50 years of age. Majority of malignant neoplastic lesions were seen between 41-70 years of age (21 cases). [Table 1]. Amongst 89 cases, 50 (56.17 %) were males and 39 (43.82%) females. Male to female ratio was 1.28:1. [Table 2].

Amongst 60 non neoplastic lesions, chronic pyelonephritis was the most common 16 cases (26.67%). Out of total 29 neoplastic lesions, malignant lesions were more common 24 cases (82.75%) than benign 5 cases (17.25%). Clear cell RCC was the commonest malignancy 8 cases (27.58%) followed by Chromophobe RCC 7 cases (s29.17%). [Table 3]

International Society of Urological Pathology (ISUP) Fuhrman nuclear grading done for renal cell carcinoma revealed Fuhrman nuclear grade 3 in 4 (50%) cases followed by grade 2 in 3 (37.5 %) out of 8 cases of clear cell RCC. [Table 4]

Table 1: Age Distribution

Age in Yrs	Non-neoplastic (%)	Neoplastic		Total (%)
		Benign (%)	Malignant (%)	
0-10	1 (1.67)	0	0	1(1.12)
11-20	4(6.67)	0	0	4(4.50)
21-30	6(10)	2(40)	0	8(8.99)
31-40	8(13.33)	1(20)	1(4.16)	10(11.23)
41-50	17(28.33)	1(20)	6(25)	24(26.98)
51-60	19(31.67)	1(20)	8(33.34)	28(31.46)
61-70	5(8.33)	0	7(29.16)	12(13.47)
71-80	0(0)	0	2(8.34)	2(2.25)
Total	60(67.42)	5(5.61)	24(26.96)	89(100)

Table-2: Gender Distribution

Type of lesion	Male (%)	Female (%)	Total (%)
Non-neoplastic	33(37.07)	26(29.21)	59(66.29)
Neoplastic -Benign	2(2.24)	3(3.37)	5(5.61)
Neoplastic -Malignant	15(16.85)	10(11.23)	24(28.08)
Total	50(56.18)	39(43.82)	89(100)

Table 3: Histopathological Spectrum of Nephrectomy Specimens (n=89)

Histopathological findings	Number	Percentage (%)
NON-NEOPLSTIC	60	67.41
Chronic Pyelonephritis	16	26.67
Chronic Pyelonephritis with hydronephrosis	14	23.33
Chronic Pyelonephritis with nephrolithiasis	7	11.66
Chronic Pyelonephritis with hydronephrosis and nephrolithiasis	15	25
Xanthogranulomatous Pyelonephritis	6	10
Chronic Granulomatous Pyelonephritis	1	1.67
Multicystic renal dysplasia	1	1.67
NEOPLASTIC	29	32.58
(A) BENIGN	5	17.25
Angiomyolipoma	2	6.90
Oncocytoma	2	6.90
Adult cystic nephroma	1	3.45
(B) MALIGNANT	24	82.75
Clear Cell RCC	8	27.58
Chromophobe RCC	7	29.17

Papillary RCC	1	4.17
High grade urothelial cell carcinoma	5	17.24
Squamous cell carcinoma	3	10.34

Table 4: (ISUP) Fuhrman Nuclear Grading.

Furham's nuclear grade	Clear cell RCC (%)	Papillary RCC (%)
Grade 1	1(12.5)	0(0)
Grade 2	3(37.5)	1(100)
Grade 3	4(50)	0(0)
Grade 4	0(0)	0(0)
TOTAL	8(100)	1(100)

Discussion

Total nephrectomies in present study was more (89) than average number of nephrectomies studied by Neelam Rajput et al [6], Shubha Bhat et al [7], Madhukumar et al [8], Kaustubh Singh et al [9], Pratik et al [10] because our hospital is a tertiary care government hospital having a specialized urology department catering a large number of patients from eastern India.

Majority of patients belonged to 41 to 55 years. Youngest patient was 5 months old and the oldest patient was 72 years old. Similar findings were observed by Aiman et al [11], Chaitra et al [12].

A male to female ratio in present study was 1.28 which was comparable to the studies by Ranga Reddy et al [13], Vinay KS et al [14].

In present study, non-neoplastic lesions were more common 60 (67.42%) than neoplastic 29 (32.58%). Chronic Pyelonephritis was the most common non-neoplastic lesion which correlated well with the studies of Madhukumar et al [8], Aiman et al [11], Shaila et al [15], Bharti Devi. et al [16] Xanthogranulomatous pyelonephritis was the second most common non neoplastic lesion 6 cases (12.50%), a finding which was comparable with other studies [6,9,12] .

Amongst the 24 malignant cases, Clear cell RCC was the commonest 8(27.58%) followed by Chromophobe RCC 7 (29.17%), findings were comparable to Neelam et al [6], Madhukumar et al [8], Aiman et al [10] studies. In our study, ISUP nuclear grading 3 was the commonest 4 (50%) cases amongst clear cell RCC similar to study done by Sedhain et al [17].

Conclusion

The present study provides a fair insight into a wide range of histopathological lesions encountered on nephrectomy specimens, many of which may be misdiagnosed clinically and radiologically, therefore, it is mandatory that a detailed histopathological examination must be carried out for a clinico-morphological correlation to ensure proper management.

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