http://jmscr.igmpublication.org/home/
ISSN (e)-2347-176x ISSN (p) 2455-0450
crossref DOI: https://dx.doi.org/10.18535/jmscr/v13i01.02

IGM Publication
Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

Diagnostic Approach to Nephrectomy done for Neoplastic Pathology

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Abstract
Background: *Renal cancer is among the top ten causes of death due to cancer world-wide in both, men and women. Surgical resection is the mainstay of treatment. However, Histopathological examination is the gold standard of diagnosis. It is imperative to study the types and subtypes of renal cancer leading to nephrectomy.*
Method: *A hospital-based cross-sectional study, observing demographic profile and clinical details of histopathological examination*
Results: *This study included 28 patients with age range from 1 year to 75 years. The peak age of incidence was the 4th decade. Incidence in males and females was equal. The maximum number of cases (50%) were diagnosed as renal cell carcinoma. Other histopathological diagnoses found were Wilms tumour, oncocytoma, cystic nephroma, and angiomyolipoma. Among Renal cell carcinomas (50%), the Clear cell variant was the most common, whereas Wilm's tumor was the most common in the pediatric age group.*
Conclusion: *Regional study for types of renal cancer in a diverse geographical country like india helps plan diagnostic and treatment modalities with optimum allotment of resources.*
Keywords: *renal cancer, renal cell carcinoma, wilms tumor, nephrectomy.*

Introduction

Nephrectomy is one of the important surgical interventions done for malignant lesions of kidney. It accounts for 3 % of all malignancies with an annual incidence of 3,38,000 new cases and 1,44,000 deaths worldwide. The most common type of renal cancer is renal cell carcinoma, which accounts for 10 percent of new cases annually[1]. Renal cancer is the seventh and tenth most common cancer in men and women, respectively. The incidence is higher in high-income countries than in low-income countries. Low rates are reported in Africa and eastern Asia. In the fifth edition of the World Health Organization (WHO) classification of tumors, renal cell carcinoma(RCC) has been divided based on morphology and molecular alterations.[2] The treatment of choice is partial nephrectomy for

T1 and T2 renal tumors and radical nephrectomy for higher stage tumors..[3] Once nephrectomy is carried out, the specimen fixed in 10% NBF and sent for histomorphological diagnosis. We aimed to study the histologic type and other markers like tumor size, histological subtype, nuclear grade, and stage. [4]

Aim of the study

To study the histopathological features of renal tumours detected in nephrectomy specimens and to grade the tumors applying Furhman's grading system.

Materials and Methods

This hospital-based cross-sectional study was carried out in the Department of Pathology from March 2021 to February 2023. The study included 28 cases of nephrectomy specimens. The specimens were grossed and inked where malignancy was suspected, fixed with 10% neutral buffered formalin (NBF), processed, sectioned on a rotary microtome, and stained with Hematoxylin and Eosin.

Exclusion Criteria

Chronic kidney diseases like pyelonephritis and polycystic kidney. Nephrectomy done in cases of trauma, secondary renal tumors or metastasis, obstructive uropathy, and vascular diseases of the kidney were also excluded.

Results

This study included 28 cases that fulfilled its criteria. The age range of patients was from 1 year to 75 years. The peak age of incidence was the 4th decade. Incidence in males and females was equal, with a ratio of 1:1. Out of 28 cases, 50% were diagnosed as renal cell carcinoma. Other histopathological diagnoses found were Wilms tumour, oncocytoma, cystic nephroma, and angiomyolipoma. Among Renal cell carcinomas (50%), the Clear cell variant was the most common, whereas Wilm's tumor was the most common in the pediatric age group. Malignant cases far outnumbered benign cases in the ratio of 3.66:1. RCC was graded using the Furhman grading system. Out of the 14 cases of RCC, 71.4% fell in Furhman grade II. 75% of the total reported wilms tumors (n=8) were triphasic in nature.

Table 1: Distribution of the cases according to age (n=28)

Age	Number of patients (n= 28)	Percentage (%)
0- 10 years	4	14.2
10- 20 years	2	7.1
20-30 years	0	0
30-40 years	8	28.4
40-50 years	4	14.2
50- 60 years	2	7.1
60-70 years	4	14.2
> 70 years	4	14.2

Table 2: Distribution of cases according to sex

MALES	FEMALES	TOTAL (n)
14	14	28

Table 3: Distribution of cases based to histopathological diagnosis (n=28)

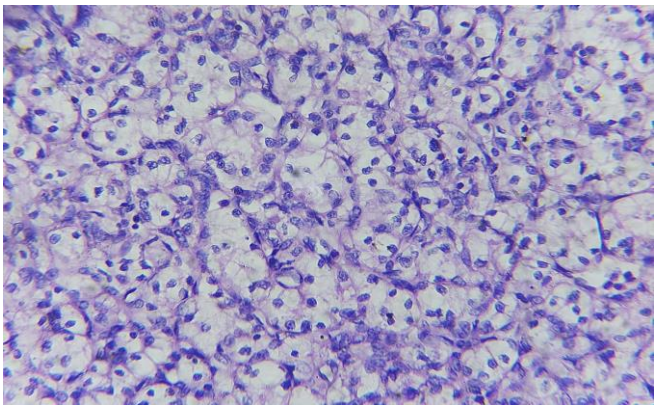
Histological diagnosis	Number of patients	Percentage	n = 28 patients
Renal cell carcinoma	14	50	
Wilms Tumour	8	28.5	
Oncocytoma	2	7.1	
Cystic nephroma	2	7.1	
Angiomyolipoma	2	7.1	

Table 4: Grading of Renal cell carcinoma

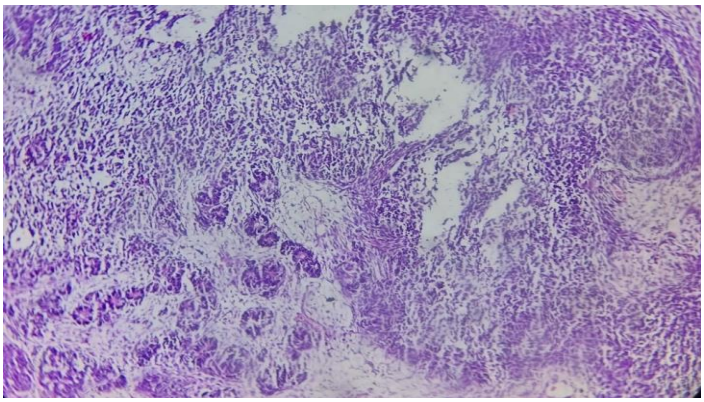
GRADE OF RCC	NUMBER OF CASES (n= 14)
Furhman Grade I	0
Furhman Grade II	10
Furhman Grade III	4
Furhman Grade IV	0

Table 5: Types of Wilms tumor

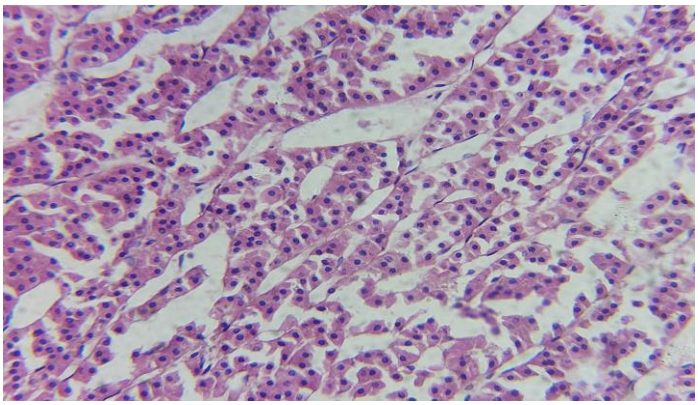
GRADE OF TUMOR	NUMBER OF CASES (n= 8)
Monophasic	0
Biphasic	2
Triphasic	6



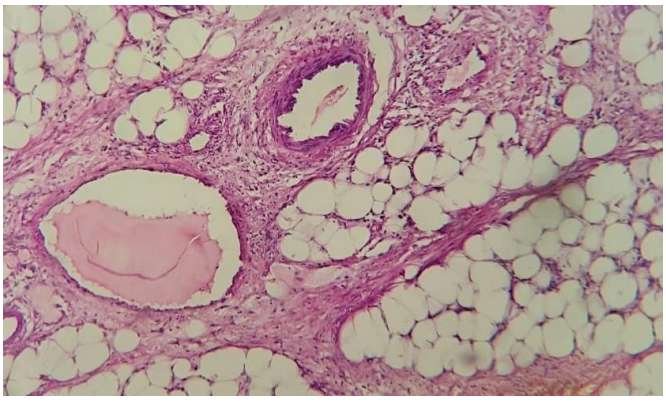
Picture 1: clear cell variant of renal cell carcinoma



Picture 2: Wilms tumor



Picture 3: renal oncocytoma



Picture 4: Renal Angiomyolipoma

Discussion

Nephrectomy (partial or total) is done for a variety of indications ranging from decompensated kidney resulting from chronic kidney disease, obstruction, calculus, or trauma to renovascular hypertension resulting from irreversible renal artery disease and nephrosclerosis, pyelonephritis, reflux or congenital dysplasia. In this study, we have limited ourselves to analyze neoplastic conditions leading to nephrectomy. The gold standard for diagnosis of nephrectomy specimens is histopathological examination.

In our study, the mean age of patients was 37.3 years and peak incidence was noted in 4th decade of life. Our results were in concordance with basnet et al [5] and thakur et al [6] . In studies by krishna et al [7] and Abbas et al [8] peak incidence was noted in 5th decade of life.

In our study the male to female preponderance was found to be equal. Similar results were reported by basnet et al[5]. In other studies by sheenu et al [9], chandanwale et al [10] and Ghalayani et al [11] males were reported to have higher incidence of renal neoplasms than females.

In our study, among all neoplastic lesions found in nephrectomy specimens, RCC was the most common (50%), followed by Wilms tumor (28.5%), oncocytoma (7.1%), cystic nephroma (7.1%), and angiomyolipoma (7.1%). In a study by Ghalayani et al[11] reported incidence RCC of 72.8% among the neoplastic cases. In the study by krishna et al [7] The incidence of RCC, Wilms tumor, cystic nephroma, and angiomyolipoma was 68.2%, 14.63%, 4.88%, and 2.44%, respectively. Though they did not report any cases of oncocytoma, other reported cases were well-differentiated squamous cell carcinoma, metastatic adenocarcinoma, and congenital mesoblastic nephroma. In a study by Sheenu et al [9] reported clear cell RCC, conventional type, as the most common neoplasm accounting for 65.5% of all the cases. There was one case each of multilocular cystic renal neoplasm of low malignant potential, papillary RCC, chromophobe RCC, Mit family

RCC, oncocytoma, and angiomyolipoma, and two clear cell papillary RCC. Uncommon tumors reported were one case each of neuroendocrine carcinoma, epithelioid angiomyolipoma, mixed epithelial stromal tumor. Two cases of Ewings sarcoma, and glomangioma were noted. Five cases of urothelial carcinoma of renal pelvis/ureter also were present.[9]

Conclusion

Regional study for types of renal cancer in a diverse geographical country like india helps plan diagnostic and treatment modalities with optimum allotment of resources.

Strengths of study

We focused our analysis on malignant lesions of kidney thus identifying the main causes of nephrectomy in renal tumors

Limitations of study

A small sample size and limited duration of study limited the number of cases which could have been included in this study

Acknowledgments

We would like to thank Department of Urology for providing the specimens.

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