

Histomorphological Study of Nephrectomy Specimens in a Single Center in Dhaka

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Abstract

Nephrectomy is a frequently performed surgical procedure for various renal pathologies, both neoplastic and non-neoplastic. This descriptive cross-sectional study was conducted in the Department of Pathology, CKD & Urology Hospital, Dhaka, from September 2024 to August 2025 to evaluate the histomorphological spectrum of nephrectomy specimens. A total of 394 specimens were analyzed grossly and microscopically, with neoplastic lesions classified according to the WHO classification and staged using the TNM system. Of the 394 cases, 294 (74.6%) were neoplastic and 100 (25.4%) were non-neoplastic. The male-to-female ratio was 2.2:1, with most patients between 41–60 years. Renal cell carcinoma (RCC) was the most common neoplasm (214 cases), predominantly clear cell RCC (131), followed by papillary RCC (42), chromophobe RCC (12), clear cell papillary RCC and RCC with sarcomatoid change (29). Rare subtypes comprised multicystic RCC (5), thyroid-like follicular RCC (1), and oncocytic renal cell tumor with tubular growth (1). Pediatric cases included Wilms’ tumor (9) and translocation-associated RCC (2). Urothelial carcinoma accounted for 67 cases, most commonly papillary type. Stage pT1 was the most common among RCC cases (61%), while stage pT3 predominated in urothelial carcinoma (51%). Among non-neoplastic lesions, chronic pyelonephritis with hydronephrosis was most frequent (77 cases), followed by simple renal cysts and cystic renal dysplasia. This study underscores the wide histopathological diversity of nephrectomy specimens, with RCC as the most common malignancy in adults and Wilms’ tumor the predominant pediatric renal tumor, emphasizing the importance of meticulous histopathological evaluation for diagnosis and management.

Introduction

Nephrectomy, the surgical removal of all or part of the kidney, is a routinely performed procedure for a variety of renal conditions, both neoplastic and non-neoplastic. Accurate histopathological evaluation of nephrectomy specimens plays a pivotal role in diagnosing renal diseases, classifying tumor subtypes, and determining pathological staging — all of which are essential for guiding patient management and treatment planning. Renal cell carcinoma (RCC) constitutes the most common primary renal malignancy in adults, whereas Wilms’ tumor predominates in the pediatric population. Non-neoplastic conditions, such as chronic pyelonephritis and cystic renal diseases, also frequently lead to nephrectomy, particularly in cases of end-stage renal damage or complications. This study aims to analyze the histomorphological patterns of nephrectomy specimens received over a one-year period at a tertiary care center in Dhaka, with the goal of identifying the spectrum of renal pathologies, their frequency, and staging characteristics.

Background

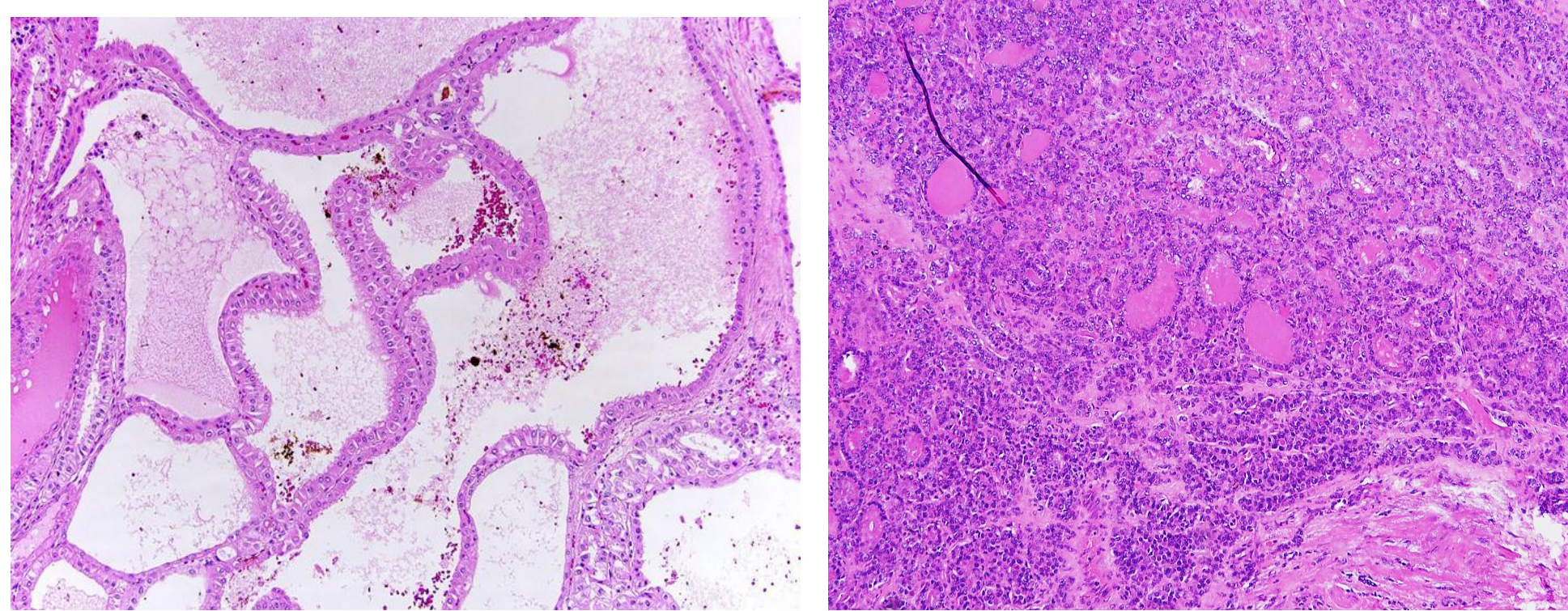
Nephrectomy is a commonly performed surgical procedure indicated for a variety of renal pathologies, both neoplastic and non-neoplastic. Histopathological evaluation of nephrectomy specimens is crucial for accurate diagnosis, tumor subtyping, and staging, thereby guiding appropriate therapeutic decisions

Objective

To evaluate the histomorphological spectrum of nephrectomy specimens.

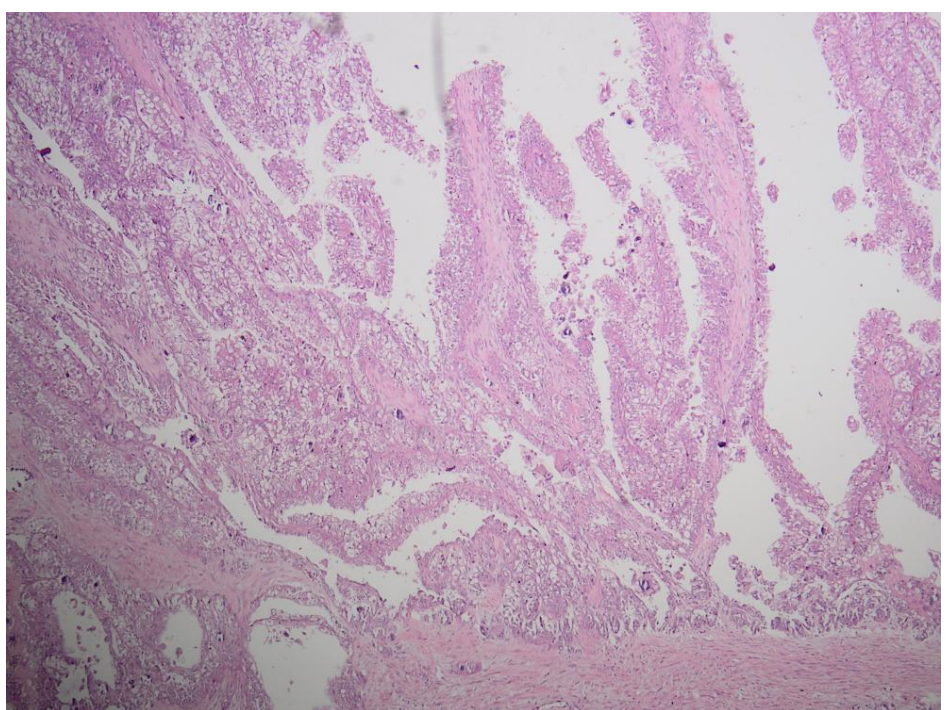
Discussion

In this study of 394 nephrectomy specimens, neoplastic lesions predominated (74.6%), consistent with reports that malignancy is the major indication for nephrectomy in tertiary care centers. RCC was the most common tumor (72.8%), with clear cell RCC (61.2%) as the leading subtype, followed by papillary RCC and chromophobe RCC. Sarcomatoid change (14%) highlighted the presence of aggressive variants. Urothelial carcinoma (23.1%) was the second most common malignancy, with papillary pattern as the predominant morphology. 13.2% showed squamous differentiation, often linked to chronic irritation and worse outcomes. Wilms’ tumor was the most frequent pediatric renal tumor. Rare entities such as multicystic RCC and thyroid-like follicular RCC were also documented, demonstrating the wide histological spectrum of renal neoplasms. Staging revealed that most RCCs were Stage pT1 (61%), indicating early, organ-confined disease likely detected incidentally, whereas most urothelial carcinomas presented at Stage pT3 (51%), suggesting late diagnosis. A male predominance (M:F = 2.2:1) and peak incidence in the 41–60-year age group align with global trends. Non-neoplastic lesions (25.4%) were dominated by chronic pyelonephritis with hydronephrosis (77%), followed by simple cysts. These findings reflect the continued burden of chronic infection and obstruction as nephrectomy indications in developing regions. Overall, our findings reinforce global patterns: RCC remains the leading renal malignancy, Wilms’ tumor is the most common pediatric lesion, and chronic pyelonephritis is the primary non-neoplastic cause. Early detection of RCC may improve outcomes, but the late presentation of urothelial carcinoma highlights the need for better awareness and screening.

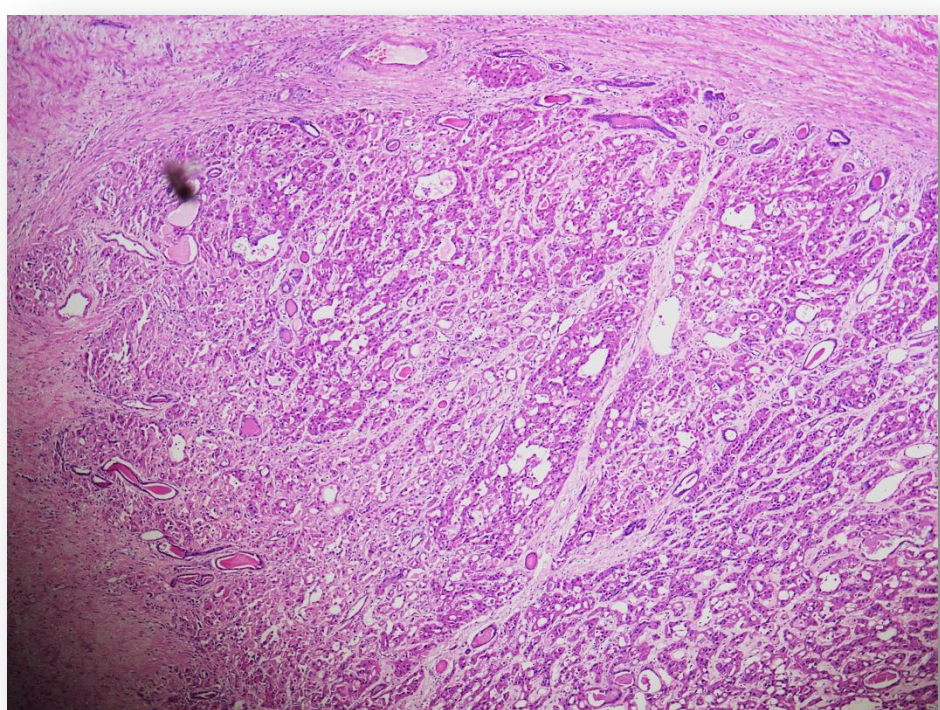


Multilocular cystic renal neoplasm of low malignant potential

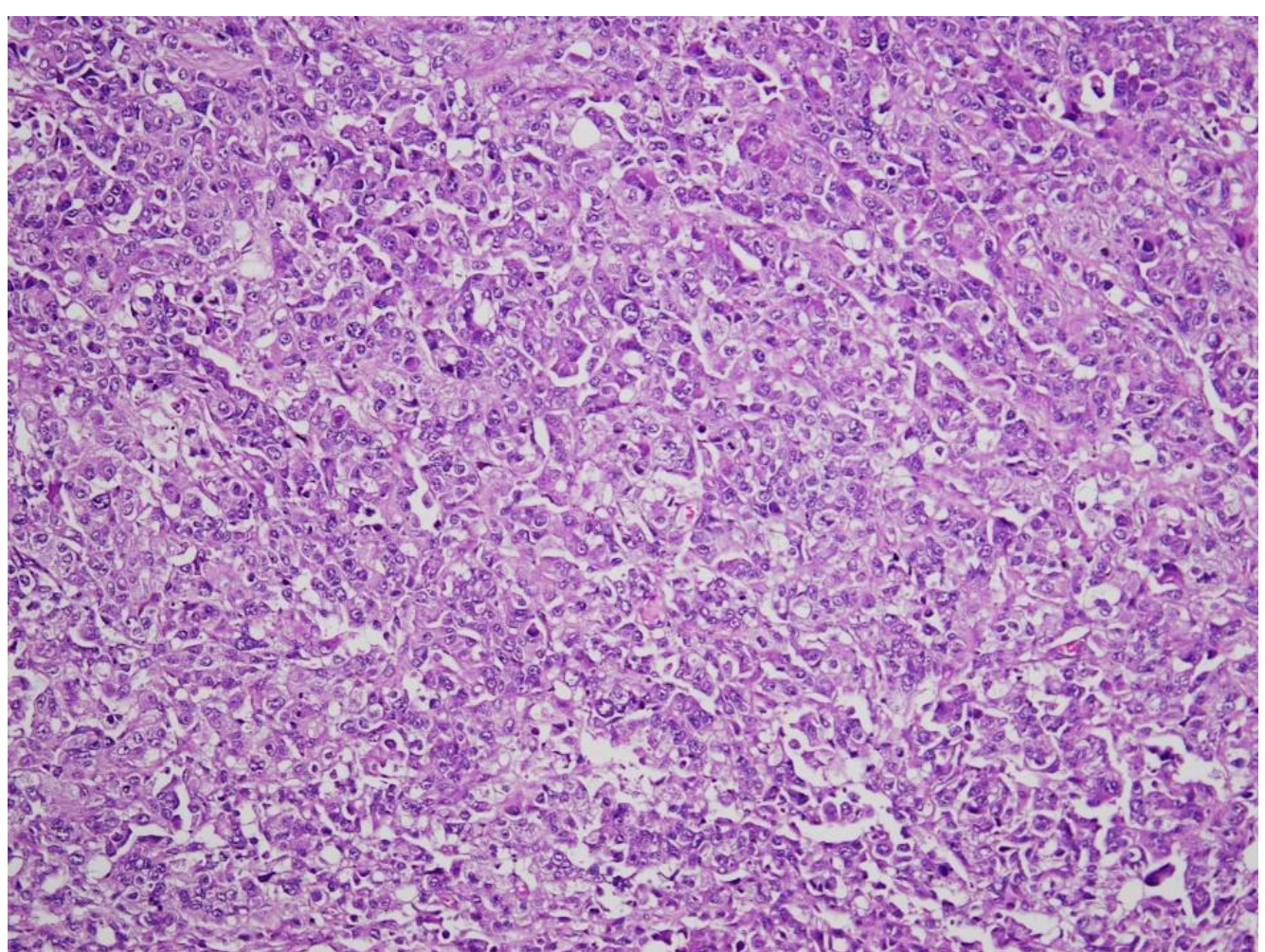
Thyroid like follicular renal cell carcinoma



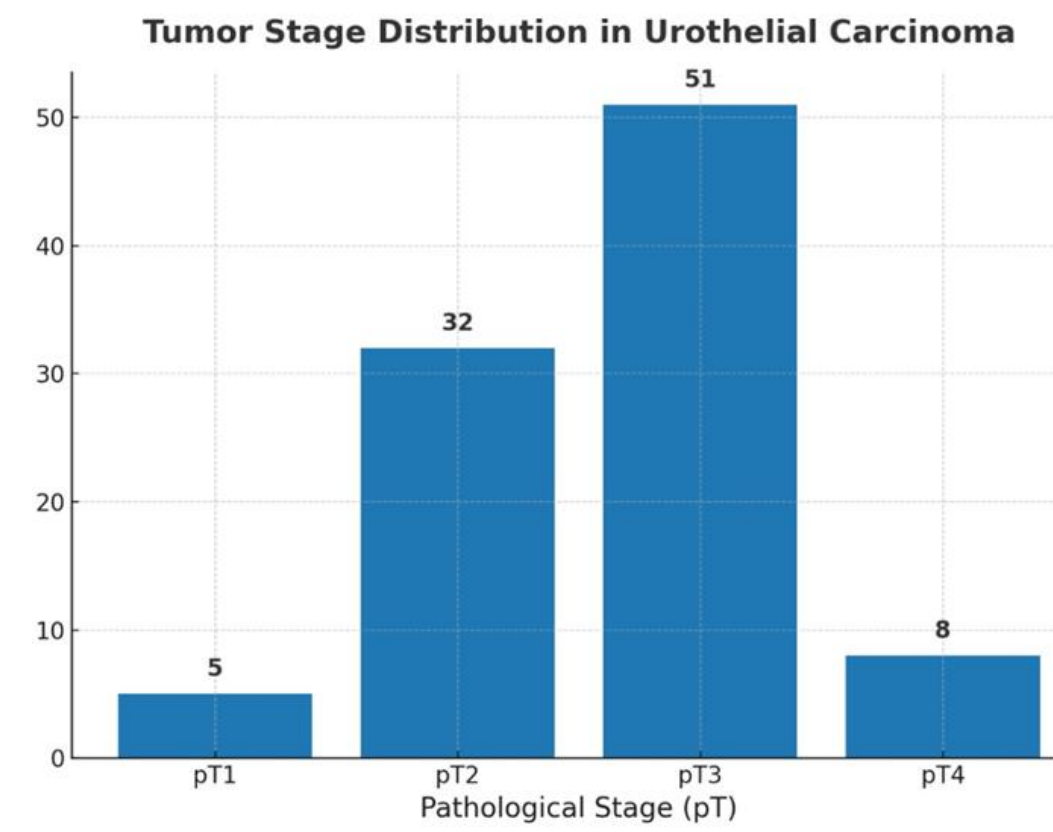
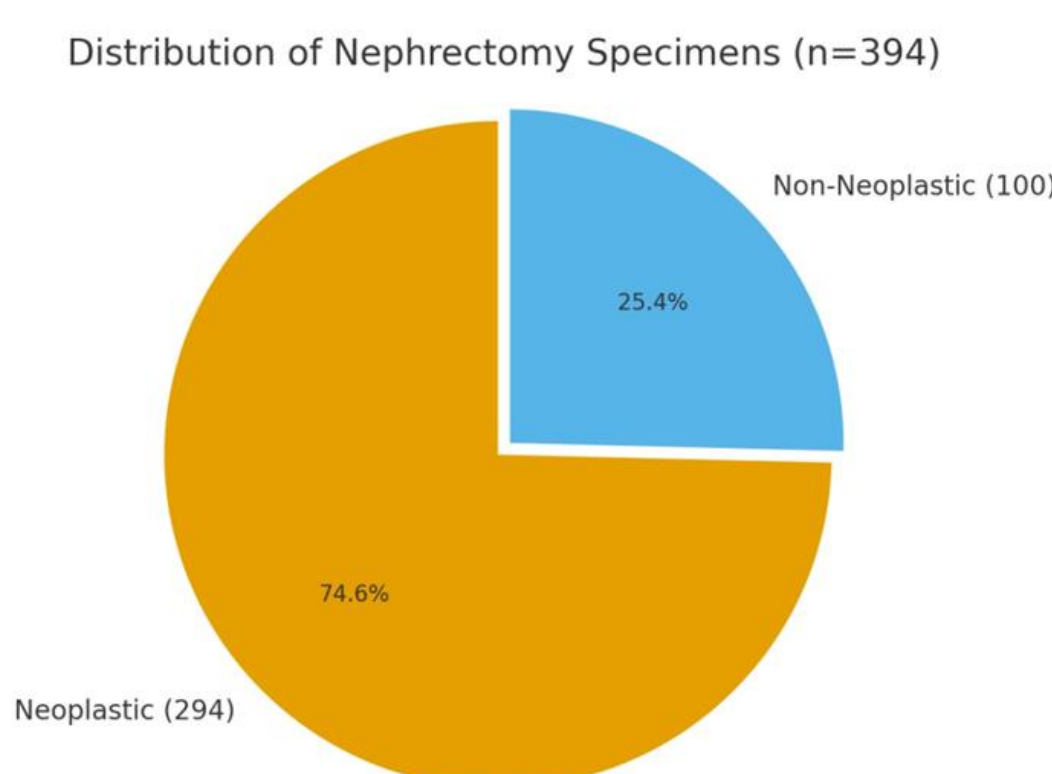
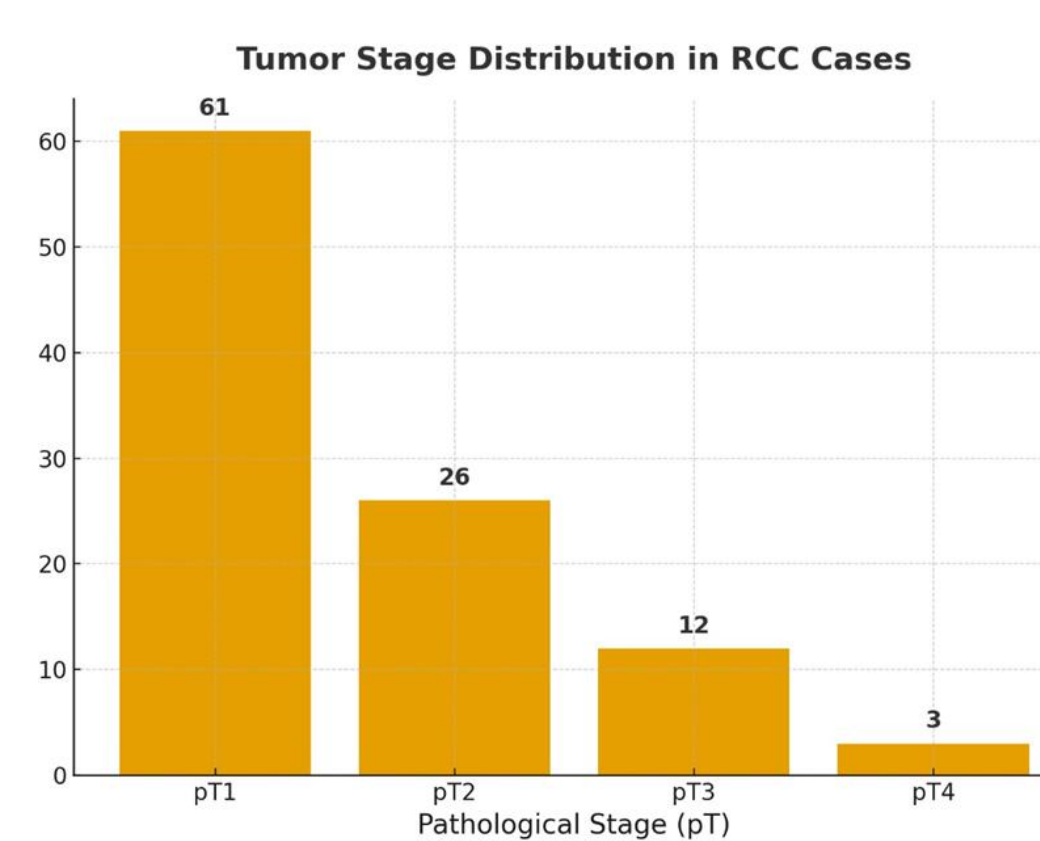
Translocation Renal Cell Carcinoma.



Oncocytic renal cell tumor with tubular growth



Urothelial carcinoma, micropapillary variant, High-grade.



Results

Of the 394 cases, 294 (74.6%) were neoplastic and 100 (25.4%) were non-neoplastic. The male-to-female ratio was 2.2:1, with most patients falling within the 41–60-year age group. Renal cell carcinoma (RCC) was the most prevalent malignancy (214 cases) in adult, with clear cell RCC 131, papillary RCC 42 cases, chromophobe RCC 12 cases, Clear cell papillary RCC and RCC with sarcomatoid change 29 cases. Other rare types are multicystic RCC 5 cases, Oncocytoma 02, thyroid-like follicular RCC one case, and oncocytic renal cell tumor with tubular growth one case. Urothelial carcinoma accounted for 67 cases, most commonly showing papillary 35 cases. In child hood, Wilms’ tumor is the predominant malignancy (9 cases) followed by translocation associated RCC 2 cases. Among RCC cases, the tumour stage PT1 was most frequent (32%), whereas stage PT3 was predominant (30%) in urothelial carcinoma. Among 100 non-neoplastic lesions chronic pyelonephritis with hydronephrosis was the most common (77 cases), followed by simple renal cysts 10, cystic renal dysplasia 09, Xanthogranulomatous pyelonephritis 02, tuberculosis 01 and polycystic kidney disease 01.

Conclusion

This study underscores the histopathological diversity observed in nephrectomy specimens. RCC remains the most frequent renal malignancy in adults, while Wilms’ tumor is the leading pediatric renal tumor. Chronic pyelonephritis with hydronephrosis was the most prevalent non-neoplastic lesion.

References

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