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Anatomical and histopathological patterns in renal neoplasms: A regional perspective.

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Introduction

Renal neoplasms represent a diverse group of tumors with varying anatomical presentations and histopathological features. The global incidence of renal cancers has shown regional variability due to differences in genetics, environmental exposures, lifestyle factors, and healthcare infrastructure. In this context, analyzing the anatomical and histopathological patterns of renal neoplasms from a regional perspective is critical for accurate diagnosis, management, and prognosis.[1].

Renal cell carcinoma (RCC) is the most common type of renal malignancy, accounting for nearly 90% of all renal cancers in adults. Among the histological subtypes of RCC, clear cell RCC (ccRCC) predominates, followed by papillary RCC (pRCC) and chromophobe RCC (chRCC) [1]. Regional studies have demonstrated variations in the relative frequencies of these subtypes. For example, studies in Asian populations often report a slightly higher incidence of papillary RCC compared to Western populations.[2].

The anatomical distribution of renal neoplasms generally favors the upper pole of the kidney. Tumors are typically unilateral and may vary in size, with larger lesions more frequently associated with aggressive behavior and late presentation. The Fuhrman nuclear grading system, often used in histopathological analysis, remains an important prognostic marker, particularly.[3]

Histopathologically, ccRCC is characterized by cells with clear cytoplasm and a delicate vasculature known as "chicken-wire" capillaries. Papillary RCC shows papillae lined by cuboidal or columnar epithelial cells and is further divided into type 1 and type 2 based on cellular morphology. Chromophobe RCC, in contrast, presents as large polygonal cells with perinuclear halos and prominent cell borders. Immunohistochemistry and molecular diagnostics have enhanced the differentiation of histological subtypes and helped identify rare neoplasms such as collecting duct carcinoma, renal medullary carcinoma, and translocation-associated RCCs. These rare tumors tend
to present at an advanced stage and are associated with poor prognosis.[4].

Recent regional studies have reported differences in tumor size at presentation, tumor grade, and histological subtypes. In developing regions, limited access to healthcare facilities and imaging often leads to the discovery of larger, more advanced tumors. Moreover, certain environmental exposures, such as arsenic-contaminated water or industrial pollutants, have been implicated in the pathogenesis of specific renal tumor types. [5].

Conclusion

Understanding the regional variations in anatomical and histopathological patterns is vital for the formulation of public health strategies and treatment protocols. Local tumor registries and population-based studies are essential to provide

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data that reflect the actual burden and biology of renal neoplasms.

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