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Editorial

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The New Landscape of Renal Biopsy in Kidney Diseases

The renal biopsy is an important diagnostic method for renal disease. It can help in accurate diagnosis, pathogenesis, and prognosis of the disease process with a rational approach to the treatment of a renal disorder. Moreover, in advanced stages of kidney damage, a biopsy can provide information regarding the possibility of recurrence of the disease following transplantation. The renal biopsy is also crucial in the management of the transplant recipient, representing the most accurate method for determining the presence of antibody- or T-cell-mediated rejection, acute tubular necrosis, cyclosporine nephrotoxicity, or the development of de novo or recurrent glomerulonephritis in the allograft.

Understanding the clinical, morphologic, and histopathogical features of renal disease as well as in-depth understanding of the anatomy and function of the normal kidney are all necessary for the correct interpretation of a renal biopsy. The pathologist should compare the full set of clinical and laboratory data with findings from light microscopy, immunofluorescence, and electron microscopic analysis to assess a kidney sample.

Most renal biopsies are performed in two methods. 1. Percutaneous needle biopsy 2. Open biopsy (Wedge sampling of outer cortex).

A renal biopsy specimen is considered acceptable if it has between 10 and 15 glomeruli, while it is considered insufficient if it has less than 6. The likelihood of making an accurate diagnosis will rise as the number of glomeruli rises. Additionally, assessment of the corticomedullary junction is necessary for the diagnosis of Focal Segmental Glomerulosclerosis (FSGS); otherwise, the precise diagnosis may be missed.

Indications for renal biopsy included-

- Haematuria of presumed renal origin, (absence of infection and urological investigation normal) is usually in association with other factors such as significant proteinuria, hypertension, and the presence of serum biomarkers (ANCA & dsDNA)
- Significant proteinuria> 1 gm/ day.
- Unexplained renal impairment.
- Renal involvement of systemic diseases.

Renal biopsy is absolutely contraindicated in case of small kidneys, abnormal coagulopathy, and uncontrolled hypertension; whereas, relative contraindications are solitary kidney, uncooperative patient, unable to lie flat on the bed etc.

Kidney biopsy under direct vision can be performed with an open incision or laparoscopically.

The possible indications for laparoscopic kidney biopsy include the following conditions: Failed percutaneous biopsy, Chronic anticoagulation state/ coagulopathy, Morbid obesity, Solitary kidney, Multiple bilateral kidney cysts, Kidney artery aneurysm, Uncontrolled hypertension.

The common complications include local pain, minor bleeding in the urinary tract, perinephric hematoma, and uncommonly arteriovenous fistula.

Electron microscopic (EM) examination along with light (LM) and immunofluorescence (IF) microscopic findings play a vital role in the analysis of biopsies. This triad of studies is generally employed in a concerted manner (correlative microscopy). Tissue for LM & EM is fixed rapidly in buffered formalin and glutaraldehyde, respectively. Additionally, tissue for IF is retained fresh on a saline-moistened gauze or Telfa pad (preferable to immersion in saline) for subsequent rapid freezing or placed in Michel's transport medium (Zeus medium) on a temporizing alternative until ready for processing. The biopsy simply includes three renal tissue cores each of which is placed in formalin, glutaraldehyde, and Michel's medium.

In order to subtype renal cell carcinoma, identify unusual kinds of renal neoplasms, and diagnose metastatic Renal Cell Carcinoma (RCC) in tiny biopsy specimens, immunohistochemical markers are crucial.

Hematoxylin and eosin staining is routinely used to assess the architectural pattern in paraffin-embedded sections and to identify the types of inflammation; however, these sections fail to clearly distinguish the extracellular matrix from the cytoplasm of glomerular, tubular, and mesenchymal cells. Extracellular material, glomerular and tubular basement membrane, mesangial components, and tubulointerstitial compartment can all be defined to a high degree using periodic acid-Schiff (PAS), periodic acid-methenamine silver (Jones), and Masson Trichrome Stain.

A renal biopsy is a relatively safe procedure that can reveal detailed information about the molecular and cellular patterns of renal disease. Furthermore, renal biopsy is also helpful for study into the pathogenesis and mechanism of progressive renal injury as well as new targeted treatments for renal cancer. The clinicopathological correlation is a tremendous challenge for both pathologists and nephrologists. The new era of molecular pathology will definitely transform the landscape of renal pathology and broaden the new horizon of the diagnostic legibility of kidney biopsy.

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