Denotements for Morphological Study of the Kidneys and Paramount Considerations

Dsc Ismatov Tuichiboy Akhrorkulovich¹, Dsc Kurbonov Obid Makhsudovich², PhD Makhmudov Kodirbai Oltinbaevich³, Norkuzieva Sherali Safaralievvich⁴, Muminov Zhavokhir Asliddinovich⁵, Norkabilov Alisher Norbekovich*⁶

¹,²,⁵,⁶ Samarkand Regional Multidisciplinary Medical Center, Department of Angiosurgery and Transplantation
² Bukhara State Medical Institute; medik-aziz@mail.ru
³ Transplantologist at the Department of Vascular Surgery and Kidney Transplantation of the Republican Scientific and Practical Center for Specialized Surgery named after Academician V. Vakhidov

Abstract: A kidney biopsy is a procedure in which a sample of kidney tissue is removed for microscopic examination. Kidney biopsy has contributed greatly to the classification of intrinsic renal diseases and hence to a better understanding of their pathogenesis. Although there are many studies regarding kidney biopsy. There is little literature regarding the correlation between indications and histopathology especially in Uzbekistan. Patients who had clinical and/or laboratory evidence of renal disease, whose diagnosis was uncertain by noninvasive methods, and who were eligible for renal biopsy underwent renal biopsy.

Keywords: Kidney biopsy, Diagnostic method, Renal pathology, Biopsy indications

Introduction

A kidney biopsy is an invasive diagnostic method in which a piece of organ tissue is removed for subsequent microscopic analysis [1,13,24]. This process plays a key role in determining the diagnosis, monitoring the condition and choosing treatment methods for various kidney pathologies. The introduction of biopsy techniques into medical practice had a significant impact on the development of nephrology, allowing for a deeper understanding of the mechanisms of development of renal diseases and improving their classification. Despite the emergence of new, less invasive diagnostic methods, biopsy remains an indispensable tool for assessing the condition of the kidneys, predicting the course of diseases and determining treatment strategies. Modern technologies such as biopsy guns and ultrasound guidance are increasing the use of this procedure. Historically, the first open biopsy was performed at the end of the 19th century [2,18,25], and the percutaneous biopsy method was first performed by Alwall in the mid-20th century [3,29,33]. It quickly became an important tool for diagnosing acute renal failure and other kidney diseases, which was previously only possible on the basis of autopsy, as reported in the studies of Iversen and Brun [4,12,30]. Thanks to this procedure, scientists were able to better understand the natural history of kidney disease. The development of immunofluorescence and electron microscopy...
techniques has significantly increased the diagnostic capabilities of biopsies about the histopathology, pathogenesis and classification of kidney diseases [5,17,26]. Nowadays, thanks to the use of ultrasound and automatic needles, the procedure has a high diagnostic value, over 99% of biopsies are diagnostic [6,15,28]. Percutaneous renal biopsy remains a valuable tool in nephrology for accurate diagnosis, prognosis, and optimal treatment for patients with renal disease [7,11,31]. However, given the risks and possible complications, it is important to carefully weigh the benefits and potential harms of the procedure for each specific case [8,9,21]. Due to the subjectivity of such an assessment, doctors’ opinions about the indications for a biopsy can vary significantly [10,11,22].

The purpose of this study was to elucidate the relationship between indications and histopathology of renal biopsies.

Methodology

The methods we used in writing our scientific article are as follows:

Research Design
A retrospective examination of kidney biopsies carried out in Uzbekistan.

Patient records of people who had kidney biopsies because they had laboratory or clinical evidence of renal illness are the source of the data.

Patients who are eligible for a kidney biopsy but have an unclear noninvasive diagnostic status are considered to meet the inclusion criteria.

Patients with kidney biopsy contraindications or those with a definite diagnosis that does not require a biopsy are excluded.

Data Analysis
Association between kidney biopsy indications and histopathological results.

Ethical Considerations
Adherence to moral standards pertaining to patient consent and data confidentiality.

Methodology
Patient selection is the process of identifying people who, in light of clinical and laboratory data, satisfy the requirements for a kidney biopsy.

Renal Biopsy Procedure
A standardised procedure for obtaining tissue samples for microscopic analysis during kidney biopsies is followed.

Histopathological Analysis
Pathologists examine kidney tissue samples to determine the presence of particular renal disorders. Data Compilation: Gathering clinical indications, histopathology results, and patient demographics for study.

Statistical Analysis
Applying suitable statistical techniques to ascertain relationships between histopathological findings and biopsy indications.

Interpretation of Results
Results are interpreted to improve knowledge of intrinsic renal disorders in the population of Uzbekistan.
Limitations: Any restrictions on the study's design or the availability of data that might have an effect on the findings are acknowledged.

Implications: The study's possible effects on Uzbekistan's ability to diagnose and treat kidney disorders are discussed.

Clinical indications for kidney biopsy

1. Rapidly progressive glomerulonephritis insufficiency (RPGN). In cases where patients experience rapid deterioration of kidney function and there is a suspicion of an acute inflammatory process affecting the glomeruli or interstitial tissue, it is advisable to perform a kidney biopsy. Such a procedure can be critical to determining whether diseases can be treated, even if there is an increased risk of complications, because it helps clarify a diagnosis that may not be clear on standard clinical tests.

2. Hematuria. When hematuria is detected, especially when it is accompanied by a significant number of dysmorphic red blood cells of 75 to 80 percent or more than 4 to 5 percent of acanthocytes, which may indicate glomerular pathology, renal biopsy becomes an important diagnostic tool. In such situations, although there are no clear recommendations for performing a biopsy in patients with isolated hematuria, the procedure may be decisive for establishing an accurate diagnosis.

3. Chronic renal failure. In situations where a patient has been diagnosed with chronic kidney failure, a biopsy is not usually recommended. However, if the patient has a moderate decline in kidney function and the organ size remains within normal limits, a biopsy may be appropriate to determine the nature of the kidney disease and the possibility of tissue repair.

4. Nephrotic proteinuria. Kidney biopsy may be recommended for patients with proteinuria levels of 1 to 2 grams per day, continued normal kidney function, and minor abnormal urine tests. This is especially true if there are signs of orthostatic proteinuria, nephrosclerosis or reflux nephropathy, which can lead to secondary focal glomerulosclerosis. The importance of biopsy increases when symptoms and clinical findings suggest primary glomerular disease.

5. Diabetic nephropathy. In the presence of non-insulin-dependent diabetes with proteinuria but no retinopathy, a kidney biopsy may be indicated to rule out kidney disease not related to diabetes. In the context of diabetic nephropathy, various types of glomerulopathies may manifest, including membranous nephropathy[11], minimal change nephropathy[12], acute glomerulonephritis[13], anti-GBM nephritis[14] and IgA nephropathy[15], especially in patients with type 1 diabetes. Kidney biopsy is recommended if a patient with diabetes does not have retinopathy and neuropathy[17], which may indicate unrelated kidney disease, or if renal function is rapidly deteriorating with hematuria[18].

6. Kidney disease in SLE: Kidney biopsy plays a key role in determining the stage of lupus nephritis in patients with systemic lupus erythematosus (SLE), which influences the choice of treatment. In SLE accompanied by proteinuria and hematuria, any stage of the glomerular apparatus may be affected, even if renal function is normal or reduced. Sometimes with SLE, the first manifestations concern
the kidneys, and systemic symptoms develop later, which is often found with membranous glomerulonephritis. In some cases, a kidney biopsy may reveal membranous nephritis even if biological markers of SLE have been absent for a long time. Biopsy may also reveal mesangial immune deposits and subendothelial deposits characteristic of lupus nephritis, even if there are no clinical signs of renal involvement. In such cases, they speak of “silent” nephritis, which can manifest as mesangial or mild focal proliferative changes.

7. **Kidney biopsy after transplantation.** A biopsy of a transplanted kidney may be necessary for various reasons. In the initial period after transplantation, it helps determine whether oligoanuria is the result of acute tubular necrosis or other irreversible damage, such as infarction or extremely rapid rejection. This method is also used to distinguish acute organ rejection from side effects of medications, infectious diseases, or other factors causing dysfunction of the transplanted kidney. Later after surgery, a biopsy may reveal causes of gradual decline in kidney function, whether chronic rejection, calcineurin inhibitor toxicity, recurrence of the primary disease, viral infections, or new-onset glomerulonephritis.

**Result and Discussion**

Important considerations and safety precautions when performing a kidney biopsy

1. **Kidney formation.** If a person has polycystic kidney disease, this is considered a categorical limitation for performing a kidney biopsy. However, if there are large cysts or well-localized renal neoplasms, this is not an absolute limitation. In such cases, either an ultrasound-guided renal biopsy or an open surgical biopsy should be performed.

2. **Single kidney.** The presence of only one kidney is usually considered a reason to avoid percutaneous kidney biopsy. However, the exception is transplanted kidneys, which are often biopsied due to their accessible location and the ability to perform compression hemostasis. Advances in technology such as real-time ultrasound guidance and automated biopsy guns have improved the safety of performing native solitary kidney biopsies. Positive results were observed in both adults [19] and children [20]. In situations where a patient only has one kidney, an open biopsy is an alternative.

3. **Chronic renal failure.** In chronic renal failure, especially when it results in smaller and deformed kidneys, the risk of complications from biopsy increases and the likelihood of obtaining reliable data decreases. Therefore, a biopsy is recommended only for those patients whose kidneys remain relatively normal in size. Before the procedure, it is necessary to ensure that blood pressure is stabilized and any abnormalities in the blood coagulation system are corrected.

4. **Urinary tract infection.** Active inflammation of the upper urinary tract, which has not been treated, is a reason to refuse a kidney biopsy. This carries the risk of creating
5. **High blood pressure.** High blood pressure increases the likelihood of complications after a biopsy. Using medications to lower blood pressure can reduce this risk, but blood vessels affected by sclerosis can lead to excessive bleeding. Therefore, uncontrolled hypertension should be recognized as a significant risk factor for the development of postoperative complications.

6. **Blood clotting disorders.** Hemorrhagic diathesis is a clear contraindication for renal biopsy. Patients with impaired renal function often have prolonged bleeding time despite coagulation results remaining within normal limits. This increases the likelihood of bleeding after the biopsy procedure, especially if the bleeding time is significantly prolonged. However, preoperative administration of desmopressin 0.3 μmol/kg over 30 minutes may temporarily normalize bleeding time, making biopsy possible.

7. **Other:** Renal artery aneurysm, perinephric abscess and horseshoe kidney, especially in the presence of calcified atherosclerosis, usually do not allow percutaneous biopsy. But in some clinical cases, when the benefits outweigh the potential risks, an open biopsy may be considered.

8. **Kidney biopsy during pregnancy:** Kidney biopsy performed early in pregnancy, before 30 weeks, is usually not accompanied by serious complications [21]. However, during the period before and after childbirth, the development of perirenal hematomas is possible[22]. Therefore, a biopsy should only be performed in cases where it is necessary to diagnose conditions not associated with severe preeclampsia. Patients with AL amyloidosis may be deficient in factor X due to its binding to amyloid deposits[23]. This, in turn, can lead to vascular occlusion and vasoconstriction after biopsy, increasing the risk of bleeding. Therefore, before biopsy in patients with amyloidosis, it is necessary to conduct a thorough examination for hemostasis disorders. The goal of a renal biopsy is to maximize the recovery of a suitable tissue sample with minimal risk of complications. Modern percutaneous biopsy is performed under ultrasound guidance, which reduces the risk of complications compared to blind biopsy. Although some practitioners continue to use Franklin Silverman and Tru-Cut needles, Cozens and colleagues [24] compared 15-gauge Tru-Cut renal biopsy with ultrasound localization and marking in a retrospective study. also with an 18-gauge kidney biopsy, which was performed under real-time ultrasound guidance. When using a blinded method, they reported a 79% yield of adequate renal tissue, while 93% when using real-time ultrasound guidance [22]. Also, similarly, two other comparable studies reported a higher mean glomerular proportion in biopsies that were obtained with real-time ultrasound compared with biopsies performed blinded [25,26].
Conclusion

Kidney biopsy is one of the most important diagnostic methods for nephrologists. In our study of the literature, the most common indication for renal biopsy was proteinuria and hematuria, and the most common histopathological diagnosis was IgA nephropathy. Thus, a morphological study using a puncture biopsy of the kidneys is an important point in the diagnosis and in the selection of drug treatment for patients with end-stage chronic renal failure.

References


Rakhimov A.Ya. The Effectiveness of Traditional the Method of Amputation and Treatment at the Lower Leg Level of Patients with Diabetic Foot Syndrome with Critical Lower Limb Ischemia. European Journal of Life Safety and Stability (EJLSS) ISSN2660-9630. www.ejls.research indexedresearch.org Volume 19, July-2022


