

FEATURES OF THE DIAGNOSIS OF RENAL TUBERCULOSIS IN MODERN CLINICAL PRACTICE

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Abstract

Renal tuberculosis is a difficult form of extrapulmonary tuberculosis due to its latent course and nonspecific symptoms, often resembling chronic pyelonephritis, urolithiasis, or cystitis. Delayed diagnosis leads to progressive renal damage and functional loss. This study aimed to assess the diagnostic value of conventional, microbiological, molecular, and imaging methods for early detection.

A retrospective analysis of 68 patients with confirmed renal tuberculosis (2018–2024) was performed. All patients underwent clinical, laboratory, microbiological, molecular (Xpert MTB/RIF), and imaging examinations, including MSCT. Diagnostic accuracy of different methods was evaluated.

The most common symptoms were lower back pain (85.3%) and dysuria (61.8%). Sterile pyuria was found in 72% of cases. Urine microscopy showed low sensitivity (<10–30%), while culture using the BACTEC MGIT 960 system confirmed infection in 89.5% of patients. The Xpert MTB/RIF assay enabled rapid diagnosis and detection of rifampicin resistance in 16.2% of cases. MSCT demonstrated the highest imaging sensitivity (94.1%).

Early detection, especially at the parenchymal stage, allows effective conservative treatment and prevention of irreversible renal damage. Molecular methods significantly improve diagnostic accuracy and enable timely initiation of appropriate therapy.

Keywords: renal tuberculosis; urinary tuberculosis; chronic pyelonephritis; sterile pyuria; Xpert MTB/RIF; molecular diagnostics; early diagnosis.

Modern renal tuberculosis is characterized by a torpid and latent course. Its clinical manifestations often completely mimic nonspecific urological diseases such as chronic pyelonephritis, urolithiasis, or recurrent cystitis. As a result, the average period from the onset of the first symptoms to diagnostic verification ranges from 1 to 3 years. During this time, the disease progresses from the parenchymal stage to the formation of cavitary destruction, which in 40–60% of cases leads to irreversible loss of organ function and patient disability [1, 2, 6, 10].

A particular challenge is bacteriological confirmation. Traditional urine microscopy using the Ziehl–Neelsen staining method demonstrates extremely low sensitivity (less than 15%), while classical culture examination on solid media requires a prolonged waiting period (up to 2–3 months), which is unacceptable under conditions of rapidly progressing destruction of renal tissue [1, 2, 5, 8].

The aim of the study is to improve the early diagnosis of renal tuberculosis by evaluating the diagnostic value of modern laboratory and molecular genetic research methods in patients with nonspecific urological symptoms.

Materials and Methods. A retrospective analysis of the medical records of 68 patients with confirmed renal tuberculosis was conducted. The mean age of the patients was 38 ± 12 years; 45.6% were men and 54.4% were women. The diagnostic methods included urine smear microscopy using Ziehl–Neelsen staining, culture on liquid media (BACTEC MGIT 960 system), the Xpert MTB/RIF assay, ultrasonography, multislice computed tomography (MSCT), and excretory urography.

Results and Discussion. General symptoms such as low-grade fever and weakness were present in less than half of the patients, confirming the latent and nonspecific course of renal tuberculosis. The main clinical manifestations were lower back pain (85.3%) and dysuria (61.8%), significantly affecting quality of life. Leukocyturia was detected in 90–100% of cases, while hematuria occurred in 50–60%. Sterile pyuria was found in 72% of patients and is considered a key marker requiring further evaluation for mycobacterial infection.

Tuberculous papillitis was the most common form (60.3%), while cavitary and destructive forms were less frequent but associated with advanced structural damage. Urine microscopy showed low sensitivity (<10–30%). In contrast, culture using the BACTEC MGIT 960 system confirmed infection in 89.5% of cases. The Xpert MTB/RIF assay provided rapid diagnosis and detected rifampicin resistance in 16.2% of patients.

MSCT was the most informative imaging method (94.1%), significantly outperforming ultrasonography (17.1%) by detecting hidden cavitary and destructive changes. Renal function remained preserved (GFR >60 ml/min) in 67.6% of patients, allowing standard therapy, while others required individualized management.

Conclusions. Renal tuberculosis is often masked by chronic pyelonephritis and cystitis that are resistant to standard therapy. Traditional urine bacterioscopy (sensitivity 11.8%) has lost its diagnostic value as a standalone method. The introduction of the Xpert MTB/RIF assay has not only increased diagnostic confirmation to 76.5%, but also enabled rapid (within 4 hours) detection of rifampicin resistance in 16.2% of patients, which is crucial for selecting an appropriate chemotherapy regimen.

Detection of mycobacteria in urine at the first (parenchymal) stage allows for complete recovery using conservative treatment methods.

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