



## A Case of Ultrasound Diagnosis of Necrotizing Papillitis

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**Abstract:** For the first time, necrotizing papillitis (NP) was described by N. Friedreich in 1877. The basis of the pathogenesis of this disease are hemodynamic disorders in the medulla of the kidney, leading to necrosis and rejection of the renal papillae. For reasons of occurrence, there is a distinction between primary and secondary NP. In primary NP, vascular disorders are the leading ones. Anatomical and physiological features of the structure of the medulla, changes in the rheological properties of blood, slowing blood flow lead to the development of irreversible ischemic changes with necrosis of the renal papillae.

**Key words:** acute pyelonephritis, papillary necrosis.

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The angiopathic mechanism of NP development is observed mainly in patients with diabetes mellitus. In secondary NP, the triggering mechanism is urodynamic disorders, intrarenal urinary stasis, increased pressure in the cavity system with the formation of fornical refluxes. The throwing of infected urine through the ethmoid field promotes the development of purulent-necrotic changes in the medulla, which, in combination with hemodynamic disorders, leads to necrosis of the papillae of the medulla of the kidney. NP associated with infection is observed as a complication of purulent pyelonephritis.

Clinical symptomatology, laboratory diagnostics, and medical imaging methods are important in the diagnosis of NP. Clinically, necrosis of the renal papillae is manifested by significant gross hematuria, pain like renal colic associated with obstruction of the urinary tract with blood clots, intoxication against the background of the underlying disease. In the urinary sediment, fragments of the necrotic stroma of the renal papillae are found. A feature of the course of NP is the rapid formation of urinary stones in the kidneys, which is due to the salt encrustation of necrotic tissues and the interaction of infected urine and blood in the lumen of the cavity system under conditions of urinary stasis. From the methods of medical imaging, the literature presents data on X-ray examination of patients with NP. On survey radiographs, shadows of calcification in the projection of the renal pyramids are revealed. Excretory urography reveals changes in the contours of the papillae, amputation of the calyces, signs of fistula formation and leakage of contrast agent into the medulla of the kidney. It should be noted that the use of X-ray examination has limitations associated with functional disorders of the kidneys, the need to use X-ray contrast agents that have a number of side effects. Sonographic criteria for the diagnosis of NP in the literature are extremely few and contradictory. Here is a case of sonographic diagnosis of NP.

Patient I., 26 years old, since 12.04.02, was treated in the intensive care unit with a diagnosis of "Closed craniocerebral injury. Severe contusion of the brain with compression of the left hemisphere by acute subdural hematoma, the right hemisphere by acute epidural hematoma. Fracture of the right parietal and temporal bones. Dislocation syndrome of II-III century. " Repeatedly underwent neurosurgical interventions for the underlying disease. Despite the treatment, the patient's condition remained severe, complicated by purulent tracheobronchitis, purulent meningitis, and acute pyelonephritis. In urine tests, significant proteinuria, leukocyturia, microhematuria were noted.

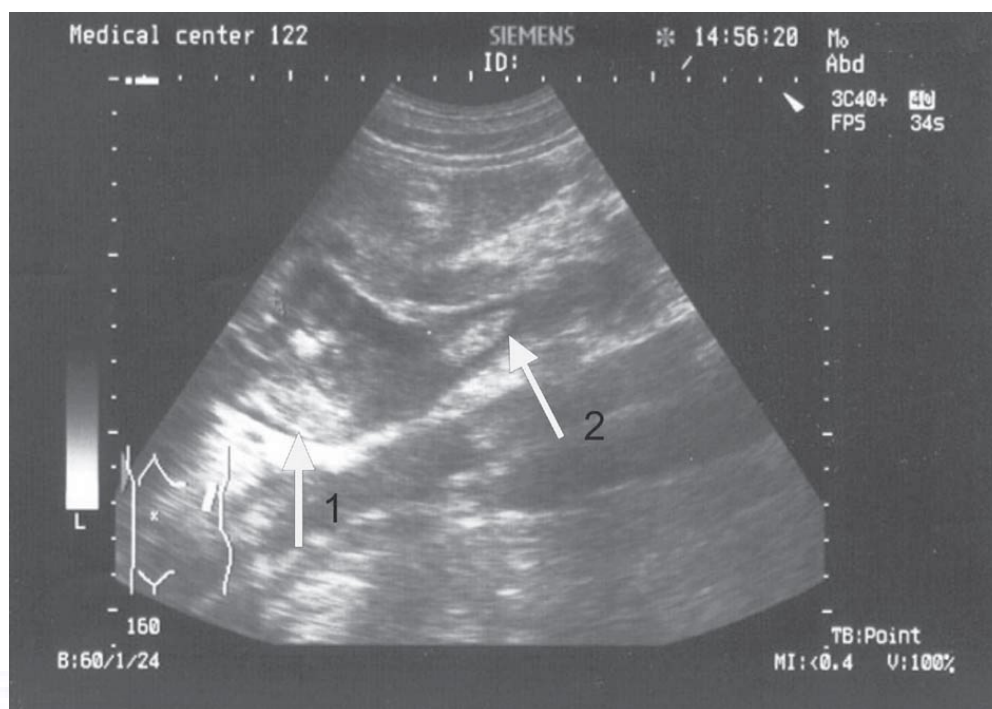


Fig. 1. Sonogram of the left kidney (Siemens Sienna, 3.5 MHz).

1 - Dense blood clots in the dilated pelvis.

2 - Dilated ureter with blood clots.

On the 37th interstitial edema of the renal parenchyma. Necrotizing papillitis with fornical bleeding. Violation of urodynamics - tamponade of the cavity systems, ureters of both kidneys, tamponade of the bladder "(Fig. 1, 2). Performed right lumbotomy with revision of the right kidney, installed a circular nephrostomy. Dynamic ultrasound examination in a week: "Kidney size remains unchanged, signs of interstitial parenchymal edema remain, on the right there is a slight improvement in urodynamics, the position of the nephrostomy is correct, on the left, urodynamic disorders of the previous severity remain, the cavity system and ureter are dilated, contain dense blood clots. On both sides, in the projection of the papillae of the renal pyramids, echo-dense structures were revealed, giving clear acoustic shadows (calcium encrustation of necrotic papillae). The bladder is empty (urethral catheter), the cavity is free. Conclusion: Signs of interstitial edema of the renal parenchyma persist. Necrotizing papillitis with calcification of necrotic renal papillae. Urodynamic disorders on the right with moderate positive dynamics, on the left - the tamponade of the cavity system and the ureter with blood clots remains. The left kidney was revised and drained from

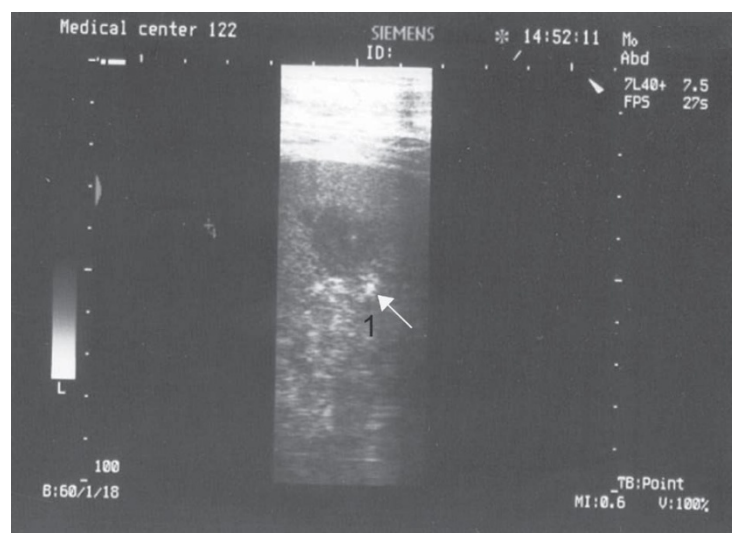


Figure: 2. Sonogram of the renal parenchyma (Siemens Sienna, 7.0 MHz).

1 - Echo-dense inlay in the necrotic renal papilla.

makregematuria appeared in 24 hours, the urethral catheter was received urine, brightly colored with blood. Hypercreatininemia was noted up to 0.31 mmol / L. On the 40th day, the cessation of urine flow through the urethral catheter was noted, which was clinically regarded as a manifestation of acute renal failure. An ultrasound of the urinary system and kidneys was performed. Ultrasound protocol: "Bladder volume 60 cc. cm, its cavity is made of dense inclusions, heterogeneous in structure (blood clots). The kidneys are symmetrically enlarged in size, the right one is 134 x 64 mm, the left one is 129 x 67 mm, they have smooth contours, the cavity systems of both kidneys are expanded - the cups are up to 20 mm, the pelvis are up to 38 mm, made with echo-dense loose inclusions (blood clots). The ureters are dilated throughout, filled with blood clots. The parenchyma on the right is thickened to 26 mm, the cortical layer is of moderately increased echogenicity, the pyramids are enlarged to 18 mm, triangular in shape, echo-dense structures without an acoustic shadow (zones of necrosis) are located in the projection of the papillae. The parenchyma of the left kidney is also thickened to 28 mm, the cortical layer is of moderately increased echogenicity, the pyramids are enlarged to 18-19 mm, triangular in shape, echo-dense structures without an acoustic shadow (necrosis zones) are located in the projection of the papillae.

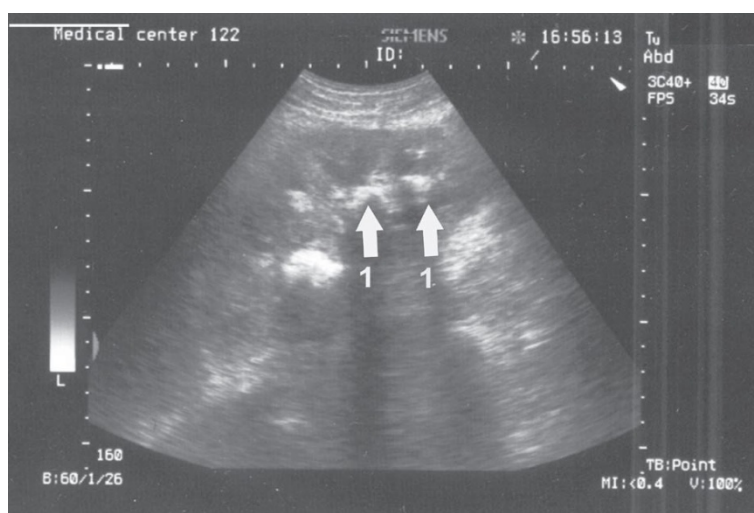


Figure: 3. Sonogram of the left kidney (Siemens Sienna, 3.5 MHz). 1 - Calcifications with acoustic shadows in the renal papillae.

Conclusion: Ultrasound Signs a large number of dense blood clots were evacuated from the pelvis and ureter, a circular nephrostomy was installed. After drainage of both kidneys, hematuria decreased and later stopped. Dynamic ultrasound of the kidneys on the 64th day of hospitalization: "Kidney sizes have slightly decreased, close to normal, interstitial edema with signs of moderate regression (pyramids up to 13-15 mm, rounded). Urodynamic disorders were arrested, cavity systems, ureters are free, not dilated. Noteworthy are multiple echo-dense formations up to 8-12 mm, giving an acoustic shadow, in the projection of the renal papillae of both kidneys, cavity systems. Conclusion: Signs of regression of interstitial edema of the renal parenchyma. No urodynamic disorders were found. Calcifications of the renal papillae of both kidneys (resolution of necrotizing papillitis), calculi of the cavity systems of both kidneys "(Fig. 3, 4). In the analysis of urine proteinuria, moderate leukocyturia, microhematuria persisted. Blood creatinine decreased to 0.17 mmol / L. Later, despite the treatment, the patient's condition worsened against the background of severe intoxication, generalized infection, multiple organ failure. Death came with an increase in cardiovascular and respiratory failure. The data of the pathological and anatomical examination of the kidneys: "Kidney sizes: right - 12 x 5.5 x 4 cm, left - 11 x 4.5 x 4 cm. The pelvis of the right kidney is completely filled with a yellow stone in the form of a loose conglomerate. In the pelvis of the left kidney there is the same loose conglomerate. The mucous membrane of the pelvis is dirty green in color, in places with tightly retaining particles of sand. The kidney tissue in the section is dark brownish-red, dull. The border between the cortical and medullary layers is smoothed, the renal papillae are encrusted with dense yellowish structures. The kidney capsule can be easily removed, exposing a smooth surface. The ureters are passable, their mucous membrane is dirty-cyanotic. Conclusion: Pyelonephritis. Bilateral necrotizing papillitis. Urolithiasis, stones of both kidneys. "

The presented clinical case demonstrates the possibilities of ultrasound diagnostics in the detection of kidney diseases. The peculiarity of this message is that, in the absence of highly specialized information, according to the results of ultrasound examination, a rather rare disease was diagnosed - NP with fornical bleeding, which was confirmed by postmortem pathological examination.

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