

## DISORDER OF BLOOD CIRCULATION IN THE KIDNEYS

*Алиева Шахина Илхом кизи*

*Бухоро Инновацион таълим ва тиббиёт университети*

*Даволаш шхи 2 боскич талабаси*

**Abstract:** The kidneys are a vital organ responsible for filtering waste and excess fluids from the blood, regulating electrolyte levels, and maintaining overall fluid balance in the body. However, when the blood circulation in the kidneys is disrupted, it can lead to a range of complications that can have severe consequences on overall health. This article will delve into the disorder of blood circulation in the kidneys, its causes, symptoms, diagnosis, treatment options, and potential complications.

**Keywords:** kidneys, blood system, blood circulation, disorders, new medical treatments, breathing

**Introduction:** Late advances in understanding the pathophysiology of persistent kidney sickness (CKD) recommend that the pathogenic components causing moderate renal obliteration join on a typical tubulo-interstitial pathway described by rounded decay and hypoxia, peritubular hairlike injury, and interstitial fibrosis, at long last prompting irreversible scarring. Earlier examinations have assessed the utilization of blood oxygenation level-dependent and dispersion attractive reverberation imaging (X-ray) to screen contrasts in relative degrees of hypoxia and interstitial fibrosis in patients with CKD. The vital benefit of these 2 strategies is that they are both endogenous difference systems and require no organization of exogenous differentiation media, which are contraindicated in subjects with compromised renal capability. The capacity to incorporate an endogenous strategy to assess renal perfusion would be of extraordinary interest in fostering an exhaustive useful convention to figure out the regular movement of CKD. Presently, there are relatively few information on renal blood stream or perfusion in patients with CKD.

Blood vessel turn marking (ASL) X-ray involves endogenous water as a tracer and is broadly utilized in the mind. Despite the fact that possibility has been exhibited in the kidneys, a critical test for ASL X-ray is the intrinsically restricted signal-to-commotion proportion (SNR) requiring reshaped estimations to permit information averaging. This is a significant obstacle in the mid-region, since breath holding limits the quantity of midpoints that can be performed. Albeit the attainability of renal perfusion X-ray with ASL has been shown involving breath-hold acquisitions in solid subjects, it is really difficult in patients with compromised renal perfusion. Instructed breathing or guide gated acquisitions have been utilized. Guide gating includes extra information obtaining to appraise the movement that can be utilized to choose whether to acknowledge or dismiss the estimation. In forthcoming gating, this choice is made progressively. In review gating, a decent number of information acquisitions are made, and acknowledge or dismiss choices are made reflectively.

Blood circulation in the kidneys is a complex process that involves the delivery of oxygenated blood to the renal tissues and the removal of deoxygenated blood. The kidneys receive approximately 20% of the total cardiac output, making them one of the most highly perfused organs in the body. Any disruption to this process can lead to a range of disorders, including renal artery stenosis, renal vein thrombosis, and chronic kidney disease.

Renal artery stenosis is a condition characterized by the narrowing of the renal arteries, which supply blood to the kidneys. This narrowing can be caused by atherosclerosis, fibromuscular

dysplasia, or other conditions that damage the arterial walls. As a result, the kidneys receive inadequate blood flow, leading to a decrease in renal function and potentially even kidney failure. Renal artery stenosis is a common condition that affects approximately 5% of the general population, with a higher prevalence in individuals with hypertension, diabetes, and cardiovascular disease.

Renal vein thrombosis, on the other hand, is a condition characterized by the formation of a blood clot in the renal veins, which drain blood from the kidneys. This can be caused by a range of factors, including nephrotic syndrome, cancer, and trauma. The clot can obstruct blood flow from the kidneys, leading to a range of symptoms including flank pain, hematuria, and acute kidney injury.

Chronic kidney disease is a condition characterized by the gradual loss of renal function over time. It can be caused by a range of factors, including diabetes, hypertension, and glomerulonephritis. As the kidneys lose function, waste products can build up in the blood, leading to a range of symptoms including fatigue, nausea, and edema. The symptoms of disorders of blood circulation in the kidneys can be non-specific and may not manifest until the disease has progressed to an advanced stage. However, common symptoms include flank pain, hematuria, proteinuria, and edema. In some cases, individuals may experience hypertension, fatigue, and decreased urine output.

Diagnosis of disorders of blood circulation in the kidneys typically involves a range of tests, including imaging studies, blood tests, and urinalysis. Imaging studies such as ultrasound, computed tomography (CT), and magnetic resonance angiography (MRA) can help to visualize the renal arteries and veins, allowing for the identification of any narrowing or blockages. Blood tests can help to assess renal function, while urinalysis can help to detect the presence of protein or blood in the urine.

Treatment options for disorders of blood circulation in the kidneys depend on the underlying cause and severity of the disease. In some cases, medications may be prescribed to control hypertension, reduce proteinuria, and slow the progression of kidney disease. Angioplasty and stenting may be used to open up narrowed or blocked renal arteries, while thrombolytic therapy may be used to dissolve blood clots in the renal veins. In advanced cases, dialysis or kidney transplantation may be necessary.

If left untreated, disorders of blood circulation in the kidneys can lead to a range of complications, including chronic kidney disease, end-stage renal disease, and cardiovascular disease. Chronic kidney disease can increase the risk of cardiovascular disease, while end-stage renal disease requires dialysis or kidney transplantation to survive. Furthermore, disorders of blood circulation in the kidneys can also increase the risk of other complications, including anemia, bone disease, and electrolyte imbalances.

The kidneys, two bean-shaped organs nestled in the posterior abdomen, play a crucial role in maintaining the body's internal environment. They act as sophisticated filters, constantly processing blood to remove waste products, regulate electrolytes, and maintain fluid balance. This intricate process relies heavily on a highly specialized circulatory system within the kidneys, ensuring efficient blood flow for filtration and reabsorption.

From the arcuate arteries, blood flows into the interlobular arteries, which extend radially towards the renal cortex, the outer layer of the kidney. The interlobular arteries give rise to the afferent arterioles, which are the main blood vessels supplying the functional units of the kidneys, the nephrons.

Each nephron consists of a glomerulus, a network of capillaries surrounded by Bowman's capsule, and a renal tubule. The afferent arteriole delivers blood to the glomerulus, where high pressure forces fluid and small solutes from the blood into Bowman's capsule. This process, known as glomerular filtration, is the first step in urine formation.

The filtrate then enters the renal tubule, a long, winding structure divided into several segments. As the filtrate flows through the tubule, essential nutrients and water are reabsorbed back into the bloodstream. This selective reabsorption is driven by various mechanisms, including active transport and passive diffusion.

The remaining fluid, now devoid of essential nutrients and containing waste products, continues its journey through the collecting duct, a larger tube formed by the merging of several renal tubules. The collecting duct empties into the renal pelvis, a funnel-shaped structure that collects urine from multiple nephrons.

From the renal pelvis, urine flows into the ureters, two muscular tubes that transport urine to the bladder for storage. When the bladder reaches a certain fullness, the ureters contract, propelling urine into the urethra, a single tube that carries urine out of the body.

The intricate blood circulation within the kidneys ensures efficient filtration and reabsorption, maintaining the delicate balance of the body's internal environment. The high pressure in the glomerulus allows for efficient filtration, while the specialized structure of the renal tubules enables selective reabsorption of essential nutrients and water. This complex interplay between blood flow and kidney function is vital for maintaining overall health and well-being.

**Additional Points to Consider:**

- The kidneys receive approximately 20% of the total cardiac output, highlighting their crucial role in blood filtration and regulation.
- The juxtaglomerular apparatus, located near the glomerulus, plays a vital role in regulating blood pressure by releasing renin, a hormone that controls the production of angiotensin II, a potent vasoconstrictor.
- The countercurrent exchange system in the renal medulla helps maintain a high concentration of solutes, enabling the reabsorption of water and the production of concentrated urine.
- Various diseases and conditions can affect blood circulation in the kidneys, leading to impaired kidney function and potentially life-threatening complications.

### **Conclusion.**

In conclusion, disorders of blood circulation in the kidneys are a range of conditions that can have severe consequences on overall health. Renal artery stenosis, renal vein thrombosis, and chronic kidney disease are all common conditions that can lead to a range of symptoms, including flank pain, hematuria, and edema. Diagnosis typically involves a range of tests, including imaging studies, blood tests, and urinalysis, while treatment options depend on the underlying cause and severity of the disease. If left untreated, disorders of blood circulation in the kidneys can lead to a range of complications, including chronic kidney disease, end-stage renal disease, and cardiovascular disease. Therefore, it is essential that individuals at risk of these conditions undergo regular screening and monitoring to prevent the development of these disorders.

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