CAUSES CLINICAL FEATURES AND TREATMENT OF NEPHROPTOSIS

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Annotation. *Nephroptosis, or floating kidney, is a pathological condition characterized by abnormal downward displacement of the kidney, most commonly observed in young, slender women. The disorder develops due to weakening of the anatomical support system of the kidney, loss of perirenal fat, abdominal wall laxity, trauma, or genetic predisposition associated with connective tissue weakness. The clinical presentation varies from asymptomatic cases to severe flank pain, hypertension, recurrent urinary tract infections, hydronephrosis, and progressive renal impairment. Modern diagnostic methods, including ultrasonography, intravenous urography, computed tomography, and renal scintigraphy, play an essential role in confirming the diagnosis and differentiating nephroptosis from other abdominal and urological disorders.*

Keywords: *Nephroptosis, Floating kidney, Perirenal fat, Connective tissue weakness, Ureteral kinking, Venous congestion, Hydronephrosis, Renovascular hypertension.*

ПРИЧИНЫ, КЛИНИЧЕСКИЕ ПРОЯВЛЕНИЯ И ЛЕЧЕНИЕ НЕФРОПТОЗА

Аннотация. *Нефроптоз, или блуждающая почка, это патологическое состояние, характеризующееся патологическим смещением почки вниз, чаще всего наблюдаемое у молодых стройных женщин. Заболевание развивается вследствие ослабления анатомической системы поддержки почки, потери околопочечной жировой клетчатки, дряблости брюшной стенки, травмы или генетической предрасположенности, связанной со слабостью соединительной ткани. Клиническая картина варьируется от бессимптомного течения до выраженной боли в пояснице, гипертонии, рецидивирующих инфекций мочевыводящих путей, гидронефроза и прогрессирующей почечной недостаточности. Современные методы диагностики, включая ультразвуковое исследование, внутривенную урографию, компьютерную томографию и сцинтиграфию почек, играют важную роль в подтверждении диагноза и дифференциации нефроптоза от других абдоминальных и урологических заболеваний.*

Ключевые слова: *Нефроптоз, Блуждающая Почка, Околопочечный Жир, Слабость Соединительной Ткани, Перегиб Мочеточника, Венозный Застой, Гидронефроз, Реноваскулярная Гипертензия.*

Introduction

Nephroptosis, also known as floating kidney, is a pathological condition characterized by the downward displacement or excessive mobility of the kidney from its normal anatomical position. In recent years, this disorder has been increasingly recognized in the fields of urology and nephrology as a relatively common problem, particularly among women. The higher prevalence in females is often explained by anatomical and physiological factors, such as weaker abdominal wall support and changes related to pregnancy and childbirth. The etiology of nephroptosis is multifactorial. Contributing factors include weakening of the ligaments and muscles that support the kidney, rapid weight loss leading to reduced perirenal fat, decreased abdominal wall tone, trauma, and post-pregnancy changes. Depending on the degree of kidney displacement, the clinical presentation may vary. In the early stages, nephroptosis is often asymptomatic; however, as the condition progresses, patients may develop lumbar pain, urinary disturbances, arterial hypertension, and general fatigue.

If left untreated, nephroptosis can lead to complications such as hydronephrosis, pyelonephritis, and secondary hypertension. Management strategies for nephroptosis include both conservative and surgical approaches. Conservative treatment is typically effective in mild cases and may involve physical therapy, the use of supportive bandages, and dietary modifications. In more advanced or symptomatic cases, surgical intervention, most commonly nephropexy, is required to restore and stabilize the kidney in its anatomical position. Early diagnosis and appropriate treatment are essential for improving patient outcomes and preventing long-term complications.

Main part

Nephroptosis, commonly referred to as "floating kidney," is a pathological condition in which the kidney descends more than 5 cm from its normal anatomical position during postural changes. Historically, this condition was first described in the 19th century and remains a subject of debate in nephrology and urology. Although often asymptomatic in early stages, nephroptosis can cause significant morbidity in advanced cases, including pain, urinary obstruction, and hypertension. The prevalence is notably higher in women, which is attributed to anatomical and hormonal factors, as well as pregnancy-related changes. Understanding nephroptosis is clinically important because it not only affects the urinary system but also contributes to systemic complications. Modern diagnostic techniques and treatment methods have improved outcomes, yet early recognition remains essential. The kidney is normally located in the retroperitoneal space, between the T12 and L3 vertebrae, held in place by perirenal fat, renal fascia, and surrounding muscles. It plays a vital role in maintaining fluid and electrolyte balance, regulating blood pressure, and excreting metabolic waste. Stability of the kidney is crucial for its physiological function. The support system includes Gerota's fascia, perirenal fat capsule, and abdominal wall musculature.

Any weakening of these structures may predispose the kidney to abnormal mobility.

Physiologically, minor displacement with respiration is considered normal; however, excessive downward movement is pathological. A thorough understanding of renal anatomy and supporting structures is necessary to explain the pathogenesis of nephroptosis and to differentiate it from other renal disorders.

Nephroptosis is defined as an abnormal descent of the kidney of more than 5 cm when a patient changes from supine to upright position. It is classified into three stages depending on the degree of displacement and clinical manifestations. In Stage I, the lower pole of the kidney is palpable upon deep inspiration; symptoms are minimal. Stage II is characterized by descent of the entire kidney below the costal margin in an upright position, often accompanied by pain.

Stage III, or advanced nephroptosis, involves significant displacement into the pelvis, causing marked symptoms and complications such as hydronephrosis. This classification is important for clinical decision-making, as management strategies vary depending on the stage.

The etiology of nephroptosis is multifactorial. Rapid weight loss, particularly loss of perirenal fat, is one of the main risk factors. Multiple pregnancies and childbirth can weaken abdominal wall muscles, increasing susceptibility. Traumatic injuries to the lumbar or abdominal region may damage renal fascia or ligaments, predisposing to kidney mobility. Genetic predisposition related to connective tissue disorders, such as Marfan syndrome, also plays a role.

Other causes include chronic heavy lifting, prolonged cough, and excessive physical exertion. Epidemiological data show a higher incidence in slender women aged 20 40 years. Understanding these etiological factors is crucial for prevention and early intervention.

The pathogenesis of nephroptosis involves structural weakening of renal support mechanisms, leading to abnormal renal mobility. As the kidney descends, ureteral kinking may occur, causing urinary obstruction and recurrent infections. Furthermore, renal artery stretching can lead to renovascular hypertension due to activation of the renin–angiotensin–aldosterone system. Prolonged obstruction results in hydronephrosis and progressive renal damage. Venous congestion may also develop, contributing to hematuria and varicocele in male patients. The combination of mechanical and vascular changes explains the variability of clinical presentations and highlights why early diagnosis is necessary to prevent irreversible complications.

Clinical manifestations of nephroptosis depend on its stage. In early stages, patients may remain asymptomatic. As the condition progresses, typical symptoms include dull aching pain in the flank or lumbar region, which intensifies with standing and decreases when lying down.

Gastrointestinal symptoms such as nausea and abdominal discomfort may occur due to ureteral obstruction. Hypertension, hematuria, and recurrent urinary tract infections are important signs of advanced nephroptosis. Chronic cases can lead to hydronephrosis, recurrent pyelonephritis, and progressive renal failure. Because symptoms often overlap with other abdominal and musculoskeletal disorders, clinical suspicion must be supported by imaging.

Diagnosis of nephroptosis requires both clinical evaluation and imaging studies. Physical examination may reveal a palpable kidney in standing position. Ultrasonography, especially Doppler studies, helps assess renal mobility and blood flow. Intravenous urography remains a classic diagnostic tool, showing downward displacement of the kidney on erect films. Computed tomography and magnetic resonance imaging provide detailed anatomical information and are increasingly used. Nuclear scintigraphy can assess renal function and drainage. Differential diagnosis should rule out renal tumors, congenital anomalies, and other causes of flank pain. A combination of clinical suspicion and radiological confirmation ensures accurate diagnosis.

Treatment strategies are based on disease severity and patient symptoms. Conservative treatment, including weight gain, abdominal binders, and physical therapy, is effective in mild cases. In advanced cases with pain, obstruction, or hypertension, surgical nephropexy is indicated. Laparoscopic nephropexy is now considered the gold standard due to its minimally invasive nature, reduced hospital stay, and favorable outcomes compared to open surgery. Long-term prognosis depends on timely intervention. Untreated nephroptosis may lead to hydronephrosis, chronic infections, and renal insufficiency. With appropriate treatment, most patients achieve symptom relief and preservation of renal function.

Conclusion

Nephroptosis is a clinically significant but often underdiagnosed condition characterized by abnormal kidney mobility. The disorder arises from a combination of anatomical, physiological, and acquired factors such as rapid weight loss, multiple pregnancies, trauma, and connective tissue disorders.

Pathogenetically, nephroptosis leads to ureteral kinking, vascular stretching, and venous congestion, which may result in pain, recurrent infections, hypertension, and progressive renal dysfunction. Clinical presentation is variable, ranging from asymptomatic forms to severe complications, necessitating careful diagnostic evaluation.

Modern imaging techniques such as Doppler ultrasound, intravenous urography, and computed tomography play a crucial role in confirming diagnosis and assessing renal function.

Management depends on the stage and clinical severity.

Conservative treatment, including physical therapy and abdominal support, remains effective in mild cases, whereas surgical nephropexy particularly laparoscopic approaches offers excellent outcomes for advanced disease.

Prognosis is generally favorable with timely recognition and intervention, but delayed diagnosis may lead to irreversible renal damage. Therefore, increased clinical awareness, early screening in at-risk groups, and individualized treatment strategies are essential to improving patient outcomes and preventing long-term complication

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