

# Endovascular Renal Therapy: Advances in Minimally Invasive Renal Vascular Management

## Introduction

Endovascular renal therapy encompasses a range of minimally invasive procedures aimed at diagnosing and treating diseases of the renal arteries and veins. These therapies have become increasingly important in the management of renovascular conditions such as renal artery stenosis, renal artery aneurysms, and certain causes of secondary hypertension. With ongoing advancements in imaging, catheter technology, and interventional techniques, endovascular approaches now offer effective alternatives to open surgical interventions, particularly in patients with high operative risk [1,2]. The goal of endovascular renal therapy is to restore or preserve renal perfusion while minimizing procedural morbidity.

## Discussion

Endovascular renal therapy includes procedures such as renal artery angioplasty and stenting, embolization of renal tumors or arteriovenous malformations, and treatment of renal artery aneurysms using coils or covered stents. These interventions are typically performed via percutaneous arterial access under fluoroscopic guidance, often with adjunctive ultrasound or intravascular imaging. The minimally invasive nature of these procedures allows for shorter hospital stays, reduced pain, and faster recovery compared with traditional surgery [3,4].

One of the most common applications is the treatment of renal artery stenosis, particularly in patients with resistant hypertension, declining renal function, or recurrent pulmonary edema. In addition, renal artery embolization is widely used in the management of renal tumors, trauma-related hemorrhage, and preoperative devascularization. Endovascular techniques also play a role in managing renal vein thrombosis and treating complications following renal transplantation [5].

Despite its advantages, endovascular renal therapy requires careful patient selection and procedural planning. Potential complications include contrast-induced nephropathy, vascular injury, embolic events, and restenosis. Advances in low-profile devices, embolic protection systems, and contrast-sparing techniques have helped reduce these risks. Long-term success depends on appropriate follow-up with imaging and clinical assessment to ensure sustained vessel patency and renal function.

## Conclusion

Endovascular renal therapy has become an integral component of modern renal and vascular care, offering effective treatment options with reduced procedural risk. Its role continues to expand as technology and expertise advance, allowing treatment of increasingly complex renal vascular conditions. While not suitable for all patients, endovascular approaches provide significant benefits when applied judiciously. A multidisciplinary strategy involving nephrologists, vascular surgeons, and interventional specialists is essential to optimize outcomes. As evidence continues to evolve, endovascular renal therapy is expected to further enhance the management of renal vascular diseases

## Lucas Meyer\*

Dept. of Vascular Medicine, Heidelberg  
Clinical University, Germany

\*Author for correspondence:  
lucas.meyer@hcu.de

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through safe, targeted, and patient-centered care.

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