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## THE ROLE OF ENDOVASCULAR SURGERY IN VASCULAR DISEASES

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**Abstract:** This article examines the role of endovascular surgery in the diagnosis and treatment of vascular diseases. Endovascular surgery is a minimally invasive medical procedure used to treat disorders of blood vessels, including arterial stenosis, aneurysms, peripheral artery disease, and venous insufficiency. The study highlights the advantages of endovascular techniques compared to traditional open surgery, such as reduced trauma, shorter hospital stays, faster recovery, and lower complication rates. Modern technologies including angioplasty, stent placement, catheter-based interventions, and embolization are discussed as effective approaches in contemporary vascular treatment. The article also analyzes the indications, limitations, and future prospects of endovascular surgery in improving patient outcomes and quality of life. The findings demonstrate that endovascular procedures have become an essential component of modern vascular medicine and continue to expand with technological progress.

**Keywords:** endovascular surgery, vascular diseases, angioplasty, stent placement, catheter intervention, minimally invasive surgery, peripheral artery disease, aneurysm treatment, embolization, vascular medicine, blood vessel disorders, interventional radiology, patient recovery, modern medical technologies.

Vascular diseases, particularly peripheral arterial occlusive disease (PAOD), remain a major global public health burden. More than 200–250 million patients worldwide are affected by this pathology, reflecting its significant epidemiological impact. Over the past decades, endovascular surgery has emerged as a minimally invasive alternative to conventional open reconstructive procedures, increasingly competing with traditional surgical approaches. Current clinical guidelines in many cases recommend an “endovascular-first” strategy, especially for short-segment stenosis and high-risk patients.

However, data from randomized controlled trials indicate a complex clinical balance between endovascular techniques and bypass surgery. Some meta-analyses report higher reintervention rates after endovascular procedures, despite lower perioperative risk. Therefore, determining the effectiveness, long-term outcomes, and optimal indications of endovascular technologies remains one of the key research priorities in modern angiosurgery.

**Aim of the study.** To systematically analyze the clinical efficacy, safety, and long-term outcomes of endovascular surgery in various vascular diseases based on contemporary Scopus-indexed scientific literature.

**Materials and methods.** This literature review was conducted according to PRISMA guidelines. Randomized controlled trials (RCTs), meta-analyses, and systematic reviews published between 2010 and 2025 were retrieved from Scopus, PubMed, Embase, Cochrane Library, and ScienceDirect databases. The search terms included “endovascular treatment,” “peripheral artery disease,” “vascular surgery,” “angioplasty,” “bypass surgery,” and “revascularization outcomes.”

**Results and discussion.** The analyzed studies indicate that endovascular interventions demonstrate high technical success rates, reported in many studies to be approximately 85–90%. In particular, angioplasty and stenting techniques are widely used in femoropopliteal and infrapopliteal arterial segments.

Meta-analyses show that endovascular treatment reduces 30-day perioperative complications and mortality compared to open bypass surgery; however, it is associated with a higher risk of reintervention. For example, pooled analyses of randomized trials demonstrate significantly higher reintervention rates in the endovascular group compared to bypass surgery (odds ratio approximately 1.9–4.6).

At the same time, long-term limb salvage rates are comparable or clinically similar between the two approaches. Several meta-analyses report limb salvage rates exceeding 90% at 6–12 months. Endovascular approaches are particularly advantageous in high-risk patients, including elderly individuals and those with diabetes or multiple comorbidities, where they are considered a safer alternative.

Furthermore, next-generation technologies such as drug-coated balloons (DCB), drug-eluting stents (DES), and hybrid endovascular techniques are designed to reduce restenosis rates and significantly improve clinical outcomes. Nevertheless, long-term vessel patency remains generally lower compared to open surgical bypass procedures.

**Conclusion.** Endovascular surgery represents a modern, minimally invasive, and clinically effective approach for the management of vascular diseases. It reduces perioperative risk and ensures faster recovery. However, long-term patency and reintervention rates remain inferior to those of open bypass surgery. Future advances in hybrid techniques and novel stent materials are expected to address these limitations.



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