Common Femoral Artery Disease: Algorithms and Treatment Decisions

A practical approach to selecting open or endovascular treatment for CFA atherosclerotic disease based on patient risk, lesion anatomy, and expected durability.

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Common femoral artery (CFA) disease should not be regarded as another femoropopliteal lesion. Its location between iliac inflow and the superficial femoral artery (SFA) and profunda femoris artery (PFA) bifurcation makes treatment particularly consequential: An inadequate intervention may compromise both direct runoff and the profunda collateral circulation. Common challenges include bulky calcification, extension into one or both branch vessels, substantial variation in vessel diameter, and the need to preserve future femoral access.

For these reasons, common femoral endarterectomy (CFE), usually with patch angioplasty, has remained the reference treatment for decades. It removes bulky calcified plaque, restores the lumen, and allows direct treatment of the PFA origin. Its durability is well established,[1-3] although historical surgical patency definitions have often relied on clinical or anatomic occlusion rather than the duplex ultrasound peak systolic velocity ratio–based criteria commonly used in endovascular studies, which clearly show some differences.[4]

Open surgery is often associated with groin-related morbidity, including wound infection, lymphatic leakage or lymphocele, hematoma, bleeding, prolonged hospitalization and readmission rates, and substantial mortality.[5] These risks are particularly relevant in patients with frailty, obesity, diabetes, chronic kidney disease, previous groin surgery, prior access complications, or hostile groin anatomy. An endovascular treatment (EVT) option is increasingly attractive in these patient populations.

The 2024 European Society for Vascular Surgery guidelines acknowledge this evolving role. EVT may be considered for isolated CFA lesions not involving the bifurcation and in patients with a hostile groin.[6] The central question is therefore not whether CFE or EVT is universally superior, but which patients and lesions benefit most from each approach.

EVIDENCE FOR OPEN AND ENDOVASCULAR TREATMENT

Available comparative evidence suggests a consistent trade-off: CFE offers greater long-term durability, whereas EVT reduces early morbidity.[7,8]

Wells et al compared open surgery and EVT for lower extremity revascularization involving the CFA.[7] Open repair was associated with more postoperative bleeding in patients with claudication, more wound infections, and longer hospital stay. In contrast, EVT independently predicted ipsilateral CFA reintervention in both claudication and chronic limb-threatening ischemia, while major amputation, survival, and major adverse limb event–free survival did not differ significantly.

A recent meta-analysis by Chen et al, including 11 comparative studies and 2,835 patients, reported lower 30-day morbidity, wound complications, surgical site infection, lymphatic fistula, and hospital stay after EVT.[8] Conversely, EVT was associated with reduced primary and secondary patency and a higher reintervention rate during follow-up.

These findings require cautious interpretation. Most evidence is retrospective and heterogeneous with respect to lesion anatomy, calcification burden, bifurcation involvement, patency definitions, devices, and adjunctive treatments. It is problematic to compare a relatively standardized surgical procedure with a broad mix of endovascular strategies. Plain balloon angioplasty, drug-coated balloons (DCBs), atherectomy, intravascular lithotripsy (IVL), laser-cut nitinol stents, and interwoven stents should not be considered a single therapeutic class such as "endovascular."

CONTEMPORARY ENDOVASCULAR STRATEGIES

Standalone balloon angioplasty has generally provided insufficient durability to challenge CFE. Current endovascular approaches instead aim to modify or remove plaque before definitive treatment with DCBs or permanent scaffolding.

Vessel Preparation and Scaffolding

The TECCO randomized trial showed lower early morbidity with stenting compared with surgery, with comparable efficacy outcomes through 2 years.[9] Interwoven nitinol stents may be particularly useful in the CFA because of their radial strength and flexibility. The VMI-CFA study (NCT02804113) evaluated the Supera stent (Abbott) and reported encouraging midterm results. Nevertheless, stenting across the PFA origin should be approached cautiously. Although PFA coverage did not appear to increase PFA stenosis during 2-year follow-up in VMI-CFA, longer-term consequences remain uncertain.

Atherectomy and DCB

Atherectomy followed by DCB angioplasty aims to debulk the plaque. In the multicenter ARISTON study, atherectomy-assisted EVT was compared with open repair in 826 symptomatic patients.[10] In a matched analysis, there were no significant differences in all-cause mortality, amputation-free survival, or clinically driven target lesion revascularization at approximately 1.7 years. Bailout stenting was required in 5.1% of EVT cases. This strategy requires careful planning to minimize embolic risk and should be performed by teams familiar with embolic protection and management of procedural complications.

IVL

IVL provides a different form of vessel preparation by modifying the involved vessels. Its purpose is to improve compliance and reduce the need for aggressive balloon dilatation, atherectomy, or stenting. In the prospective, multicenter FESTIVAL registry of 117 patients with de novo CFA disease treated without stenting, technical success was 97.4%.[11] Estimated 2-year primary patency was 93.9%, freedom from clinically driven target lesion restenosis was 92.6%, and freedom from any reintervention was 91.9%.

Outcomes were less favorable in Azéma type III lesions involving the femoral bifurcation, as the tapering anatomy and diameter mismatch between the CFA, SFA, and PFA can complicate appropriate balloon sizing and wall apposition.

ONGOING RANDOMIZED TRIALS

Two randomized trials may substantially refine the evidence base. SUPERSURG-RCT (NCT04349657) is comparing Supera stenting with CFE in patients with stenotic, restenotic, or occlusive CFA lesions. In 13 European centers, 286 patients have been randomized 1:1, with stratification for calcification severity, body mass index, and femoral bifurcation involvement. The primary efficacy endpoint is noninferiority for 12-month primary patency, defined as freedom from clinically driven target lesion revascularization and binary restenosis on duplex ultrasound. The primary safety endpoint is freedom from 30-day complications. The PESTO-CFA trial (NCT02517827) randomized 320 patients to directional atherectomy plus DCB angioplasty or CFE with the same primary endpoints.[12]

Together, these studies will compare three major treatment concepts (interwoven scaffolding, atherectomy plus DCB, and CFE) in > 600 patients. Their value lies not only in overall comparisons but also in identifying anatomic and clinical subgroups that benefit from each strategy.

A PRACTICAL DECISION ALGORITHM

01

Assess the Patient

Treatment selection should balance technical feasibility against procedural risk and expected durability, life expectancy, functional status, quality of life, and patient preference.

Younger, physiologically robust patients with low perioperative risk and long life expectancy generally remain strong candidates for CFE. In such patients, the durability of open reconstruction and the lower expected reintervention burden may outweigh the short-term disadvantages of surgery.

Chronological age alone should not determine treatment. A functionally independent older patient with preserved cardiopulmonary, renal, and cognitive reserve may still be an appropriate candidate for CFE. Conversely, a younger patient with severe systemic disease, obesity, diabetes, renal impairment, prior groin intervention, or hostile groin anatomy may benefit from an endovascular-first approach.

The American Society of Anesthesiologists (ASA) classification estimates systemic disease burden, and the Clinical Frailty Scale assesses functional reserve and vulnerability to physiological stress.[13-15] Used together, these tools provide a more clinically meaningful estimate of surgical risk than either measure alone. A Clinical Frailty Scale score ≥ 5 and an ASA score of > 2 should prompt particular caution regarding open groin surgery.

02

Assess and Address the Lesion

Preprocedural lesion assessment should define length, calcification pattern, branch-vessel involvement, reference diameters, inflow and outflow disease, and prior interventions. Duplex ultrasound should assess hemodynamic severity and branch flow; CTA is mandatory for procedural planning and calcium density/location assessment.

CFE remains favored for extensive bifurcation disease, especially with PFA ostial/proximal involvement and for severe to extreme calcification, in which adequate endovascular expansion is unlikely. It remains also a reasonable option for chronic total occlusion and recurrent disease after EVT. An endovascular-first strategy is most appropriate for focal nonbifurcation CFA lesions, in vulnerable patients, and in multilevel disease that can be treated in a single minimally invasive procedure. Mild-to-moderate calcification and the ability to preserve PFA flow improve the likelihood of a durable endovascular result.

For nonbifurcation disease, IVL or atherectomy followed by appropriately sized DCB angioplasty achieves good short- to midterm results.[10,11] Interwoven stenting remains a good alternative in the presence of significant recoil, flow-limiting dissection, or unacceptable residual stenosis after vessel preparation.

For bifurcation lesions, the PFA origin deserves particular attention. Severe calcification at the proximal PFA may favor selective protected debulking prior to DCB treatment to reduce the risk of plaque displacement into the branch vessel. Marked diameter mismatch between the CFA and the SFA or PFA can make correct scaffold sizing impossible and IVL inappropriate due to lack of intense wall apposition ing. In contrast, less pronounced mismatch and limited deep femoral artery (DFA) disease may be amenable to IVL or interwoven scaffolding in experienced hands.

03

Surveillance and Secondary Prevention

Technical success is only the beginning of treatment. All patients require optimal medical therapy, including lipid-lowering treatment, blood pressure and diabetes management, smoking cessation, exercise therapy (when feasible), and antithrombotic therapy tailored to bleeding risk and the revascularization performed. Clinical assessment, ankle-brachial index measurement, and duplex surveillance remain essential for early detection of restenosis or loss of patency.

CONCLUSION

Today, CFE remains the most durable treatment for CFA atherosclerotic disease and is particularly valuable in low-risk patients with long life expectancy, severe bifurcation with proximal PFA disease, and severe to extreme calcification. EVT reduces early morbidity, wound and lymphatic complications, and hospital stay, making it particularly attractive in frail patients, hostile groins, and focal nonbifurcation disease or mild-to-moderate bifurcation/DFA calcium load.

Treatment should therefore be individualized rather than dogmatic. Atherectomy plus DCB, IVL plus DCB, and interwoven stenting each have a potential role. Results from SUPERSURG-RCT and PESTO-CFA should help define the patient and lesion subsets for which these approaches can reliably complement or, in specific lesion and patient subcohorts, replace CFE. ■

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