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Contemporary Surgical Management of Carotid Stenosis: Optimizing Outcomes with Carotid Endarterectomy and Carotid Artery Stenting

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1. Abstract

Carotid artery stenosis is a major cause of ischemic stroke and remains an important target for preventive vascular intervention. Two principal revascularization strategies are currently used: Carotid Endarterectomy (CEA) and Carotid Artery Stenting (CAS). Although both procedures are effective, optimal selection between them continues to depend on patient-specific anatomy, plaque morphology, comorbidities, and procedural risk. This review outlines a practical treatment strategy based on clinical outcomes and evolving evidence. CEA remains the preferred option for severe carotid stenosis, particularly in eccentric or tortuous lesions, narrow residual lumens, and unstable soft plaque. CAS is often favored in patients considered high risk for open surgery, including those with contralateral carotid occlusion, distal internal carotid lesions, restenosis, radiation-induced disease, or significant medical comorbidity. When appropriately selected, both CEA and CAS can be performed with low morbidity and mortality while providing effective stroke prevention.

2. Keywords

Carotid stenosis, Carotid endarterectomy, Carotid artery stenting, Stroke prevention, Plaque imaging, Vascular surgery

3. Introduction

Atherosclerotic carotid artery stenosis is a well-recognized contributor to transient ischemic attack and ischemic stroke. In patients with significant stenosis, especially symptomatic disease, surgical or endovascular intervention may substantially reduce the risk of recurrent cerebrovascular events.

For decades, Carotid Endarterectomy (CEA) was considered the standard operative treatment. More recently, Carotid Artery Stenting (CAS) has emerged as a less invasive alternative, particularly for patients with unfavorable surgical risk profiles.

Despite widespread use of both procedures, debate continues regarding the most appropriate indications for each therapy. Modern decision-making requires not only assessment of stenosis severity but also evaluation of plaque stability, lesion morphology, vascular access anatomy, age, and systemic comorbidities.

This review summarizes a contemporary strategy for choosing between CEA and CAS while emphasizing individualized treatment planning.

4. Pathophysiology of Carotid Stenosis

Carotid stenosis is most commonly caused by atherosclerotic plaque formation at the carotid bifurcation and proximal internal carotid artery. Progressive luminal narrowing can lead to stroke through two major mechanisms:

- Artery-to-artery embolization from unstable plaque
- Hemodynamic insufficiency from severe flow limitation

The risk of stroke increases in patients with symptomatic lesions, ulcerated plaque, rapid progression, or severe stenosis.

5. Conclusion

Carotid Endarterectomy and Carotid Artery Stenting are both valuable options for treating carotid stenosis. Neither procedure is universally superior in all patients. CEA remains the preferred treatment for many severe, tortuous, or unstable plaque lesions, whereas CAS is especially useful in surgically high-risk or anatomically difficult cases. Excellent outcomes can be achieved when treatment is tailored to plaque characteristics, vascular anatomy, comorbidities, and institutional expertise.

References

1. Endovascular versus surgical treatment in patients with carotid stenosis in the Carotid and Vertebral Artery Transluminal Angioplasty Study (CAVATAS): a randomised trial. Lancet. 2001; 357: 1729-1737.
2. North American Symptomatic Carotid Endarterectomy Trial Collaborators. Beneficial effect of carotid endarterectomy in symptomatic patients with high-grade carotid stenosis. N Engl J Med. 1991; 325: 445-453.
3. North American Symptomatic Carotid Endarterectomy Trial.

Methods, patient characteristics, and progress. Stroke. 1991; 22: 711-720.

4. Yadav JS, Wholey MH, Kuntz RE, Fayad P, Katzen BT, Mishkel GJ, Bajwa TK. Protected carotid-artery stenting versus endarterectomy in high-risk patients. N Engl J Med. 2004; 351: 1493-1501.
5. Tsukahara T, Hatano T, Nakakuki T, Tsuji Y, Aoyama T, Ogata H. Combined treatment using CEA and CAS for carotid arterial stenosis. Acta Neurochir Suppl. 2008; 103: 109-112.
6. Tsukahara T, Fukuda S, Nakakuki T, Murakami M, Arai D, Yamaguchi S. Indication for surgical treatment of carotid arterial stenosis in high-risk patients. Acta Neurochir Suppl. 2011; 112: 21-24.
7. Arai D, Yamaguchi S, Murakami M, Nakakuki T, Fukuda S, Satoh-Asahara N, et al. Characteristics of carotid plaque findings on ultrasonography and black blood magnetic resonance imaging in comparison with pathological findings. Acta Neurochirurgica Suppl. 2011; 112: 15-20.
8. International Carotid Stenting Study investigators, Ederle J, Dobson J, Featherstone RL, Bonati LH, van der Worp HB, et al. Carotid artery stenting compared with endarterectomy in patients with symptomatic carotid stenosis (International Carotid Stenting Study): an interim analysis of a randomised controlled trial. Lancet. 2010; 375: 985-997.
9. Brott TG, Hobson RW 2nd, Howard G, Roubin GS, Clark WM, Brooks W, et al. Stenting versus endarterectomy for treatment of carotid-artery stenosis. N Engl J Med. 2010; 363: 11-23.
10. Tsukahara T, Akiyama Y, Nomura M, Hashimoto N. Carotid Endarterectomy: Standard Techniques to Avoid Complications. Jpn J Neurosurg. 1977; 11: 731-736.
11. Cao P, De Rango P, Verzini F, Maselli A, Norgiolini L, Giordano G . Outcome of carotid stenting versus endarterectomy: a case-control study. Stroke. 2006; 37: 1221-1226.