EDITORIAL

The New 2023 European Society for Vascular Surgery (ESVS) Carotid Guidelines — The European Perspective

The 2023 European Society for Vascular Surgery (ESVS) clinical practice guidelines on the management of atherosclerotic carotid and vertebral artery disease[1] is a comprehensive document that expands considerably the earlier (2017) ESVS Carotid and Vertebral Guidelines.[2] The 2023 Guidelines include a total of 133 recommendations, of which 84 remained unchanged, 11 have been regraded since the previous Guidelines,[2] and 38 are new.[1] Importantly, the new Guidelines provide answers to a number of previously "unanswered questions", such as which patients are "high risk" for carotid endarterectomy (CEA) or carotid artery stenting (CAS), if there is an association between asymptomatic carotid stenosis (ACS) and cognitive decline, if this can be reversed/prevented by CEA/CAS, as well as other important issues.

The timing of the publication of the 2023 ESVS guidelines[1] is optimal, as they follow the publication of the updated Society for Vascular Surgery (SVS) clinical practice guidelines for the management of carotid artery stenosis, that were e-published in June 2021.[3,4] As a result, both guidelines address the topic of the current optimal management of patients with both asymptomatic and symptomatic carotid stenosis, and provide up to date recommendations for clinicians.[1,3,4] Consequently, it would be useful to see where these two contemporary guidelines converge, as well as which aspects differ.

MANAGEMENT OF PATIENTS WITH ASYMPTOMATIC CAROTID STENOSIS

Both the ESVS[1] and the SVS[3,4] guidelines recognise the essential role of best medical therapy (BMT) and risk factor modification in the management of patients with ACS. Both guidelines provide detailed recommendations regarding the treatment of hypertension, diabetes mellitus, hyperlipidaemia/dyslipidaemia, as well as lifestyle measures that should be implemented in all ACS patients (including smoking cessation, exercise, adoption of a healthy diet, and weight loss).[1,3,4] Furthermore, both guidelines recommend primary prevention strategies, including low dose (75 — 325 mg/day) aspirin or clopidogrel (75 mg/day) and lipid lowering therapy with statins.[1,3,4]

A key difference between the ESVS[1] and the SVS[3,4] guidelines is in the role of invasive/procedural treatment (CEA/CAS) for the management of ACS patients. According to the SVS guidelines,[3,4] CEA + BMT is strongly recommended over BMT alone in low surgical risk patients with $>$ 70% ACS for the long term prevention of stroke and death (level of recommendation: Grade 1 [Strong]; Quality of Evidence: B [Moderate]). In contrast, the ESVS guidelines identified specific clinical/imaging features associated with an increased risk of late ipsilateral stroke in patients with 50% — 99% ACS (e.g., silent ipsilateral infarction on computed tomography (CT)/magnetic resonance imaging (MRI), stenosis progression, a large plaque area, large juxtaluminal black area on computerised plaque analysis, plaque echolucency, intraplaque haemorrhage on MRI, impaired cerebrovascular reserve, spontaneous embolisation on transcranial Doppler monitoring, and others).[1] Similar to the earlier 2017 ESVS guidelines,[2] the 2022 ESVS guidelines recommended that in "average surgical risk" patients with a 60% — 99% ACS and one or more imaging or clinical characteristics that may be associated with an increased risk of late stroke, CEA should (Class IIa; level of evidence: B) and CAS may be considered (Class IIb; level of evidence: B) provided the patient's life expectancy exceeds five years and 30 day stroke/death rates are $\leq$ 3%. In other words, the ESVS[1] guidelines adopt a more conservative (or a more selective) approach for the invasive management of ACS patients than the SVS Guidelines[3,4]

MANAGEMENT OF PATIENTS WITH SYMPTOMATIC CAROTID STENOSIS

For patients with a recent transient ischaemic attack (TIA) or a minor stroke ipsilateral to a 50% — 99% internal carotid artery (ICA) stenosis, both the ESVS[1] and the SVS Guidelines[3,4] provide a strong recommendation for prophylactic CEA, ideally within 14 days of symptom onset. Dual antiplatelet treatment with aspirin + clopidogrel or aspirin + dipyridamole is recommended within 24 hours after a TIA/minor ischaemic stroke after exclusion of intracranial bleeding/haemorrhagic stroke by brain imaging and prior to an expedited carotid intervention.[1,3,4] Both guidelines recommend CEA over transfemoral CAS for recently symptomatic patients $>$ 70 years and an ipsilateral $\geq$ 50% ICA stenosis.[1,3,4] Furthermore, both guidelines provide a weaker recommendation for CAS as an alternative to CEA for patients $<$ 70 years and for recently symptomatic patients with an ipsilateral 50% — 99% ICA stenosis and anatomical features (e.g., high carotid bifurcation, tracheal stoma, etc.) or co-morbidities (e.g. congestive heart failure, chronic obstructive pulmonary disease, etc.) that render a patient at "high risk" for surgery.[1,3,4]

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A key difference between the two guidelines is in the role of transcarotid artery revascularisation (TCAR) for the management of patients with symptomatic carotid stenosis. The SVS guidelines recommend TCAR over both CEA and transfemoral CAS for symptomatic patients with $\geq$ 50% ICA stenosis and a lesion above the second cervical vertebra.[3,4] Furthermore, TCAR is preferred over both CEA and transfemoral CAS in "high surgical risk" patients (both anatomically and physiologically).[3,4] In contrast, the ESVS Guidelines[1] recognise that TCAR has emerged as a promising new CAS technology but are more reluctant to support this novel alternative.

The reasons for the more cautious approach by the ESVS Guidelines[1] are twofold. The first is that only one registry has reported procedural risks for TCAR stratified for timing after symptom onset.[5] The second reason is that a large percentage of patients included in the various registries reporting outcomes for TCAR are asymptomatic. A Society for Vascular Surgery Vascular Quality Initiative (SVS-VQI) study comparing outcomes after TCAR (n = 638) *vs.* transfemoral CAS (n = 10 136) demonstrated significantly higher in hospital TIA/stroke/death rates after transfemoral CAS (odds ratio [OR] 2.1; 95% confidence interval [CI] 1.08 − 4.08; p = .030).[6] However, only 214/638 (33.5%) patients of the TCAR cohort were symptomatic compared with 4 236/10 136 (41.9%) of the transfemoral CAS cohort (p < .001).[6] In a second SVS-VQI registry comparing TCAR (n = 1 182) *vs.* CEA (n = 10 797), no difference was reported regarding in hospital stroke/death rates (OR 1.3; 95% CI 0.8 − 2.2; p = .28).[7] However, once again only 32% of the TCAR patients were symptomatic compared with 27% of the CEA patients (p < .001).[7] Although several systematic reviews and meta-analyses have demonstrated that TCAR is associated with low peri-operative stroke/death/myocardial infarction and complication rates (e.g., cranial nerve injuries and local haematoma), as well as a high technical success rate,[8−10] the value of this promising technique needs to be demonstrated in appropriately designed randomised controlled trials before it is recommended as an alternative to CEA for the management of patients with symptomatic carotid stenosis.

CONCLUSIONS

The 2023 ESVS clinical practice guidelines on the management of atherosclerotic carotid and vertebral artery disease is an exhaustive document covering all aspects of the prevention, diagnosis, and treatment of carotid and vertebral artery stenosis. It provides extensive coverage and explicit details of every possible issue that may arise in the everyday clinical practice of physicians and surgeons dealing with the management of patients with carotid and vertebral artery stenosis. These robust recommendations provide invaluable assistance and should guide clinicians in decision making for often complex vascular patients in everyday clinical scenarios. We urge all surgeons and physicians involved in the management of vascular patients to study this comprehensive document carefully and thoroughly.

REFERENCES

1 Naylor AR, Rantner B, Ancetti S, de Borst GJ, de Carlo M, Halliday A, et al. European Society for Vascular Surgery (ESVS) 2023 Clinical Practice Guidelines on the Management of Atherosclerotic Carotid and Vertebral Artery Disease. *Eur J Vasc Endovasc Surg* 2023;**65**:7−111.

2 Naylor AR, Ricco JB, de Borst GJ, de Haro J, Halliday A, Hamilton G, et al. ESVS Guidelines Committee. Editor's Choice − management of atherosclerotic carotid and vertebral artery disease: 2017 clinical practice guidelines of the European Society for Vascular Surgery (ESVS). *Eur J Vasc Endovasc Surg* 2018;**55**:3−81.

3 AbuRahma AF, Avgerinos ED, Chang RW, Darling 3rd RC, Duncan AA, Forbes TL, et al. Society for Vascular Surgery clinical practice guidelines for management of extracranial cerebrovascular disease. *J Vasc Surg* 2022;**75**:4S−22S.

4 AbuRahma AF, Avgerinos ED, Chang RW, Darling 3rd RC, Duncan AA, Forbes TL, et al. The Society for Vascular Surgery implementation document for management of extracranial cerebrovascular disease. *J Vasc Surg* 2022;**75**:26S−98S.

5 Cui CL, Dakour-Aridi H, Eldrup-Jorgensen J, Schermerhorn ML, Siracuse JJ, Malas MB. Effects of timing on in-hospital and one-year outcomes after transcarotid artery revascularization. *J Vasc Surg* 2021;**73**:1649−57.

6 Malas MB, Dakour-Aridi H, Wang GJ, Kashyap VS, Motaganahalli RL, Eldrup-Jorgensen J, et al. Transcarotid artery revascularization versus transfemoral carotid artery stenting in the Society for Vascular Surgery Vascular Quality Initiative. *J Vasc Surg* 2019;**69**:92−103.

7 Schermerhorn ML, Liang P, Dakour-Aridi H, Kashyap VS, Wang GJ, Nolan BW, et al. In-hospital outcomes of transcarotid artery revascularization and carotid endarterectomy in the Society for Vascular Surgery Vascular Quality Initiative. *J Vasc Surg* 2020;**71**:87−95.

8 Paraskevas KI, Antonopoulos CN, Kakisis JD, Geroulakos G. An updated systematic review and meta-analysis of results of transcervical carotid artery stenting with flow reversal. *J Vasc Surg* 2020;**72**:1489−98.

9 Galyfos GC, Tsoutsas I, Konstantopoulos T, Galanopoulos G, Sifala F, Filis K, et al. Editor's Choice − Early and late outcomes after transcarotid revascularisation for internal carotid artery stenosis: a systematic review and meta-analysis. *Eur J Vasc Endovasc Surg* 2021;**61**:725−38.

10 Naazie IN, Cui CL, Osaghae I, Murad MH, Schermerhorn M, Malas MB. A Systematic review and meta-analysis of transcarotid artery revascularization with dynamic flow reversal versus transfemoral carotid artery stenting and carotid endarterectomy. *Ann Vasc Surg* 2020;**69**:426−36.

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