Management of Carotid Stenosis

- **BMT** (Best Medical Treatment)
- **CEA** (Carotid Endarterectomy)
- **CAS** (Carotid Angioplasty & Stenting)

BMT (Best Medical Treatment)

- Antiplatelet agents
- High-intensity statin therapy

  (Atorvastatin 40-80mg or Rosuvastatin 20 to 40 mg)

  - Ezetimibe, alternative or add-on
  - PCSK9 inhibitor, add-on for unsatisfied patients.
- Treatment of hypertension and diabetes
- lifestyle modifications: Cessation of cigarette smoking…

頸動脈支架健保適應症

1. 無症狀的頸動脈狹窄大於80%以上。
2. 有症狀的頸動脈狹窄大於60%以上。
3. 放射線治療後之頭頸部動脈狹窄（含頸動脈、椎動脈及鎖骨下動 脈）。
4. 頸動脈或椎動脈剝離所引起之狹窄或剝離性動脈瘤。
5. 因嚴重心肺疾病，不適合外科頸動脈內膜剝離術或全身麻醉者。

Symptomatic Carotid Stenosis
- 2014 AHA/ASA Guidelines

- ✓ CEA is recommended for patients with:
  - Recent TIA or ischemic stroke within 6 months
  - 70 - 99 % carotid stenosis
  - Perioperative risk <6%

Class I	Level A

Symptomatic Carotid Stenosis
- 2014 AHA/ASA Guidelines

- ✓ CEA is recommended for patients with:
  - Recent TIA or ischemic stroke within 6 months
  - 50 to 69 % carotid stenosis
  - Depending on patient-specific factors, such as age, sex, and comorbidities.
  - Perioperative risk <6%

Class I | Level B

Symptomatic Carotid Stenosis
- 2014 AHA/ASA Guidelines

- ✓ CAS is reasonable for patients with symptomatic stenosis (>70 %) who have anatomic or medical conditions that greatly increase the risk for surgery, or have other specific circumstances, such as radiation-induced stenosis or restenosis after CEA.

Class I | Level B

Symptomatic Carotid Stenosis
- 2014 AHA/ASA Guidelines

- When CEA is indicated for patients with TIA or nondisabling stroke, it is reasonable to perform the surgery within two weeks rather than delaying surgery, if there are no contraindications to early revascularization.

Class IIa | Level B

Symptomatic Carotid Stenosis
- 2014 AHA/ASA Guidelines

- ✓ Optimal medical therapy, which should include antiplatelet therapy, statin therapy, and risk factor modification, is recommended for all patients with carotid artery stenosis and a TIA or stroke

Class I	Level A

Symptomatic Carotid Stenosis
- 2014 AHA/ASA Guidelines

- ✓ No indication for CEA or CAS is stenosis <50 %.

Class III | Level A

Symptomatic Carotid Stenosis
- 2021 ESO Guidelines

- ✓ In patients with severe (50–99%) symptomatic carotid artery stenosis, we recommend CEA.
- ✓ In patients with 50–99% symptomatic carotid stenosis in whom surgery is considered appropriate, we recommend early endarterectomy, ideally within two weeks of the first neurological event.

Symptomatic Carotid Stenosis
- 2021 ESO Guidelines

- ✓ In patients with symptomatic carotid artery stenosis requiring revascularisation, we recommend CEA as the treatment of choice.
- ✓ In patients with symptomatic carotid stenosis <70 years old requiring revascularisation, we suggest that CAS may be considered as an alternative to endarterectomy.

Symptomatic Carotid Stenosis
- 2014 AHA/ASA Guidelines

✓ CAS is as an alternative to CEA, when ICA stenosis:

- >70% by noninvasive imaging or
- >50% by angiography or noninvasive imaging with corroboration
- Peri-procedural stroke or death risk <6%.

Class IIa	Level B

Symptomatic Carotid Stenosis
- 2014 AHA/ASA Guidelines

In terms of risk for periprocedural complication (ie, stroke,MI, or death) and long-term risk for ipsilateral stroke:

- ✓ For older patients(≧70 years), CEA may be associated with improved outcome compared with CAS, when arterial anatomy is unfavorable for CAS.
- ✓ For younger patients, CAS is equivalent to CEA

Class IIa | Level B

Symptomatic Carotid Stenosis
- 2014 AHA/ASA Guidelines

- ✓ CAS and CEA in the above settings should be performed by operators with established periprocedural stroke and mortality rates of <6%.

Class I | Level B

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Asymptomatic Carotid Stenosis
- 2014 AHA/ASA Guidelines

- ✓ Patients should be prescribed daily aspirin and a statin.
- ✓ Screened for other treatable risk factors for stroke.
- ✓ Appropriate medical therapies and lifestyle changes.

Class I	Level C

Asymptomatic Carotid Stenosis
- 2014 AHA/ASA Guidelines

- In patients who are to undergo CEA, aspirin is recommended perioperatively and postoperatively unless contraindicated.

Class I	Level C

Asymptomatic Carotid Stenosis
- 2014 AHA/ASA Guidelines

- It is reasonable to consider performing CEA in asymptomatic patients who have >70% stenosis of the internal carotid artery if the risk of perioperative stroke, MI, and death is low (<3%).
- However, its effectiveness compared with contemporary best medical management alone is not well established.

Class IIa | Level A

Asymptomatic Carotid Stenosis
- 2014 AHA/ASA Guidelines

- It is reasonable to repeat duplex ultrasonography annually by a qualified technologist in a certified laboratory to assess the progression or regression of disease and response to therapeutic interventions in patients with atherosclerotic stenosis >50%.

Class IIa	Level C

Asymptomatic Carotid Stenosis
- 2014 AHA/ASA Guidelines

- Prophylactic CAS might be considered in highly selected patients with asymptomatic carotid stenosis (minimum, 60% by angiography, 70% by validated Doppler ultrasound),
- but its effectiveness compared with medical therapy alone in this situation is not well established.

Class IIb | Level B

Asymptomatic Carotid Stenosis - 2021 ESO Guidelines

- In patients with $\geqq$ 60% asymptomatic carotid artery stenosis considered to be at increased risk of stroke on best medical therapy alone, we recommend carotid endarterectomy (CEA).
- In patients with asymptomatic carotid stenosis in whom revascularisation is considered to be appropriate, we suggest CEA as the current treatment of choice.

Asymptomatic Carotid Stenosis
- 2014 AHA/ASA Guidelines

- In asymptomatic patients at high risk of complications for carotid revascularization by either CEA or CAS, the effectiveness of revascularization versus medical therapy alone is not well established

Class IIb | Level B

2021 ESO Guidelines

Table 7. Synoptic table of all recommendations.

Recommendations	Quality of evidence	Strength of recommendation
In patients with ≥60% asymptomatic carotid artery stenosis considered to be at increased risk of stroke on best medical therapy alone, we recommend carotid endarterectomy.	Moderate ⊕⊕⊕	Strong for carotid endarterectomy ↑↑
In patients with asymptomatic carotid stenosis, recommend against carotid artery stenting as a routine alternative to best medical therapy alone.	Very low ⊕	Weak against carotid stenting ↓?
In patients with asymptomatic carotid stenosis in whom revascularisation is considered to be appropriate, we suggest endarterectomy as the current treatment of choice.	Moderate ⊕⊕⊕	Weak for carotid endarterectomy ↑
In patients with severe (70–99%) symptomatic carotid artery stenosis, we recommend carotid endarterectomy.	Moderate ⊕⊕⊕	Strong for carotid endarterectomy ↑↑
In patients with moderate (50–69%) symptomatic carotid artery stenosis, we suggest carotid endarterectomy.	Low ⊕⊕	Weak for carotid endarterectomy ↑
In patients with mild (<50%) symptomatic carotid artery stenosis, we recommend against carotid endarterectomy.	Very low ⊕	Strong against carotid endarterectomy ↓↓
In patients with 50–99% symptomatic carotid stenosis in whom surgery is considered appropriate, we recommend early endarterectomy, ideally within two weeks of the last neurological event.	High ⊕⊕⊕⊕	Strong for carotid endarterectomy ↑↑
In patients with symptomatic carotid artery stenosis requiring revascularisation, we recommend endarterectomy as the treatment of choice.	Moderate ⊕⊕⊕	Strong for carotid endarterectomy ↑↑
In patients with symptomatic carotid stenosis <70 years old requiring revascularisation, we suggest that stenting may be considered as an alternative to endarterectomy.	Low ⊕⊕	Weak for carotid stenting ↑

Recent stroke/TIA < 6 months

No → **Asymptomatic**

Yes → **Symptomatic**

Stenosis 60-99%	Stenosis <60%	Occlusion or near-occlusion	Stenosis <50%	Stenosis 50-69%	Stenosis 70-99%
>70 or 80%					

Asymptomatic

Life expectancy>5y?
Favorable anatomy?
High stroke risk?

No → **BMT**
Class I A

Yes

CEA + BMT
Should be considered
Class IIA B

*Delay to benefit
<3% risk

CAS + BMT
May be considered
Class IIB B

<3% risk

Symptomatic

CEA + BMT
Should be considered
Class IIA B
Except for woman

CAS + BMT
May be considered
Class IIB B

CEA + BMT
Class I A
2-14d

CAS + BMT
Should be considered if high risk for CEA
Class IIA B
* SAPPHIRE

Otherwise may be considered
Class IIB B

2017 Clinical Practice Guidelines of the European Society for Vascular Surgery (ESVS)