

ACST-2: Randomised trial of stenting vs surgery for asymptomatic severe carotid artery stenosis

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for the ACST-2 collaborators

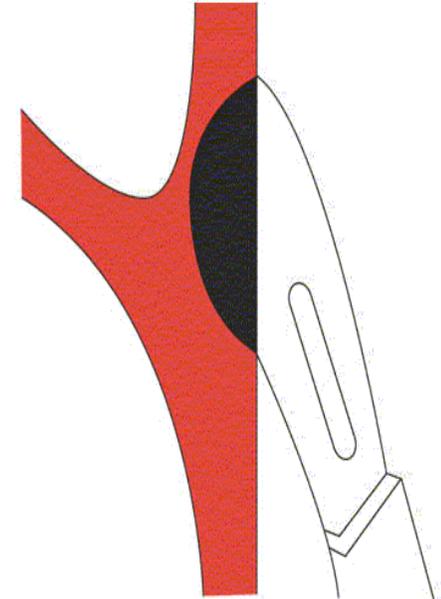
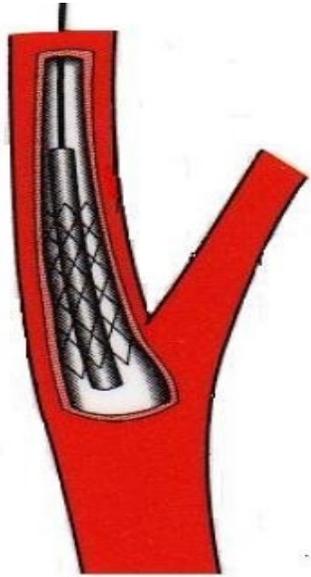
Declaration of interest

- I have nothing to declare

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ACST-2: trial in 3625 patients of carotid artery stenting (CAS) vs carotid artery surgery (CEA: “endarterectomy”)



ACST-2: trial of carotid stenting (CAS) vs surgery (CEA)

Background on asymptomatic patients
with severe carotid stenosis

Surgery restores patency, and trials show it ~halves later stroke rates.
But, modern medical therapy also ~halves long-term stroke rates.

Stenting also restores patency, and in recent nationwide registry data
CAS and CEA each have ~1% risk of causing disabling stroke or death.

In-hospital^{*} CAS/CEA risks in asymptomatic patients

	Stenting 18,000 CAS	Surgery 86,000 CEA
<u>Disabling</u> stroke or death:	0.7%	0.7%
<u>Any</u> stroke or death:	1.8%	1.4%

NB In-hospital stroke risks were not affected by gender, or by age.

ACST-2: carotid stenting (CAS) vs surgery (CEA)

CAS vs CEA: why do we *also* need *randomised* evidence?

Large, representative registries can assess procedural hazards, and determine reliably whether they depend on gender or age.

But, registries cannot reliably compare long-term non-procedural stroke rates; for this, *large-scale randomised evidence* is required.

ACST-2: carotid stenting (CAS) vs surgery (CEA)

- Randomised trial in 130 hospitals (mostly European), each with a collaborating vascular surgeon, interventionist, and stroke doctor
- Collaborators used their normal procedures, with, for stenting, any CE-approved devices and double anti-platelet therapy.

ACST-2: carotid stenting (CAS) vs surgery (CEA)

- Severe carotid artery stenosis ($\geq 60\%$ on ultrasound), with no recent ipsilateral stroke or other symptoms from it
- Thought to need a carotid procedure (stenting or surgery), but substantially uncertain whether to prefer CAS or CEA

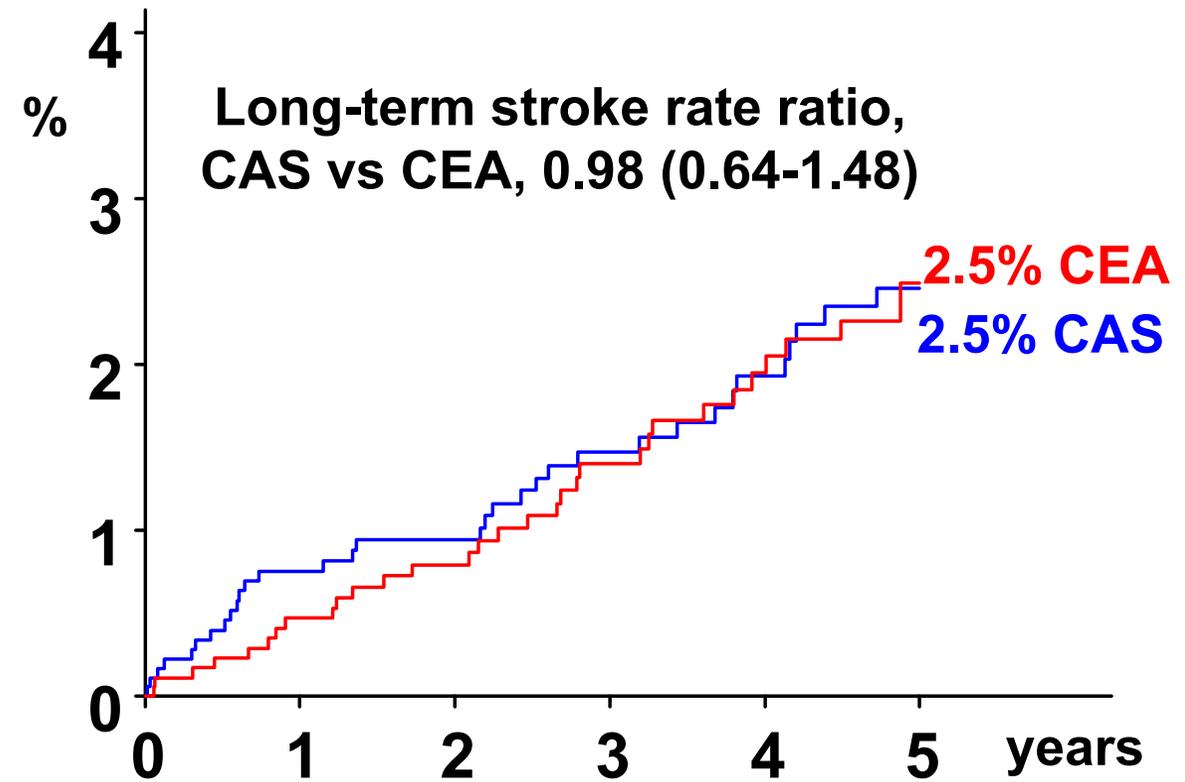
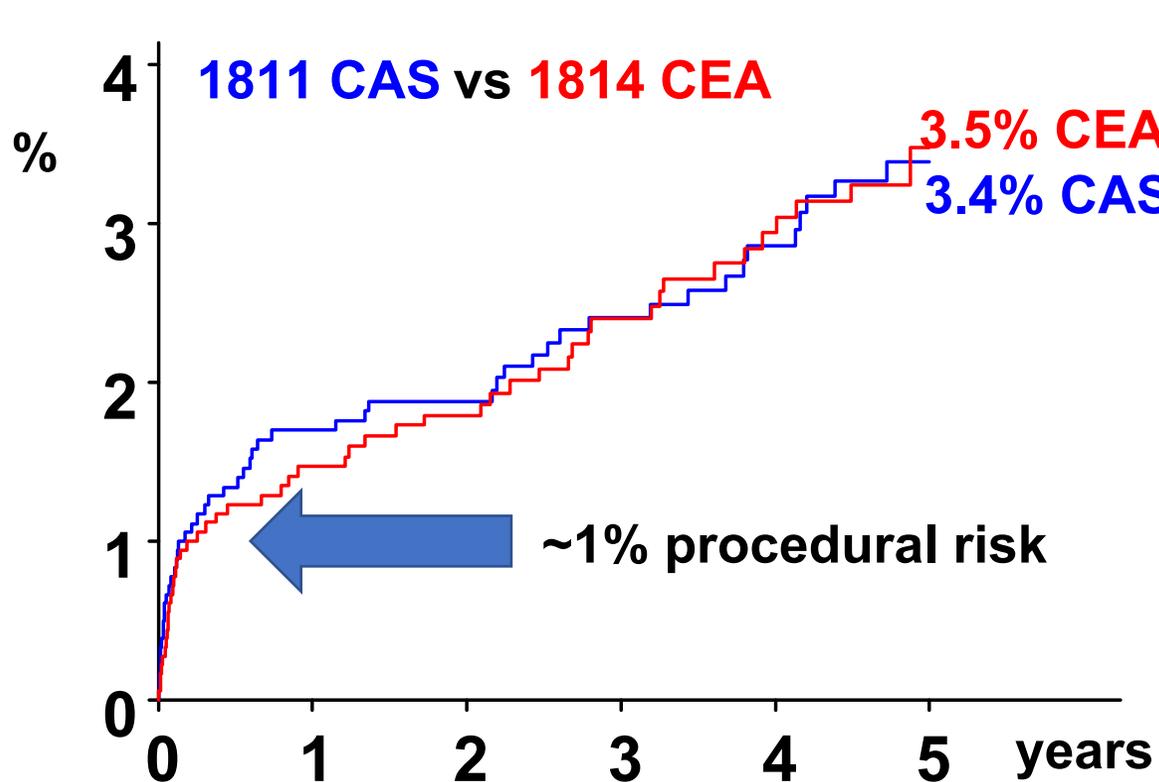
ACST-2: carotid stenting (CAS) vs surgery (CEA)

- 3625 patients randomised, half to stenting and half to surgery (70% male, 30% diabetic, mean age 70, mean follow-up 5 years)
- Both groups got good long-term medical treatment, 80-90% with lipid-lowering, anti-thrombotic and anti-hypertensive therapy.
- Strokes were classified by residual disability 6 months afterwards (defining a “disabling” stroke as modified Rankin Score [mRS] 3-5).

ACST-2: carotid stenting (CAS) vs surgery (CEA)

5-year risk of procedural death, or of disabling or fatal stroke

Left: Including procedural risks, **Right:** Excluding procedural risks



ACST-2: carotid stenting (CAS) vs surgery (CEA)

Severity of worst procedural event & worst non-procedural stroke

	Procedural (<30 days) stroke or death		Non-procedural stroke (with mean 5-year FU)	
	Allocated CAS n=1811	Allocated CEA n=1814	Allocated CAS n=1748*	Allocated CEA n=1767*
Disabling or fatal	15 (0.9%)[†]	18 (1.0%)[†]	44 (2.5%)	45 (2.5%)
<u>Non-disabling</u>	48 (2.7%)	29 (1.6%)	47 (2.7%)	34 (1.9%)

* Excludes the 63 CAS vs 47 CEA patients who had a procedural stroke or death

† Includes the 2 CAS vs 6 CEA procedural deaths not involving a stroke

ACST-2: carotid stenting (CAS) vs surgery (CEA)

Severity of worst procedural event, and worst non-procedural stroke

	Procedural (<30 days) stroke or death		Non-procedural stroke (with mean 5-year FU)	
	Allocated CAS n=1811	Allocated CEA n=1814	Allocated CAS n=1748	Allocated CEA n=1767
Disabling or fatal	15	18	44	45
<u>Non-disabling:</u>				
mRS score 2	9	9	9	5
mRS score 1	23	15	23	17
mRS score 0	16	5	15	12

ACST-2: carotid stenting (CAS) vs surgery (CEA)

Any procedural death or any stroke at any time, by severity

	Allocated CAS n=1811	Allocated CEA n=1814
mRS >1: Fatal, disabling, or unable to carry out some previously usual activities	77	77
mRS 0-1: Non-disabling, and still able to carry out all previously usual activities	77 (4.2%)	49 (2.7%)

ACST-2: carotid stenting (CAS) vs surgery (CEA)

3625 patients with severe stenosis but no recent ipsilateral symptoms, half allocated CAS, half CEA; good compliance, and good medical therapy.

Summary of results

1% 30-day risk, in each group, of *procedural death or disabling stroke*;
2.5% 5-year risk, in each group, of *non-procedural disabling/fatal stroke*.

But, with stenting, there was a 1-2% excess risk of *non-disabling stroke* that left patients still able to carry out all their previously usual activities.

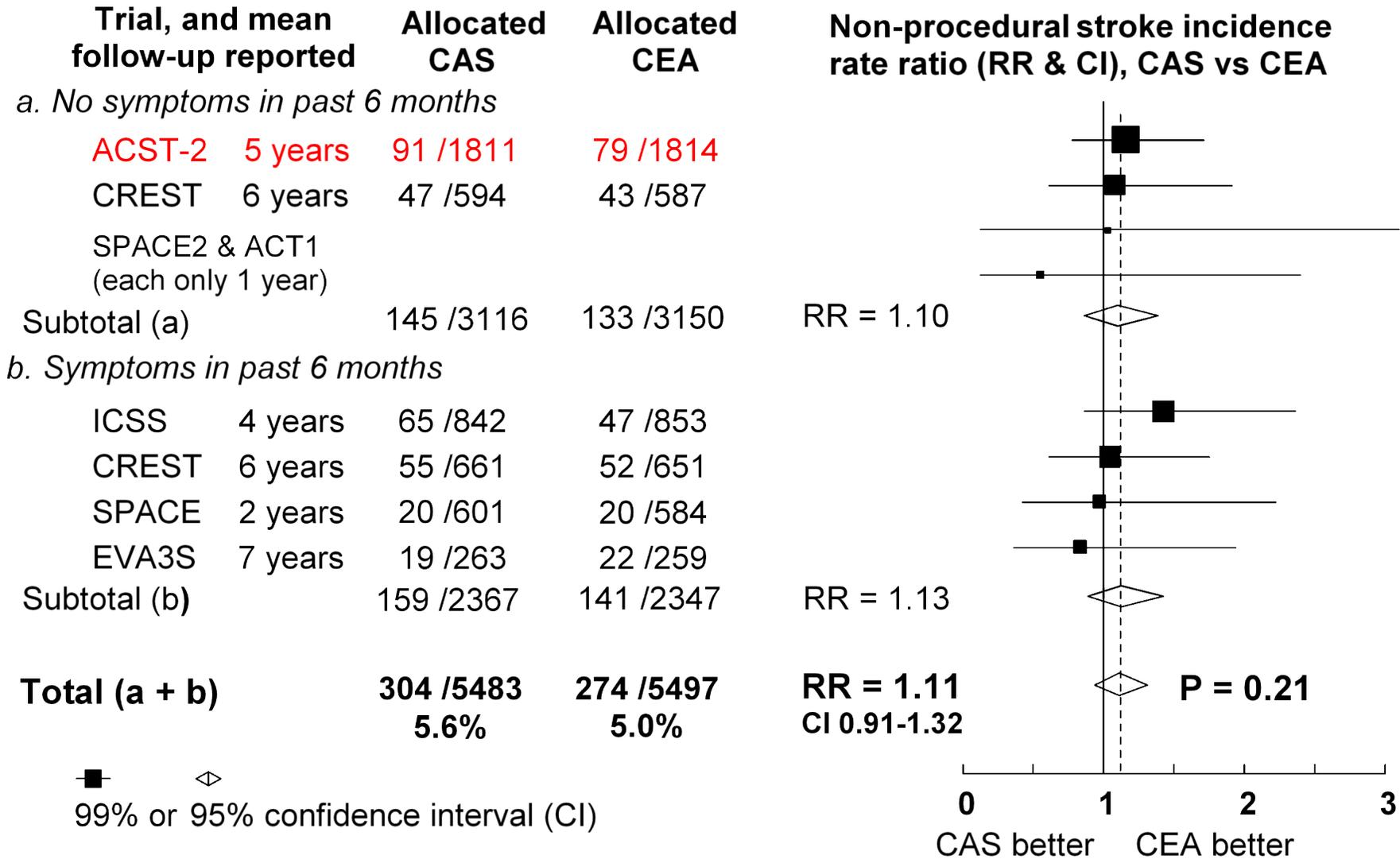
Stenting vs surgery: **ACST-2** results plus other evidence

Procedural strokes: An excess of non-disabling procedural strokes from stenting is consistent with large, recent, nationally representative registry data.

Non-procedural strokes: To compare the effects of CAS vs CEA, ACST-2 should be considered along with all other major trials.

8 major trials of CAS vs CEA, 4 in asymptomatic and 4 in symptomatic patients, have been reported. A formal meta-analysis can combine their findings.

Non-procedural stroke incidence in the 8 major trials of CAS vs CEA



Conclusions from the German national registry and from **ACST-2** and the other major trials of CAS vs CEA

Competent CAS and CEA involve ~1% procedural death or disabling stroke, then have similar effects on long-term rates of fatal or disabling stroke.

For asymptomatic patients with severe stenosis, previous trials showed that, even if good medical treatment is given, CEA ~halves long-term stroke rate.

If so, then in ACST-2, where 0.5% per year had a fatal or disabling stroke with either CAS or CEA, with neither procedure ~1% per year would have done so.

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