

LING

Is classical surgery for carotid disease still necessary in the future?

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Disclosure

Speaker name: Martin Storck

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I have the following potential conflicts of interest to report:

- Consulting
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Other(s)

- I do not have any potential conflict of interest

Short answer

YES!!



...But why?

Long tradition of carotid endarterectomy

First Carotid Endarterectomy 7.8.1953

Michael De Bakey /Houston

Second Carotid Endarterectomy 19.5.1954

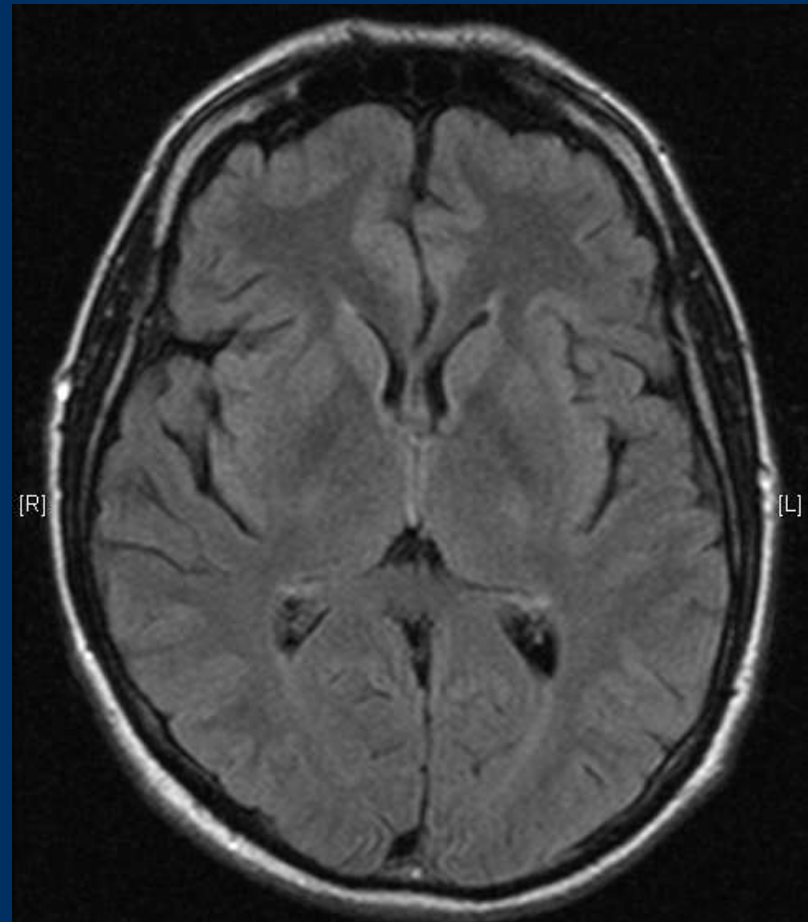
Eastcott HH et al.



Clinical conditions favoring CEA

- Severe kinking
- Severe calcification
- Difficult access
- Floating thrombus
- Incoming Stroke
- Special situations (ACC involvement)

Subacute ACC occlusion – CEA?CAS?



m, 57 ys, dizziness, suspected posterior infarction (Rankin 1) 3 months earlier

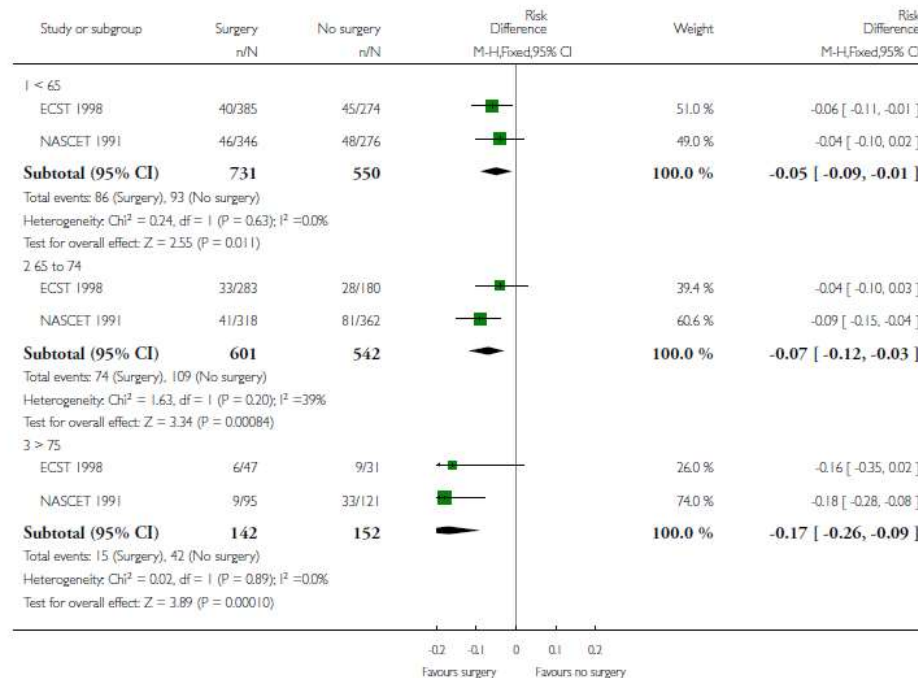
Evidence for CEA in symptomatic stenosis

Analysis 2.2. Comparison 2 Subgroup analyses (5-year cumulative risk of ipsilateral carotid ischaemic stroke, and any stroke or death within 30 days after surgery, according to 3 variables in patients with > 50% carotid stenosis in ECST and NASCET), Outcome 2 Age (years).

Review: Carotid endarterectomy for symptomatic carotid stenosis

Comparison: 2 Subgroup analyses (5-year cumulative risk of ipsilateral carotid ischaemic stroke, and any stroke or death within 30 days after surgery, according to 3 variables in patients with > 50% carotid stenosis in ECST and NASCET)

Outcome: 2 Age (years)



Orrapin S, Rerkasem K.

Carotid endarterectomy for symptomatic carotid stenosis.

Cochrane Database of Systematic Reviews 2017, Issue 6. Art. No.: CD001081.

DOI: 10.1002/14651858.CD001081.pub3.

Highest effect in high grade stenosis

Patients or population: people with carotid stenosis and recent transient ischaemic attacks (TIA) or minor ischaemic strokes in the territory of that artery
Settings: in hospitals with carotid centres¹
Intervention: best medical therapy with carotid surgery^{2,3}
Comparison: best medical therapy without carotid surgery²

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	Number of participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Best medical treatment alone	Best medical treatment with carotid surgery				
Any stroke or operative death	Near occlusion		RR 0.95 (0.59 to 1.53)	271 (2 studies)	++++ High ⁴	None of these RCTs could be blinded for surgeons or patients due to the nature of the intervention
	22 per 100	20 per 100				
	70% to 99% carotid stenosis		RR 0.53 (0.42 to 0.67)	1095 (3 studies)	+++O Moderate ⁵	
	29 per 100	15 per 100				
	50% to 69% carotid stenosis		RR 0.77 (0.63 to 0.94)	1549 (3 studies)	+++O Moderate ⁵	
	23 per 100	18 per 100				
	30% to 49% carotid stenosis		RR 0.97 (0.79 to 1.19)	1429 (2 studies)	++++ High ⁴	
	21 per 100	20 per 100				
	< 30% carotid stenosis		RR 1.25 (0.99 - 1.56)	1746 (2 studies)	++++ High ⁴	

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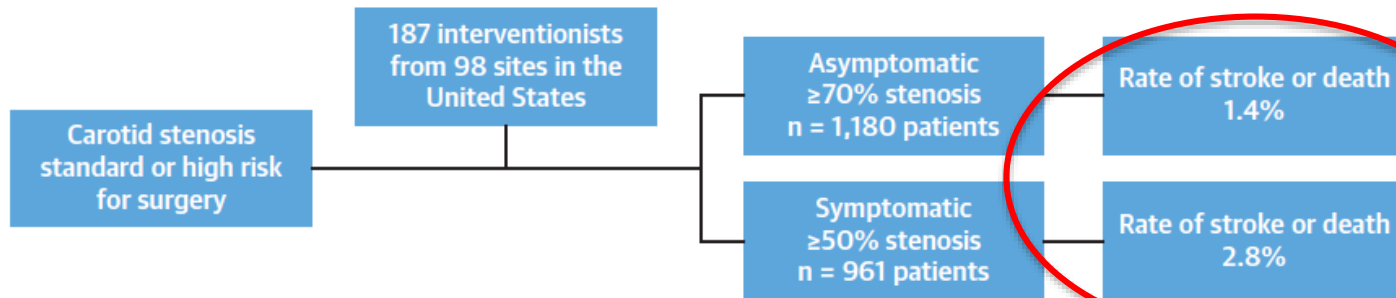
Less Evidence for CEA (and CAS) in asymptomatic stenosis

Recommendation 17	Class	Level	References
In “average surgical risk” patients with an asymptomatic 60–99% stenosis, carotid endarterectomy should be considered in the presence of one or more imaging characteristics that may be associated with an increased risk of late ipsilateral stroke, ^a provided documented perioperative stroke/death rates are <3% and the patient’s life expectancy exceeds 5 years	Ila	B	13,35,54,84–94, 96,97
Recommendation 18			
In “average surgical risk” patients with an asymptomatic 60–99% stenosis in the presence of one or more imaging characteristics that may be associated with an increased risk of late ipsilateral stroke, ^a carotid stenting may be an alternative to carotid endarterectomy, provided documented perioperative stroke/death rates are <3% and the patient’s life expectancy exceeds 5 years	Ilb	B	80,84–98
Recommendation 19			
Carotid stenting may be considered in selected asymptomatic patients who have been deemed by the multidisciplinary team to be “high-risk for surgery” and who have an asymptomatic 60–99% stenosis in the presence of one or more imaging characteristics that may be associated with an increased risk of late ipsilateral stroke, ^a provided documented procedural risks are <3% and the patient’s life expectancy exceeds 5 years	Ilb	B	84–94,104,105

How good is CAS in 2020?

CREST II CAS Registry

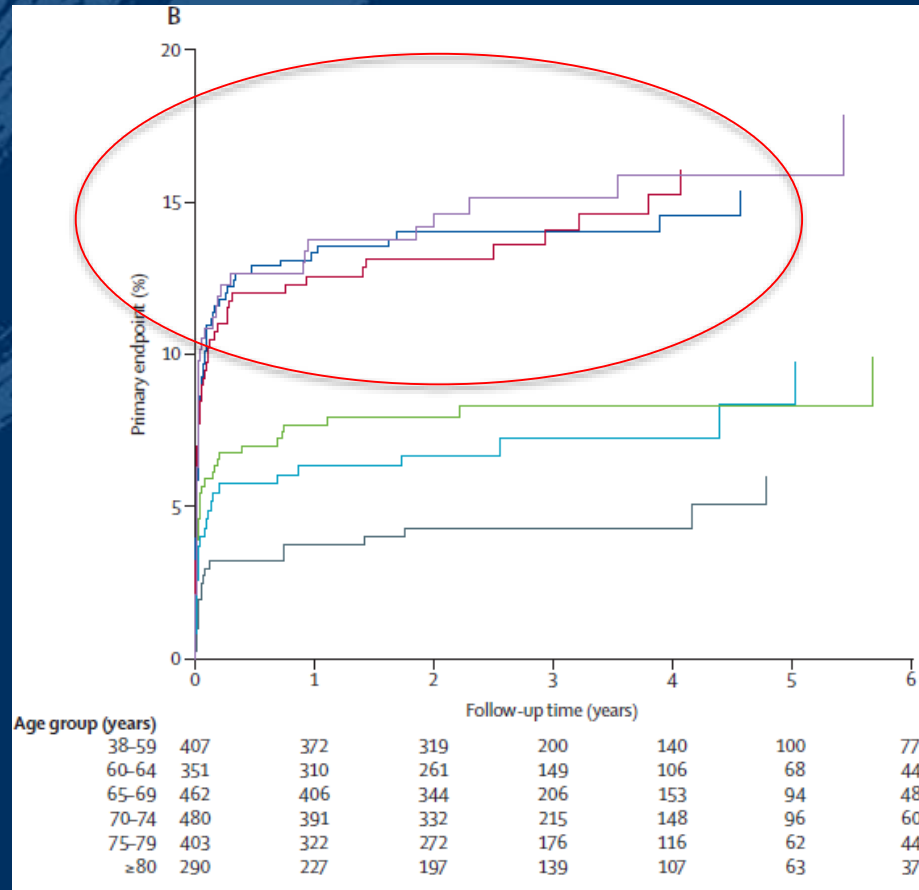
CENTRAL ILLUSTRATION Outcomes for Stenting of Atherosclerotic Carotid Stenosis in the CREST-2 Registry



Lal, B.K. et al. *J Am Coll Cardiol*. 2019;74(25):3071-9.

Consecutive patients with standard or high-risk stenosis were enrolled to undergo stenting with all U.S. Food and Drug Administration-approved stents and embolic protection devices. Adverse events achieved by interventionists from 5 different specialties were low for both symptomatic and asymptomatic patients. CREST-2 = Carotid Revascularization and Medical Management for Asymptomatic Carotid Stenosis Study.

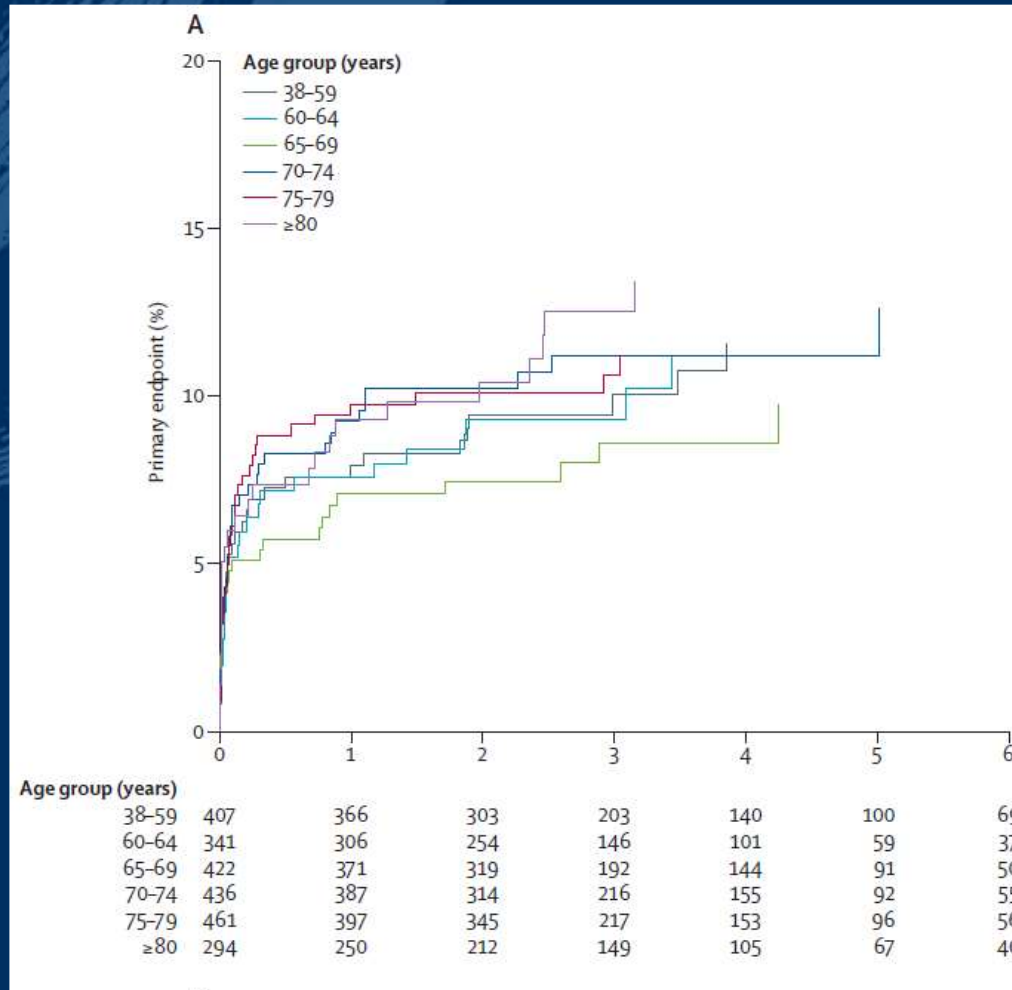
Influence of age – Metaanalysis of 4 RCT's (CAS)



Age
dependent
differences
in outcome
for CAS

Carotid Stenting Trialist's Collaboration.
The Lancet 2016; 387:1305-311

Influence of age – Metaanalysis of 4 RCT's (CEA)



Age **not**
an outcome
relevant
factor in CEA!

Carotid Stenting Trialist's Collaboration.
The Lancet 2016; 387:1305-311

Carotid Endarterectomy in Octogenarians

ACS NSQIP data

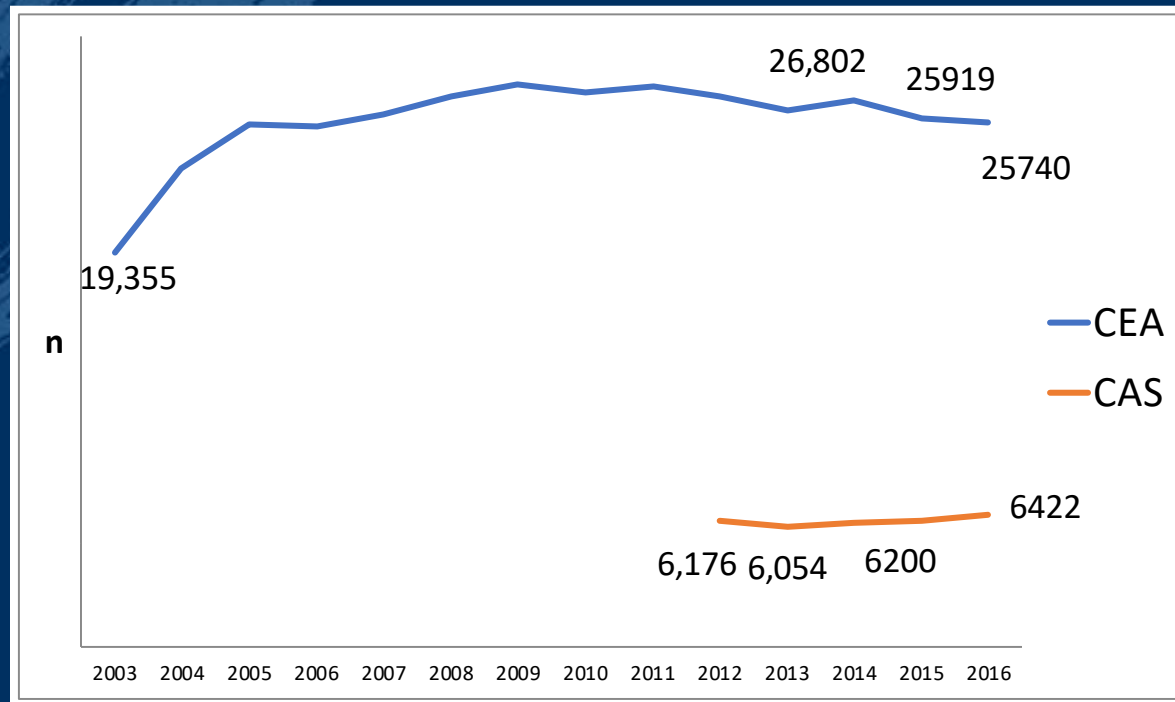
Outcome	Octogenarian (n = 2509)	Younger (n = 11,337)	P value ^a	OR (95% CI)	P value
Mortality	30 (1.2)	56 (0.5)	<.01	2.1 (1.3-3.4)	<.01
Stroke	25 (1.0)	138 (1.2)	.35	0.9 (0.6-1.4)	.54
Stroke/death	51 (2.0)	184 (1.6)	.15	1.2 (0.9-1.8)	.22
Cardiovascular events	51 (2.0)	144 (1.3)	<.01	1.4 (1.0-2.0)	.05
Pulmonary complication	48 (1.9)	184 (1.6)	.31	1.1 (0.8-1.6)	.50
Renal dysfunction	5 (0.2)	22 (0.2)	.96	0.8 (0.3-2.2)	.65
Wound complications	14 (0.6)	49 (0.4)	.40	1.4 (0.7-2.7)	.31
VTE (DVT or PE)	10 (0.4)	18 (0.2)	.02	2.3 (1.0-5.4)	.06
Return to operating room	83 (3.3)	261 (2.3)	<.01	1.4 (1.1-1.9)	.01
Blood transfusion	52 (2.1)	169 (1.5)	.04	1.2 (0.8-1.6)	.42
Hospital LOS, days	2.1 ± 3.8	1.9 ± 3.3	<.01	—	—
Discharged home	1161 (95.2)	5589 (97.3)	<.01	0.9 (0.8-1.0)	.14

CI, Confidence interval; DVT, deep venous thrombosis; LOS, length of stay; OR, odds ratio; PE, pulmonary embolism; VTE, venous thromboembolism. Continuous data are shown as the mean ± standard deviation and categorical data as number (%). Bold values represent significant differences defined as $P < .05$.

^aUnivariate P value.
^bMultivariate P value.

Appropriate selection needed.....

Routine Reality / German National Registry

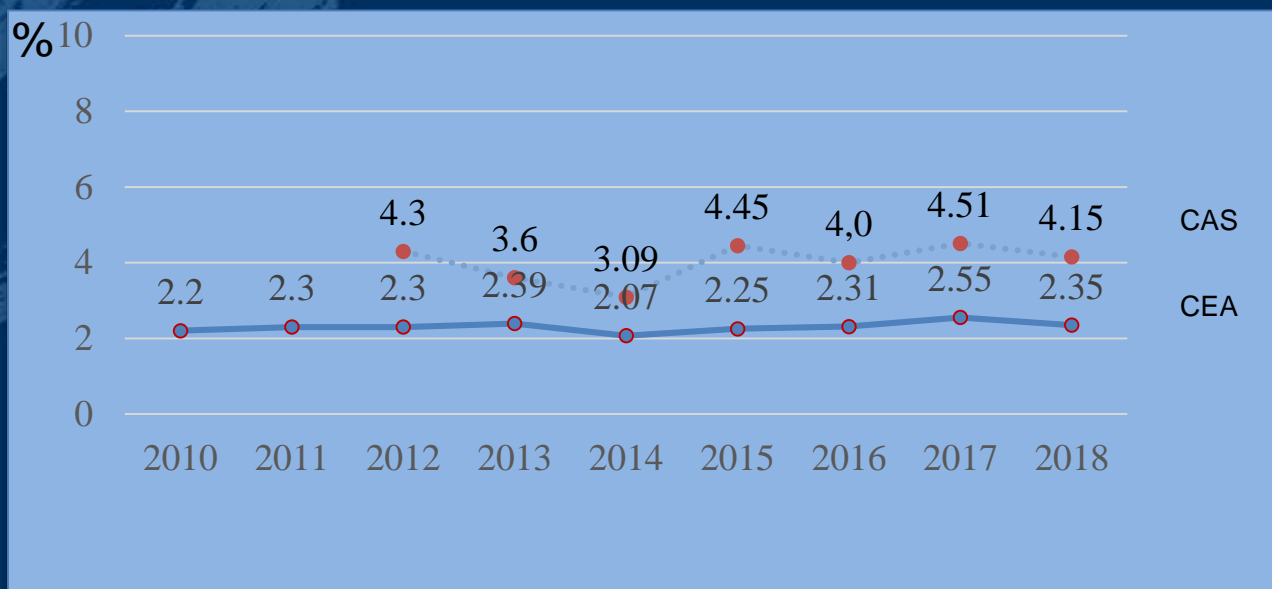


CAS: 19% of all recorded procedures



In Hospital Periprocedural S/D Rates CEA and CAS / all indications

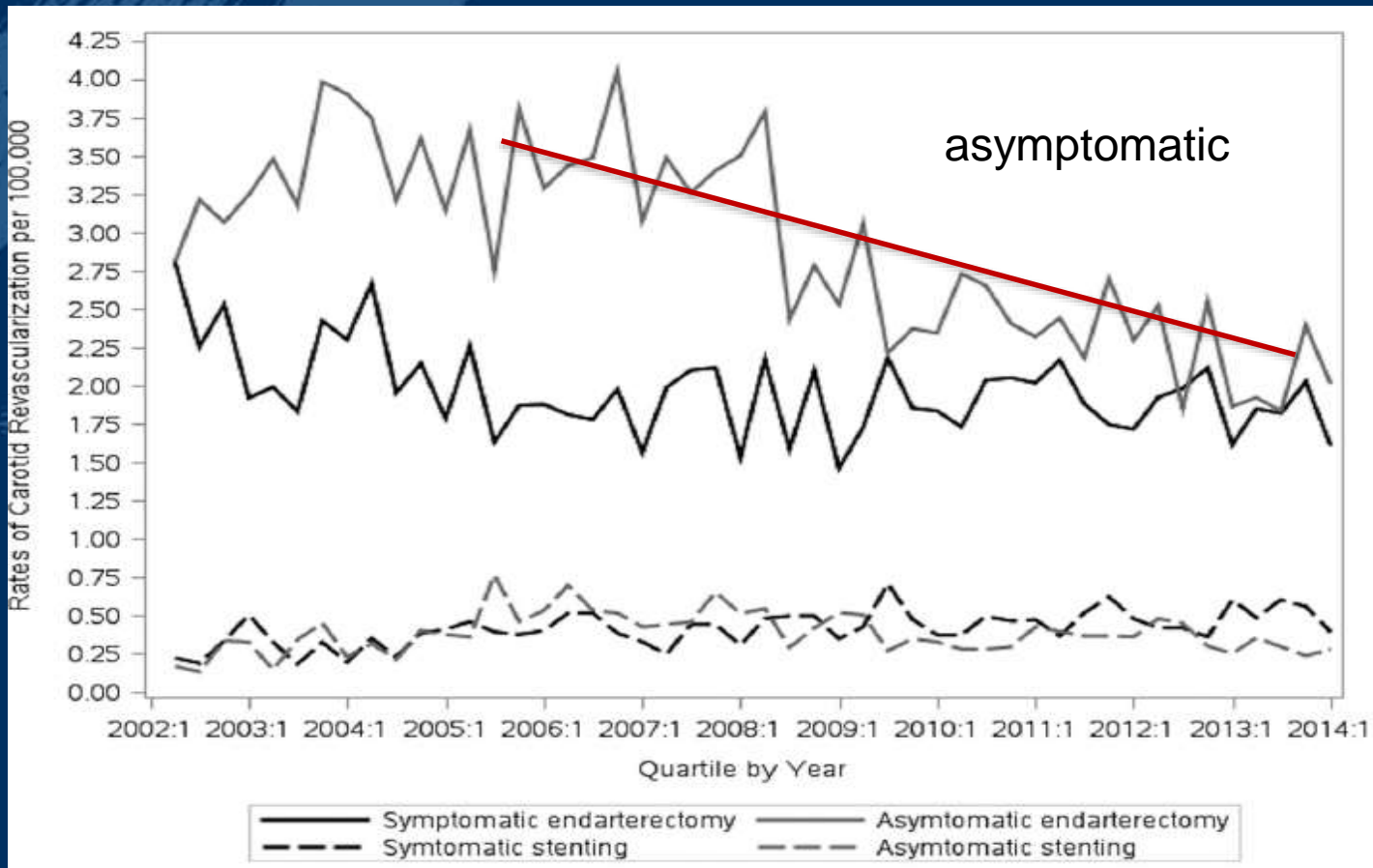
Non –adjusted results



	2009	2010	2011	2012	2013	2014	2015	2016	2017
QI 11704: O/E Apo/Tod OC	7	2	7	5	6	7	9	10	13
QI 51873: O/E Apo/Tod kath.	*	*	*	*	4	2	2	4	7
QI 11724: O/E schwere Apo/Tod OC	4	2	4	5	4	2	6	5	8
QI 51865: O/E schwere Apo/Tod kath.	*	*	*	*	3	2	1	5	3

Risk adjustment: Rates Observed vs. Expected

Temporal trends in CAS and CEA – CEA less frequent than CAS



Regional frequency variation of revascularization procedures for carotid stenosis in Germany: Secondary data analysis of DRG data from 2012-2014

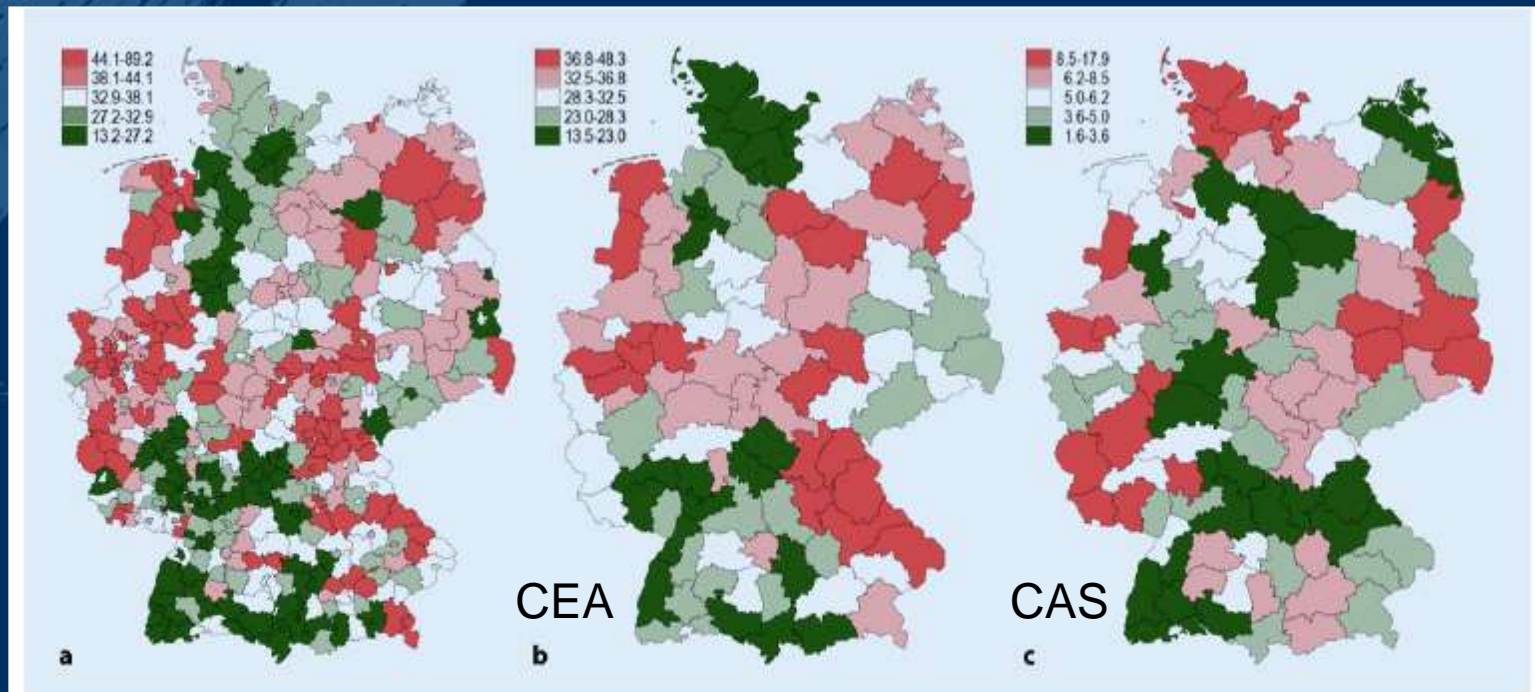


Fig. 1 ▲ Age and sex standardized frequency of procedures per 100,000 inhabitants in the period 2012–2014. Spatial resolution refers to patients' place of residence (districts and cities in a, spatial planning region in b and c). a Procedure frequency (CEA + CAS; global spatial autocorrelation: Moran's $I = 0.43$; $p < 0.001$ clustered pattern). b Procedure frequency (CEA; global spatial autocorrelation: Moran's $I = 0.47$; $p < 0.001$ clustered pattern). c Procedure frequency (CAS; global spatial autocorrelation: Moran's $I = 0.32$; $p < 0.001$ clustered pattern)

Summary

- The Quality of CAS seems to have reached a limit
 - CEA and CAS show comparable longterm results
 - There are however certain conditions, where CEA is of advantage
 - Regional differences
- Skilled Surgeons are still needed in future!

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