

ISNVD



INTERNATIONAL SOCIETY OF NEUROVASCULAR DISEASE

9th annual meeting

May 30-31, 2019, University of Ferrara - Italy

AULA MAGNA - S. ANNA UNIVERSITY-HOSPITAL, CONA VIA ALDO MORO 8



program

Meeting President
Prof. Paolo Zamboni, University of Ferrara

Cerebral protection and monitoring in
vascular and endovascular surgery

**Better embolic protection
may reinvigorate CAS?**

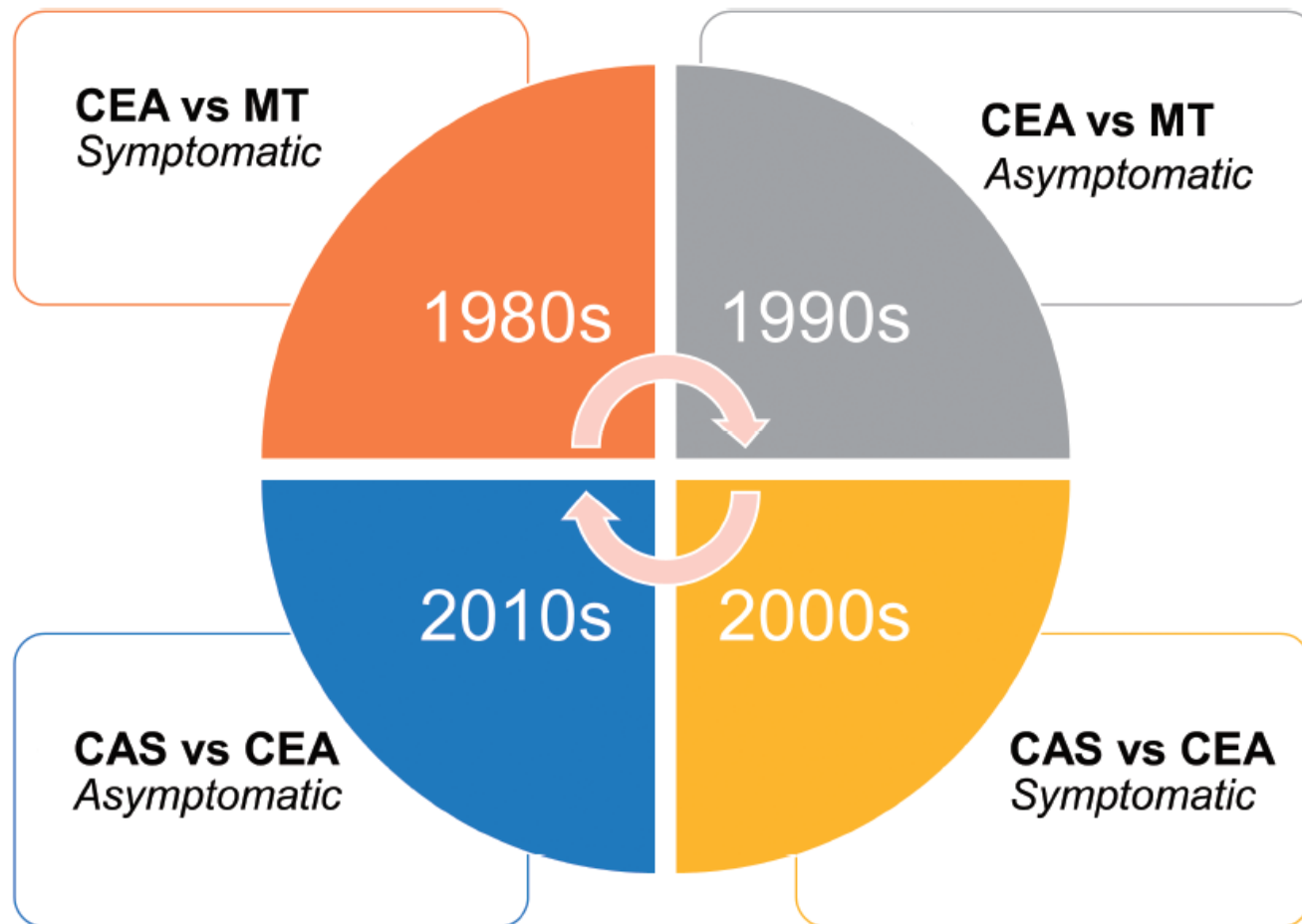
Raffaele Pulli



Vascular and Endovascular Surgery
University of Bari

Evidence-Based Carotid Interventions for Stroke Prevention: State-of-the-art Review

Dylan R. Morris¹, Kengo Ayabe², Takashi Inoue³, Nobuyuki Sakai⁴, Richard Bulbulia¹, Alison Halliday⁵ and Shinya Goto²



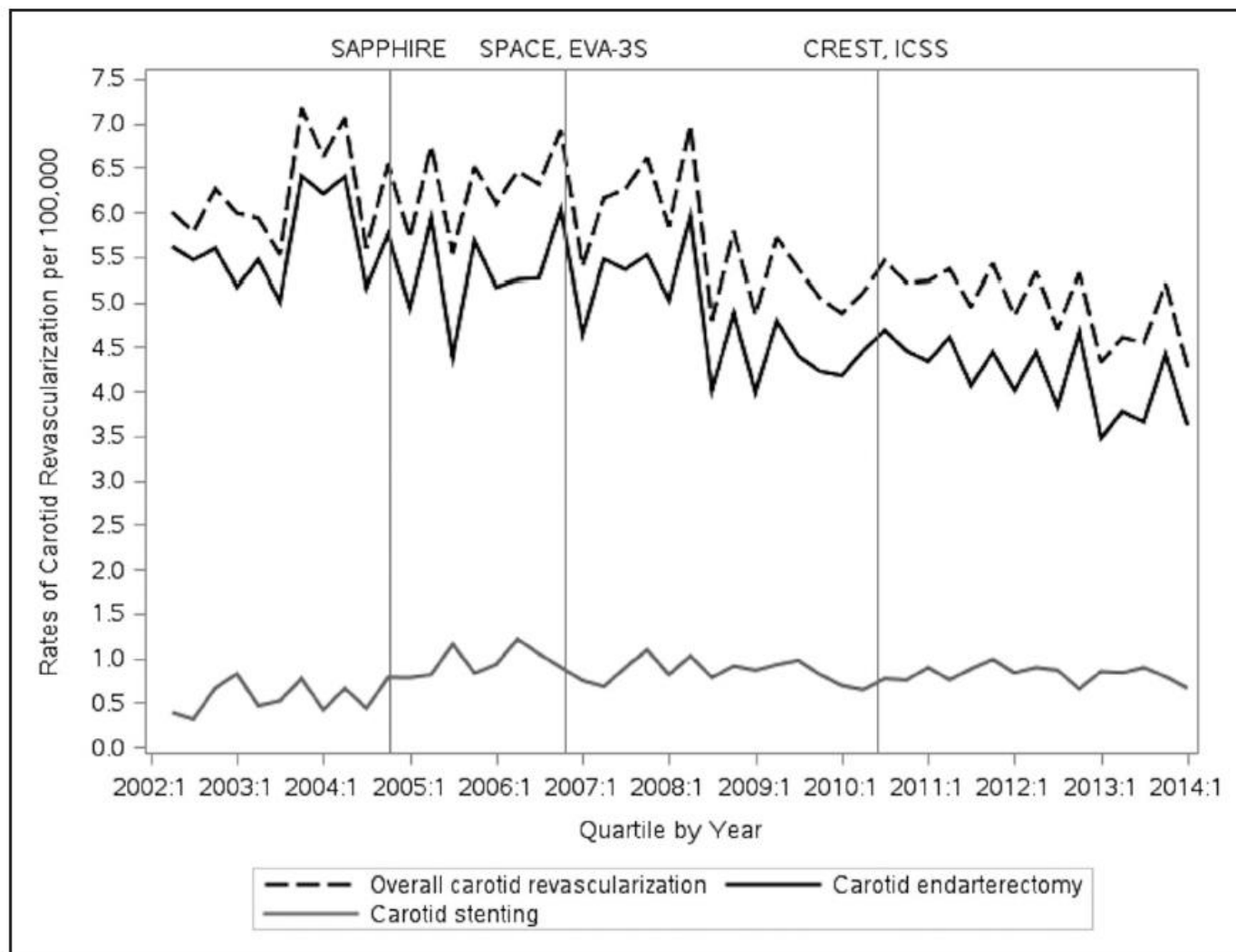
J Atheroscler Thromb, 2017; 24: 373-387.

doi: 10.5551/jat.38745

Impact of Clinical Trial Results on the Temporal Trends of Carotid Endarterectomy and Stenting From 2002 to 2014

Mohamad A. Hussain, MD; Muhammad Mamdani, PharmD, MA, MPH;
Jack V. Tu, MD, PhD; Gustavo Saposnik, MD, MSc; Zeyad Khoushhal, MBBS, MPH;
Badr Aljabri, MD; Subdoh Verma, MD, PhD; Mohammed Al-Omran, MD, MSc

Stroke December 2016



Stroke/Death Rates Following Carotid Artery Stenting and Carotid Endarterectomy in Contemporary Administrative Dataset Registries: A Systematic Review

K.I. Paraskevas ^{a,*}, E.L. Kalmykov ^b, A.R. Naylor ^b

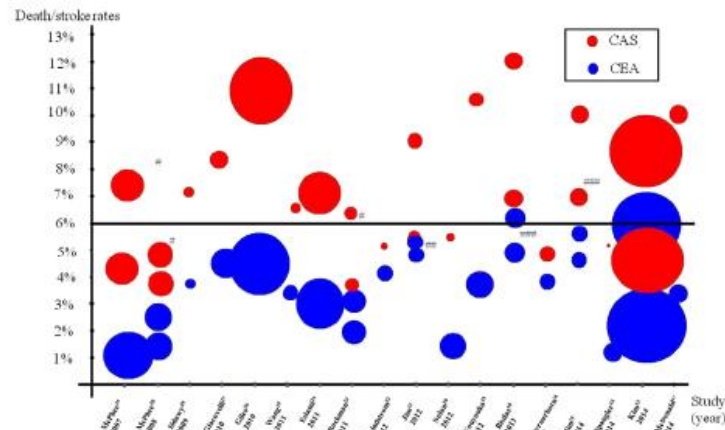


Figure 3. Stroke/death rates for “average risk” symptomatic patients undergoing CAS and CEA in various registries. [#]Stroke and death rates reported separately. ^{##}Stroke/death rates reported separately for patients aged <65 and ≥65 years. ^{###}Stroke/death rates reported separately for males and for females.

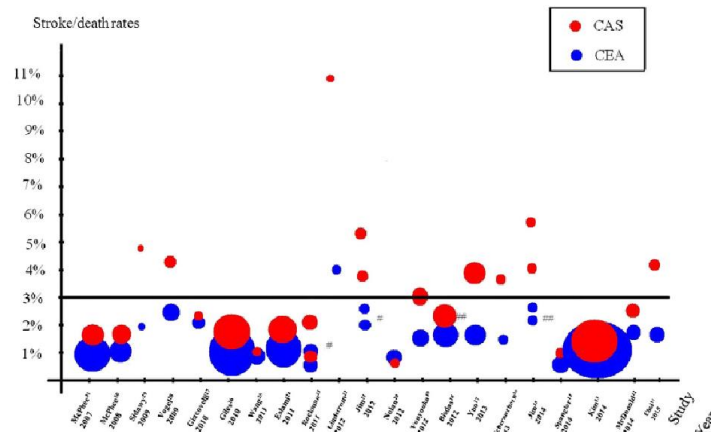


Figure 2. Stroke/death rates for “average risk” asymptomatic patients undergoing CAS and CEA in various registries. [#]Results reported separately for patients aged <65 and ≥65 years. ^{##}Results reported separately for males and females.

Editor's Choice — Management of Atherosclerotic Carotid and Vertebral Artery Disease: 2017 Clinical Practice Guidelines of the European Society for Vascular Surgery (ESVS)

A.R. Naylor^a, J.-B. Ricco^a, G.J. de Borst^a, S. Debus^a, J. de Haro^a, A. Halliday^a, G. Hamilton^a, J. Kakisis^a, S. Kakkos^a, S. Lepidi^a, H.S. Markus^a, D.J. McCabe^a, J. Roy^a, H. Sillesen^a, J.C. van den Berg^a, F. Vermassen^a,
ESVS Guidelines Committee^b, P. Kolh, N. Chakfe, R.J. Hinchliffe, I. Koncar, J.S. Lindholt, M. Vega de Ceniga, F. Verzini,
ESVS Guideline Reviewers^c, J. Archie, S. Bellmund, A. Chaudhuri, M. Koelemay, A.-K. Lindahl, F. Padberg, M. Venermo

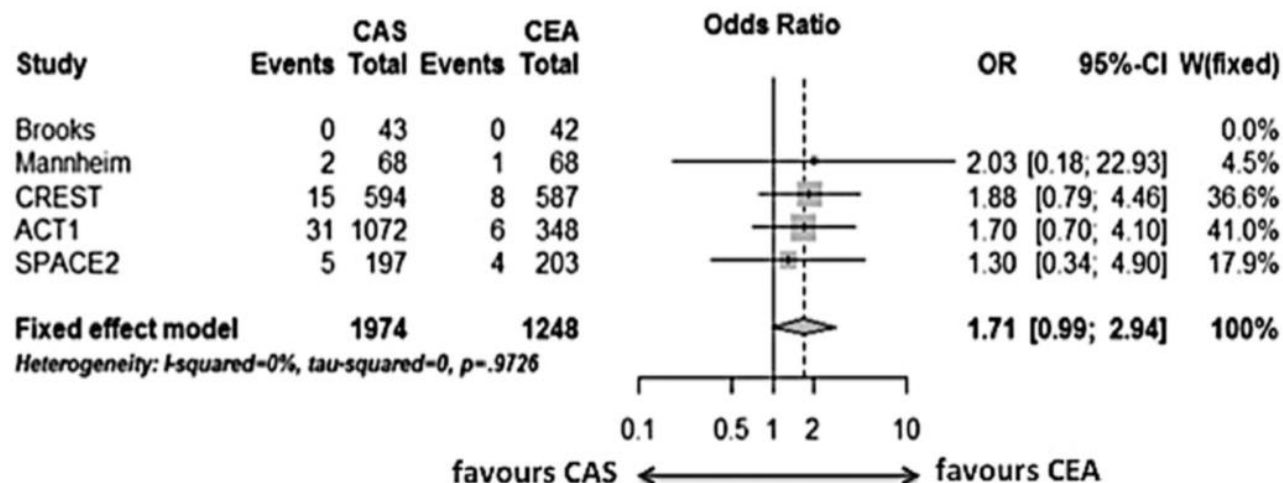


Figure 4. Forest Plot comparing 30-day death/stroke in four randomised trials comparing carotid endarterectomy and carotid artery stenting in asymptomatic patients.

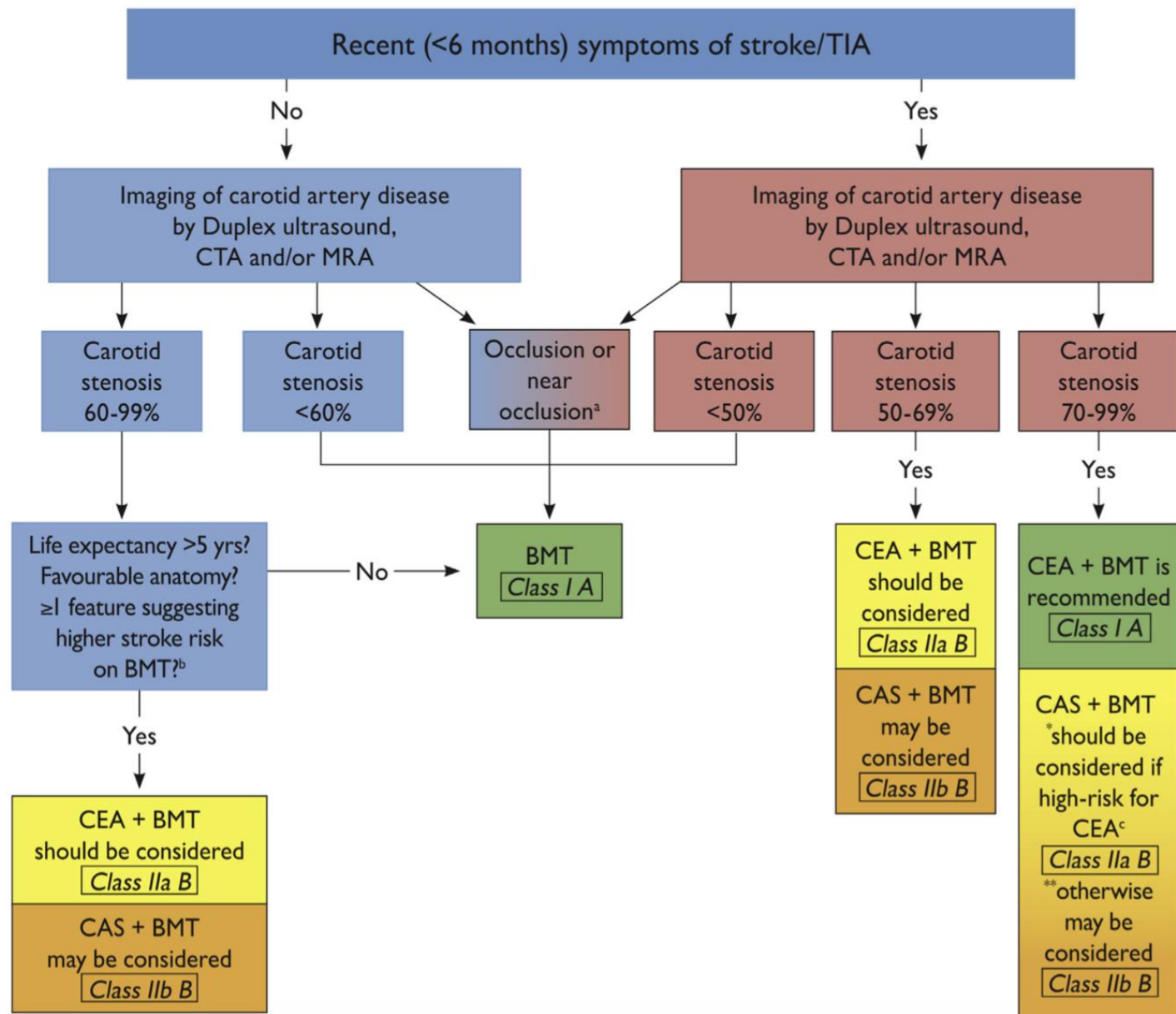


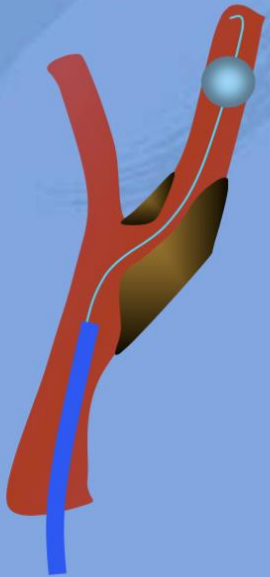
Figure 5. Algorithm detailing management strategies in patients with symptomatic and asymptomatic atherosclerotic extracranial carotid

CAS procedures

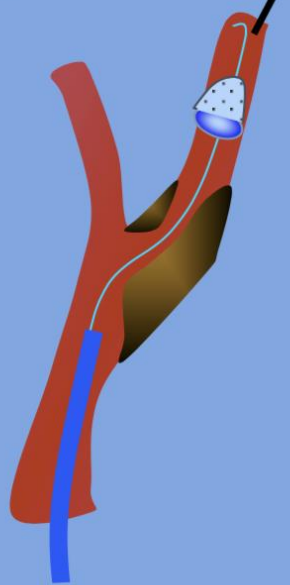
- Patient selection
- Center and operator selection
- Medication
- Getting access
- Crossing the lesion
- Embolic protection
- Pre-dilatation
- Stent selection and implantation
- Post-dilatation
- Retrieval of embolic protection device
- Post stent management

Cerebral protection devices

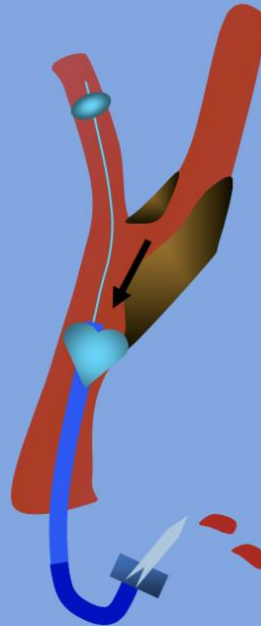
Distal Flow Blockage



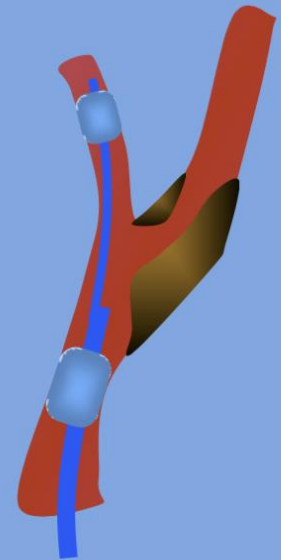
Distal Filters



Proximal Protection with Flow Reversal



Proximal Protection with Flow Blockage



Choices of Stent and Cerebral Protection in the Ongoing ACST-2 Trial: A Descriptive Study

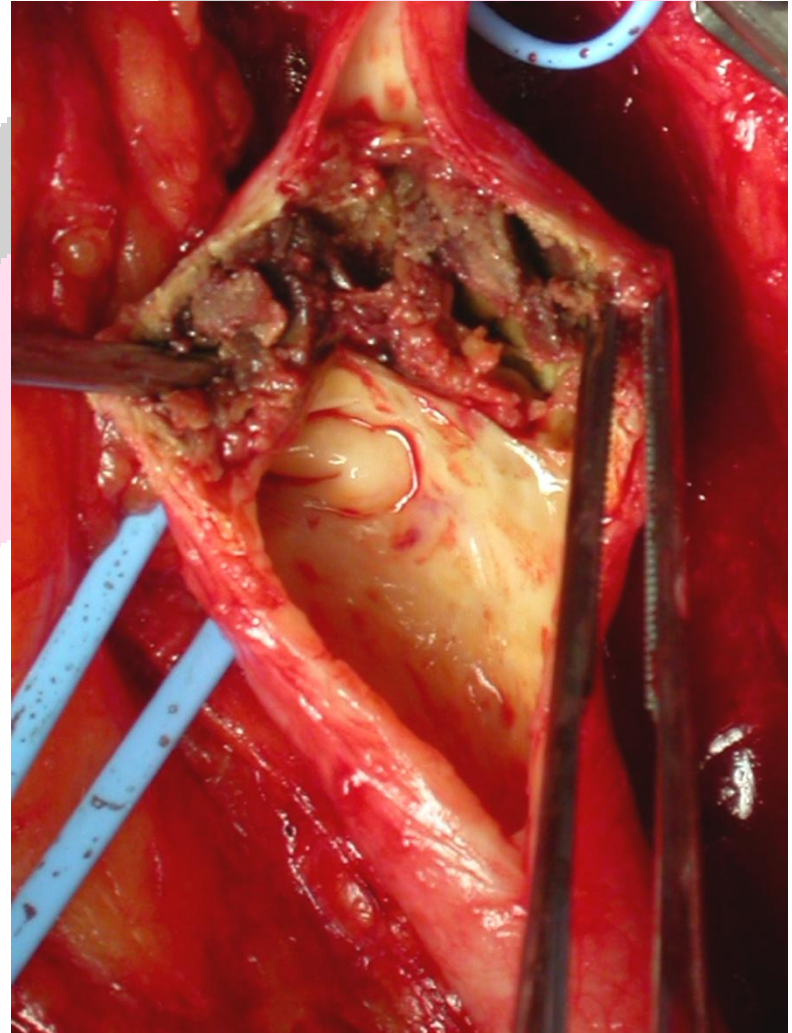
D.D. de Waard ^{a,b}, A. Halliday ^{a,*}, G.J. de Borst ^b, R. Bulbulia ^c, A. Huibers ^b, R. Casana ^d, L.H. Bonati ^e, V. Tolva ^f, on behalf of the ACST-2 Collaborative Group

Table 4. Use of cerebral protection devices (CPD).

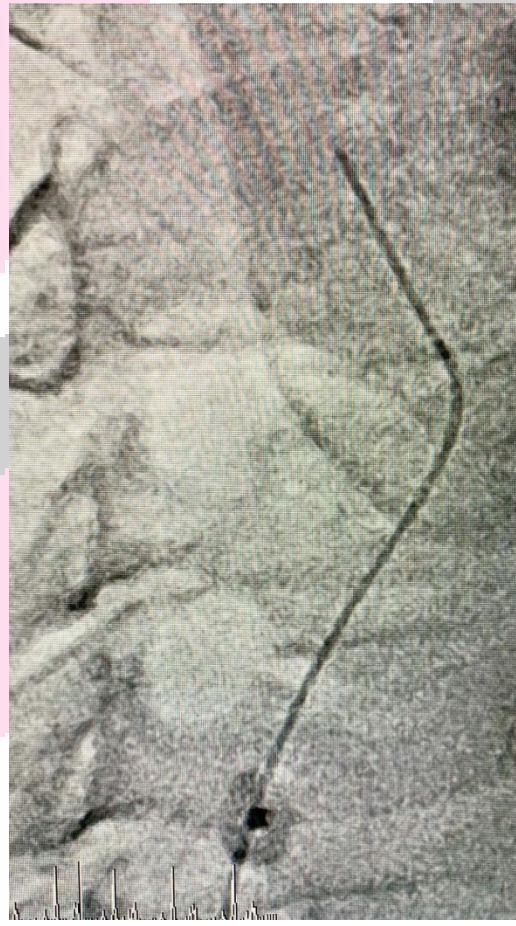
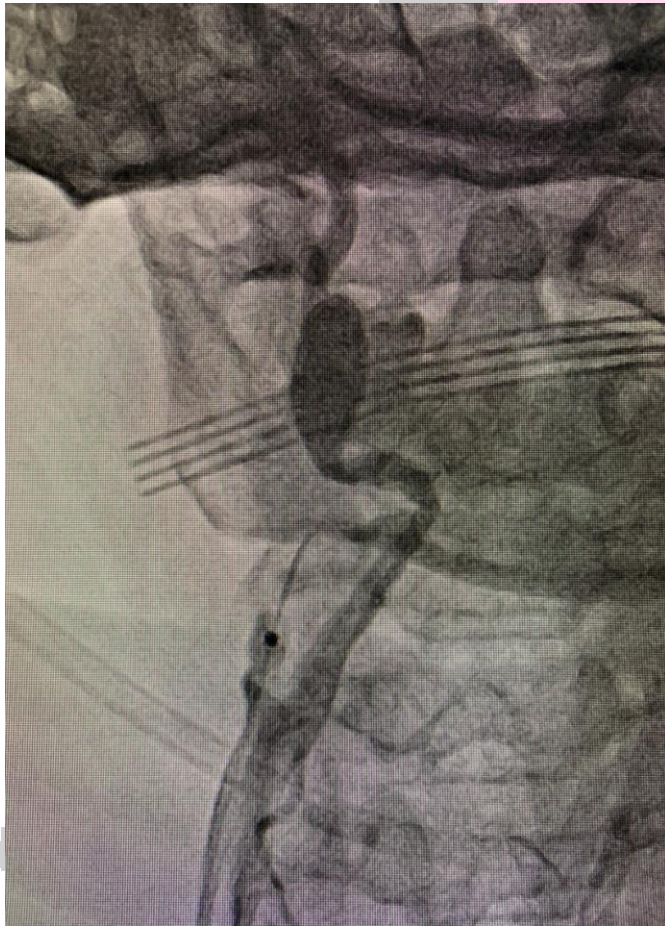
Type of CPD	Name (Manufacturer)	<i>n</i> (%)
Filter	Emboshield (Abbott)	204 (24.5)
	Filterwire (Boston Scientific)	159 (19.1)
	Spider (Medtronic—Covidien)	112 (13.4)
	Accunet (Abbott)	57 (6.9)
	Angioguard (Cordis)	43 (5.2)
	Fibernet (Medtronic)	1 (0.1)
	Filter uncategorised	4 (0.5)
Proximal occlusion	Mo.Ma Ultra (Medtronic)	114 (13.7)
	Gore Flow Reversal (Gore)	28 (3.4)
Distal balloon	TwinOne (Minvasys)	3 (0.4)
	Viatrac (Abbott)	1 (0.1)
None used	—	105 (12.6)
Total		831

Better embolic protection

- MO.MA.
- Transcarotid artery revascularization (TCAR)
- Paladin double filtration
- Neuroguard



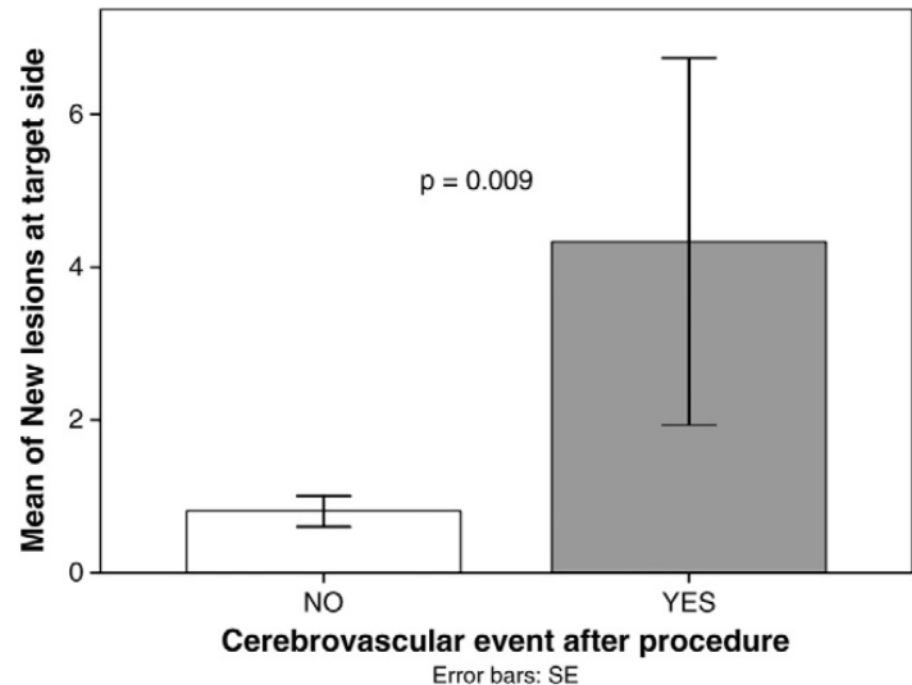
MO.MA. Device



The DESERVE study: Diffusion weighted-MRI based evaluation of the effectiveness of endovascular clamping during carotid artery stenting with the Mo.Ma device☆

Table 1
Baseline patient characteristics.

	Total (n = 127; 100%)		Symptomatic (n = 16; 12.6%)	
	n	%	n	%
Male	86	67.7	11	68.8
Female	41	32.3	5	31.3
	Mean	SD	Mean	SD
Age	68.9	8.9	66.9	9.3
Medical history of:	N	%	N	%
Previous stroke	13	10.2	8	50.0
CAD	55	43.3	5	31.3
PAD	20	15.7	1	6.3
Previous CAS	7	5.5	0	0.0
Previous PTCA/CAB	39	30.7	5	31.3
Risk factors	N	%	N	%
Current smoker	23	18.1	4	25.0
Previous smoker	37	29.1	5	31.3
Diabetes mellitus	45	35.4	8	50.0
Hypertension	119	93.7	15	93.8
Hyperlipidemia	118	92.9	15	93.8
Family history of CAD	28	22.0	2	12.5
Carotid disease	N	%	N	%
Asymptomatic	111	87.4	–	–
Symptomatic	16	12.6	16	100.0



International Journal of Cardiology, 2014

Transcarotid artery revascularization

◀ Direct Carotid Access ▶ Eliminates Arch Navigation



Transcarotid artery revascularization versus transfemoral carotid artery stenting in the Society for Vascular Surgery Vascular Quality Initiative

Table IV. Analysis of adjusted in-hospital outcomes using multivariable logistic regression

	Multivariable logistic regression ^a				
	TFCAS (n = 10,136) vs TCAR (n = 638)		Parameters used to evaluate the regression models		
	OR (95% CI)	P value	C statistic, %	Mean VIF	Hosmer-Lemeshow test (P value)
Total stroke	1.62 (0.80-3.26)	.18	72.4	1.17	.87
Stroke or death	1.75 (0.85-3.62)	.13	75.8	1.19	.54
Stroke/death/MI	1.39 (0.79-2.44)	.25	74.3	1.19	.12
TIA alone	3.03 (1.08-8.5)	.04	66.1	1.03	.99
Any neurologic event (TIA/stroke)	2.21 (1.18-4.14)	.01	69.9	1.2	.55
Any neurologic events or death	2.10 (1.08-4.08)	.03	72.2	1.22	.48

CI, Confidence interval; MI, myocardial infarction; OR, odds ratio; TCAR, transcarotid artery revascularization; TFCAS, transfemoral carotid artery stenting; TIA, transient ischemic attack; VIF, variance inflation factor.

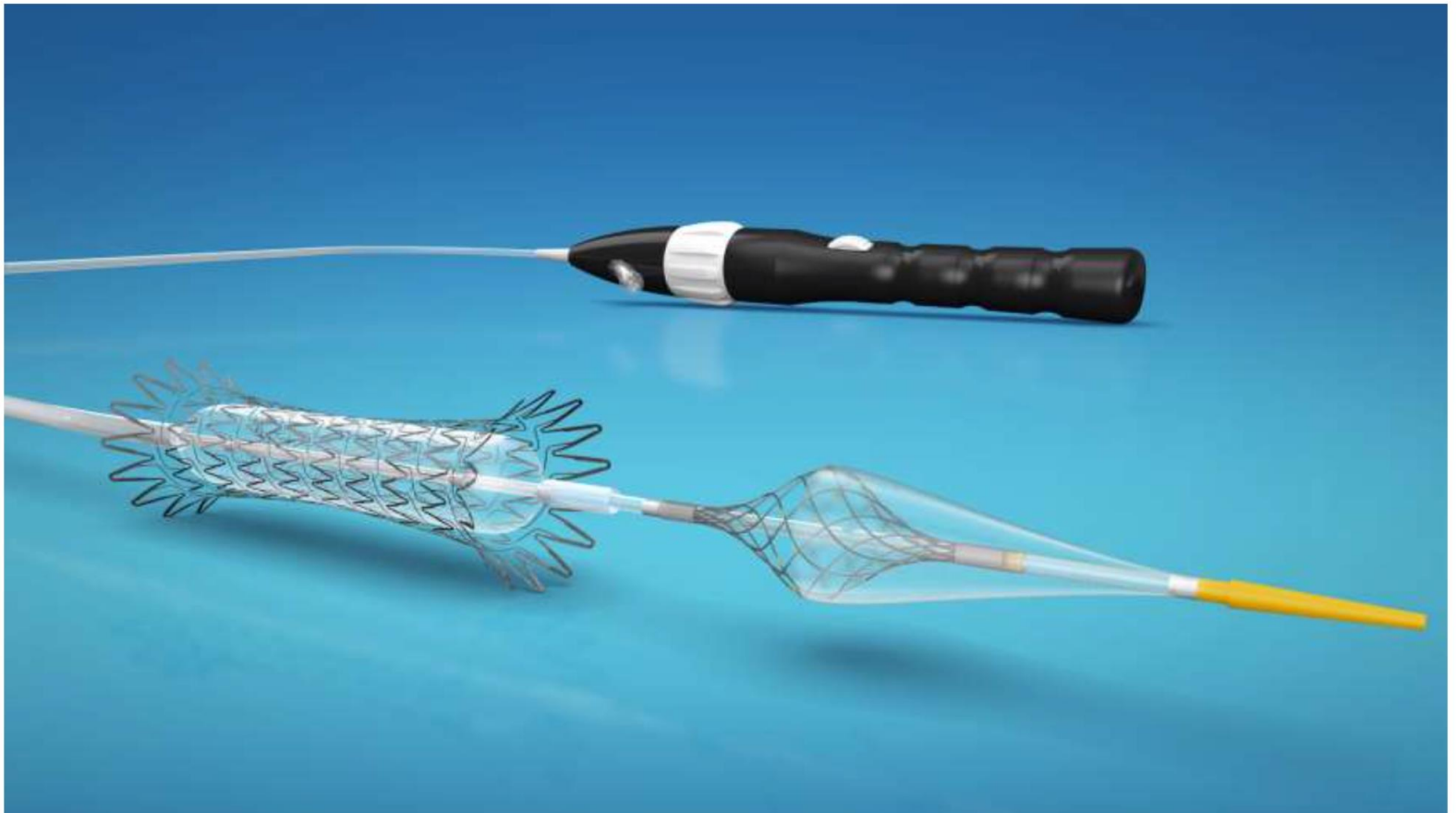
^aMultivariable analysis: adjusted for sex, race, ethnicity, age, insurance status, coronary artery disease (CAD), congestive heart failure (CHF), prior coronary artery bypass grafting (CABG) or percutaneous coronary intervention (PCI), diabetes, smoking, chronic kidney disease (CKD), American Society of Anesthesiologists class, symptomatic status, restenosis, prior carotid endarterectomy (CEA) or carotid artery stenting (CAS), prior amputation, medications (aspirin, antiplatelet, statin, anticoagulants, angiotensin-converting enzyme inhibitors), anatomic and medical high risk, elective vs urgent or emergent procedures.

New Concept: Paladin Double filtration Integrated Embolic Protection (IEP)TM



- ✓ The first device that combines an embolic protection filter and balloon
- ✓ 40 micron pore size allows micro-embolic capture
- ✓ Filter size can be adjusted to suit each patient's unique anatomy

Neuroguard

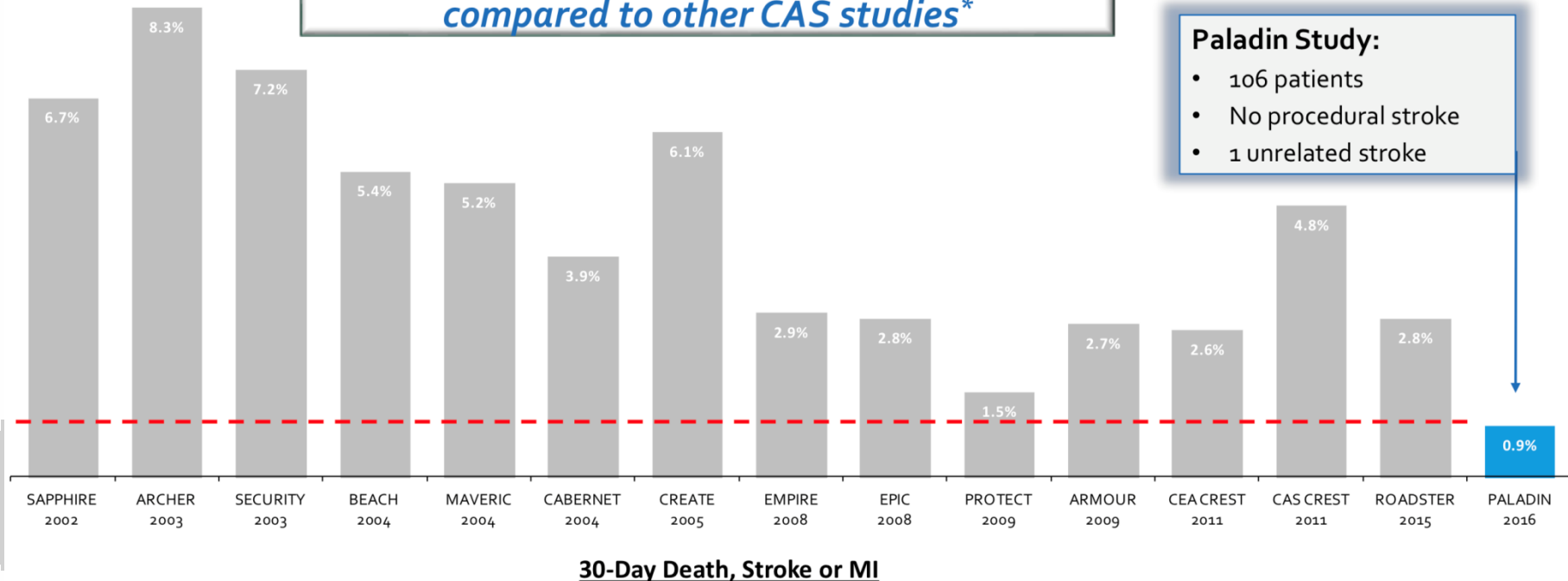


Clinical Data: Comparison of Paladin With Other Carotid Studies

*Paladin demonstrates lowest stroke rates compared to other CAS studies**

Paladin Study:

- 106 patients
- No procedural stroke
- 1 unrelated stroke



Concerns

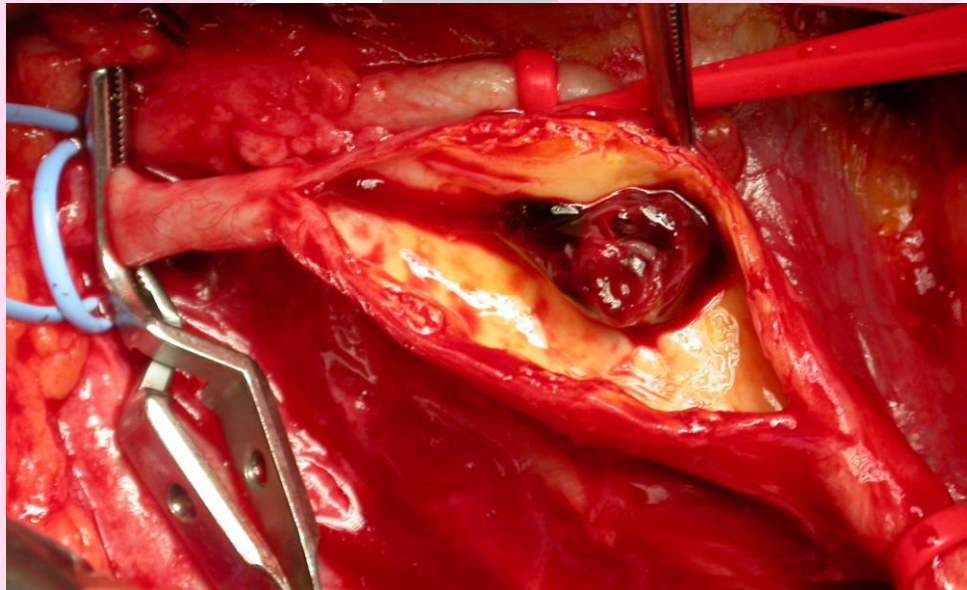
- Better embolic protection seems to reduce the risk of intraoperative neurological events...
however embolization may occur within 24-48 hours after CAS
- DW-MRI hits are still high after CAS
- Cognitive functions impairment after CAS

CLINICAL RESEARCH STUDIES

From the New England Society for Vascular Surgery

Presidential address: Carotid endarterectomy, under attack again!

James O. Menzoian, MD, *Boston, Mass*



A comparative analysis of long-term mortality after carotid endarterectomy and carotid stenting

Jesse A. Columbo, MD,^{a,b} Pablo Martinez-Camblor, PhD,^b Todd A. MacKenzie, PhD,^{b,c} Ravinder Kang, MD, MS,^b Spencer W. Trooboff, MD, MBA,^b Philip P. Goodney, MD, MS,^{a,b} and A. James O'Malley, PhD,^{b,c} Lebanon, NH

Journal of Vascular Surgery
January 2019

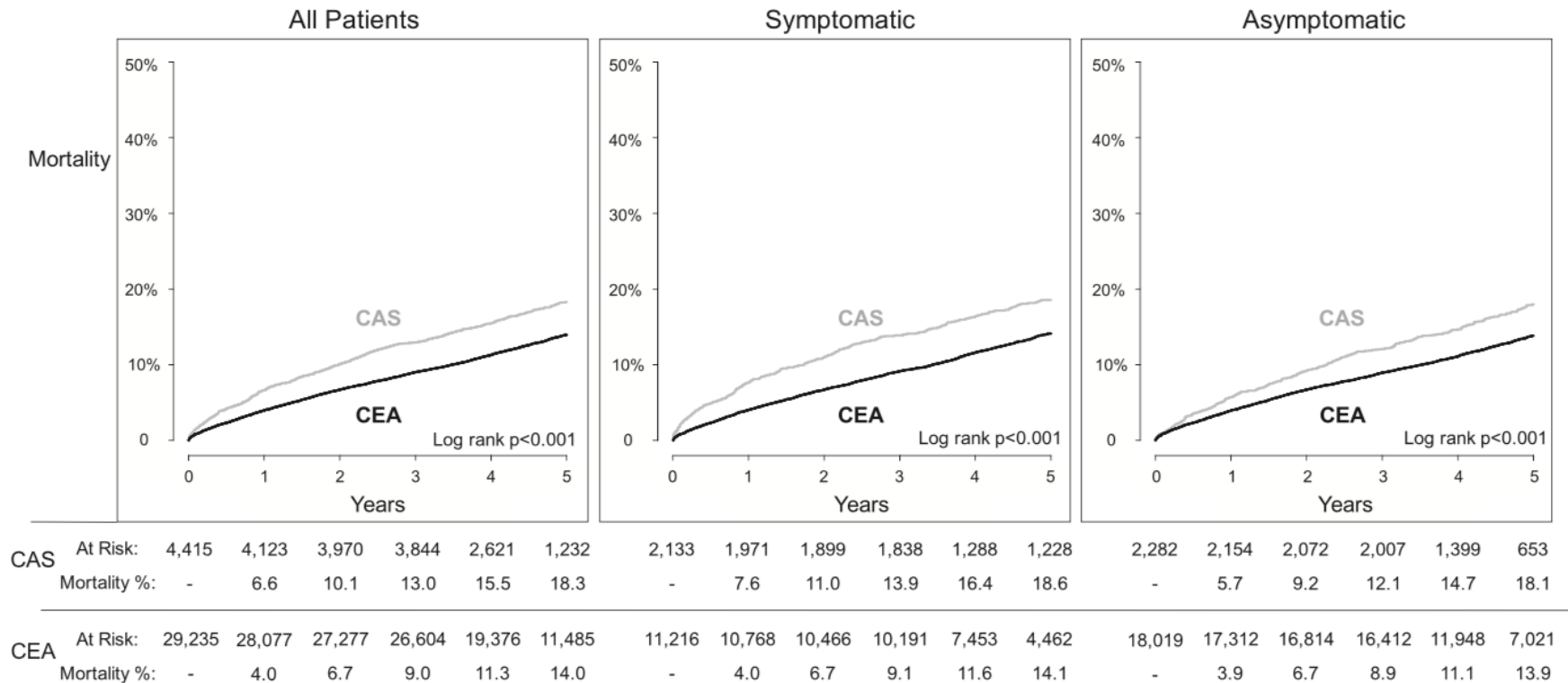
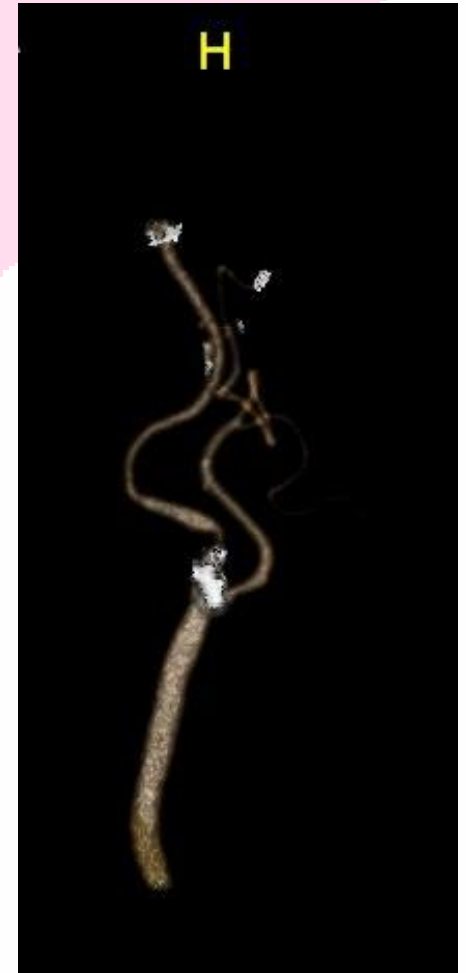


Fig. Kaplan-Meier estimated cumulative mortality after carotid endarterectomy (CEA) and carotid artery stenting (CAS).

Accurate selection of cases



CAS



Plaque prolapse between stent struts

De Donato et al
Eur J Vasc Endovasc Surg 2013;45:479



CEA

