Lesion Based High Risk Population: Objective Assessment

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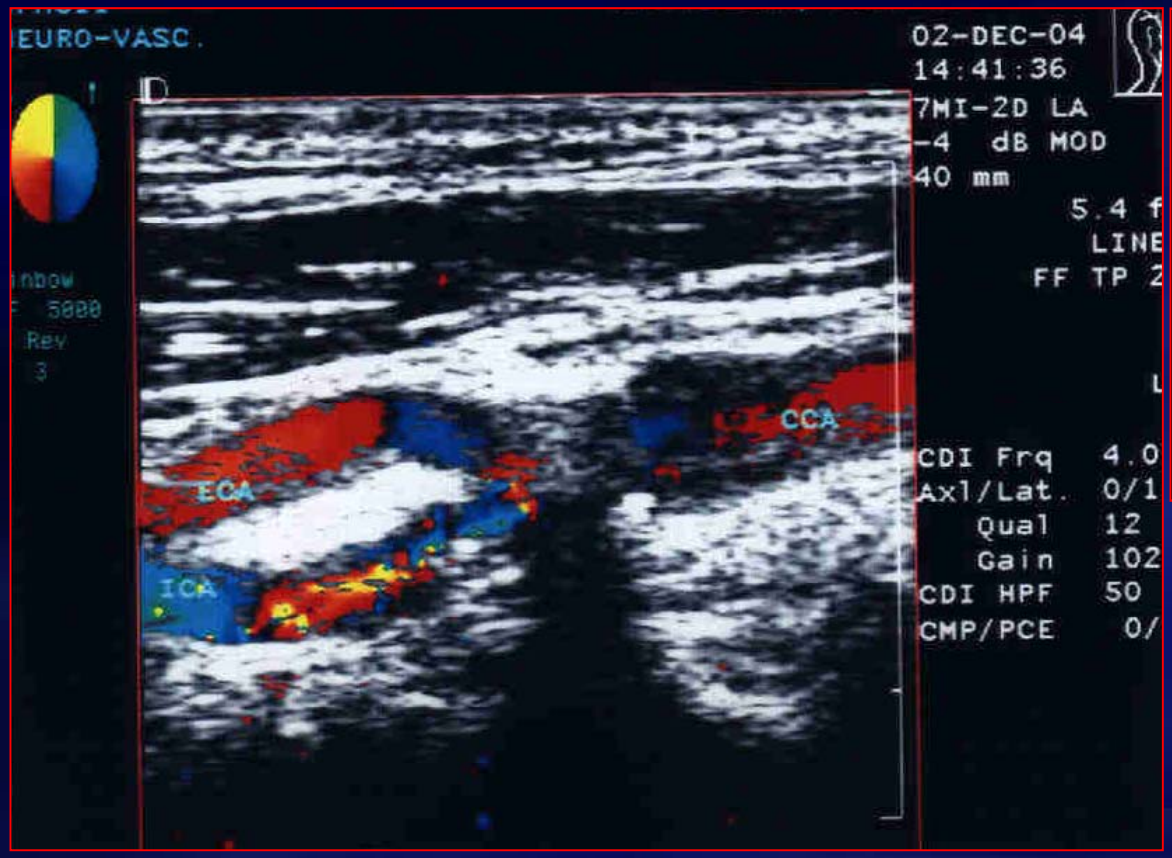
Case Presentation

- Male, 76 years old
- Cardiovascular risk factors:
  - Hyperlipidemia, HTN, DM (II), RAS with renal insufficiency (creatinine 1.6 mg/dL)
- Stable angina: triple vessel CAD (LM - nl, LCX -70% proximal stenosis, mid LAD - 60%, Distal RCA 50%)
- Examination normal except for asymptomatic (R) carotid bruit

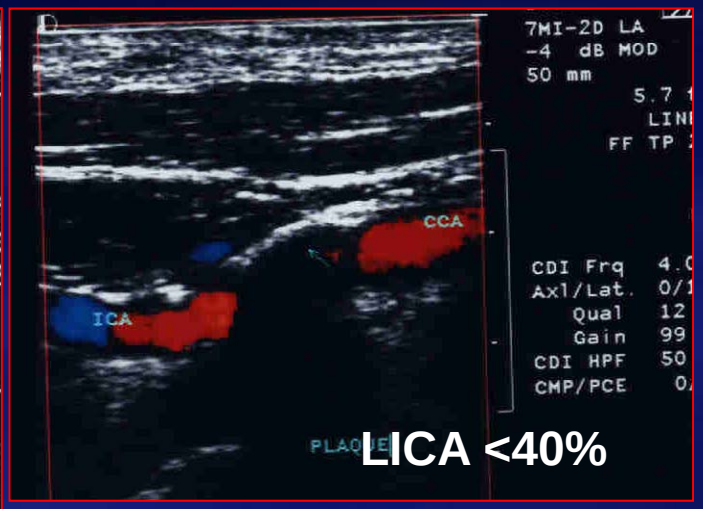
Medical Regimen

- Aspirin 325 mg Q D
- Lipitor 40 mg Q D
- Toprol XL 50 mg Q D
- Glipizide 10 mg BID
- HCTZ 12.5 mg Q D

Carotid Duplex Ultrasound



RICA 80-99%



LICA <40%

Patient Referred to Determine Management Options

A. Continue medical treatment for CAD and CAS

B. PCI for coronary disease and medical TX for CAS

C. PCI for coronary disease followed by carotid stenting

D. CABG + CEA in any order

Patient Selection for Carotid Revascularization

- Which asymptomatic patient should undergo carotid revascularization?
- Selection of patients for Carotid Stenting

Which Asymptomatic Patient Should Undergo Carotid Revascularization

A. Patients with carotid stenosis >80% who have high probability of survival in the next 3-5 yrs

B. Risk stratification, beyond stenosis severity, is important in determining benefit/risk of intervention

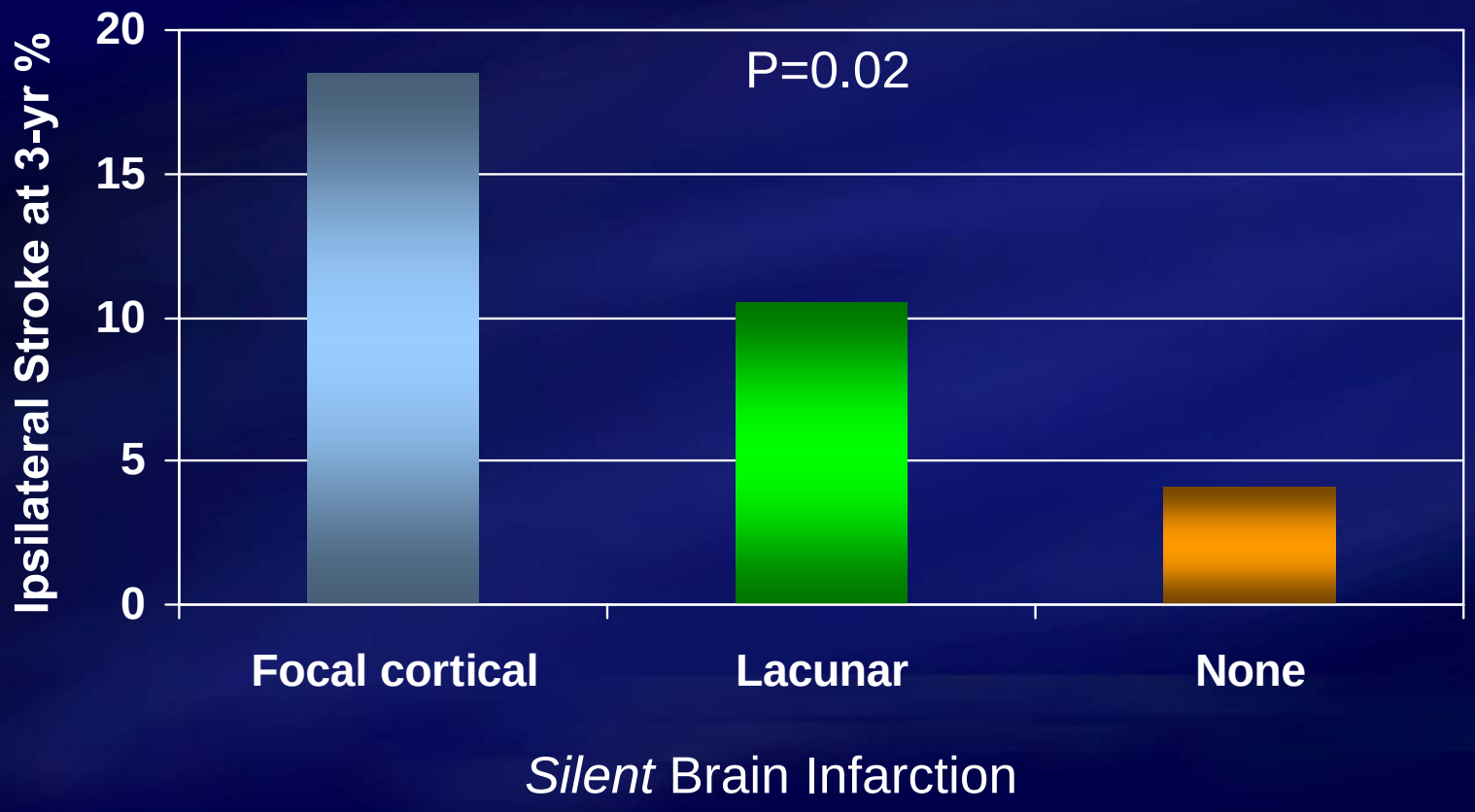
Risk Stratification

Who is the asymptomatic patient?

1. Clinical vs. imaging-based definition
2. Ipsilateral vs. contralateral symptoms
3. Never symptomatic vs. old symptoms

Risk Stratification

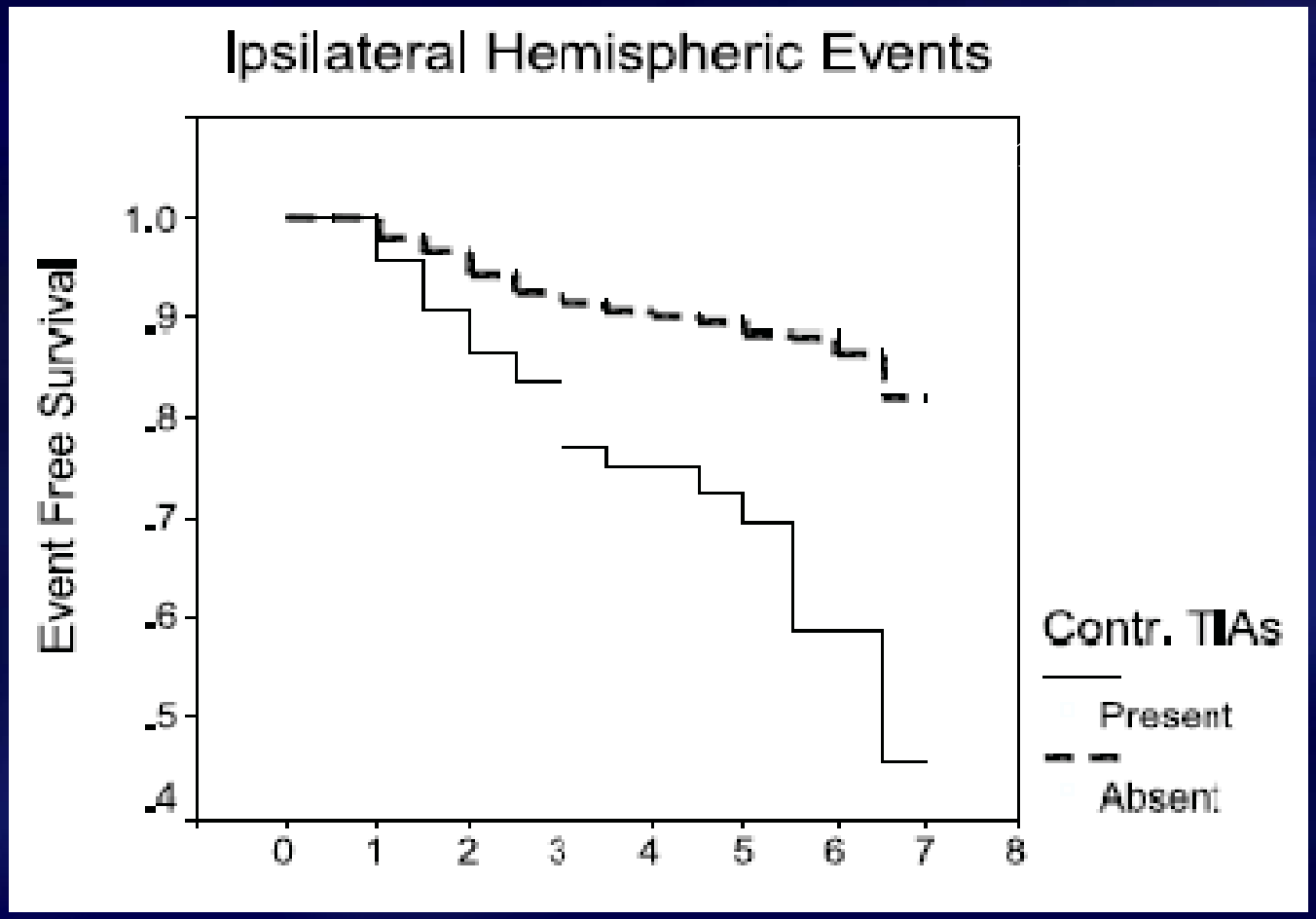
Impact of *silent* brain infarction on future events



Tegos TJ et al. Int Angiol. 2001 Jun;20(2):110-7

Risk Stratification

Impact of remote contralateral TIA on ipsilateral stroke risk



Nicolaides AN et al. the ACSRS study. Eur J Vasc Endovasc Surg. 2005; 30: 275-284.

What predisposes an asymptomatic patient to stroke?

Its Not as Simple As We like to Think!

I. **Demographic and clinical parameters**
   A. Advanced age
   B. Chronic renal Insufficiency
   C. Contralateral neurologiocal ischemic symptoms
II. **Carotid stenosis parameters**
   A. Carotid stenosis severity
   B. Carotid stenosis progression
   C. Carotid plaque morphology
III. **End organ (Brain) parameters**
   A. Cerebral silent infarcts
   B. Asymptomatic cerebral embolization
   C. Compromised cerebrovascular reserve

Carotid Stenosis Morphology

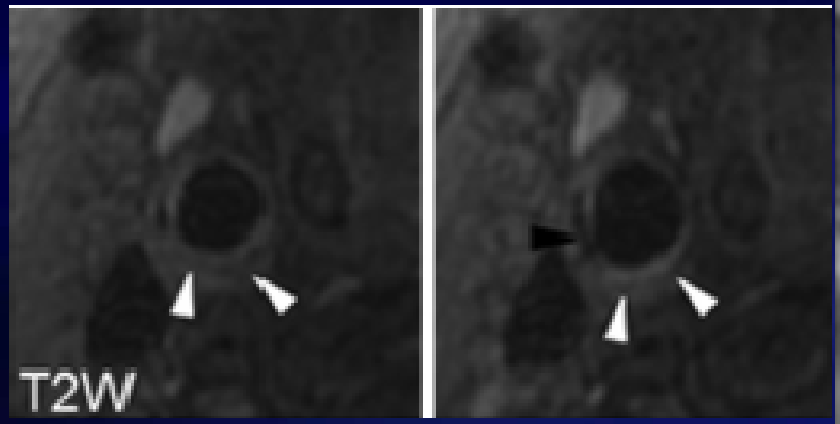
Angiographic

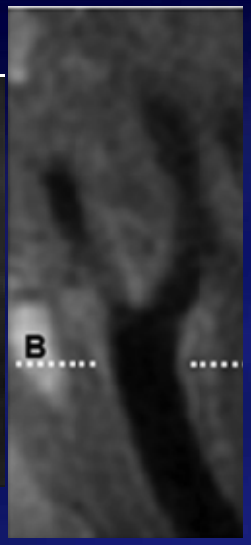
Carotid Plaque Morphology

What Predicts Carotid Plaque Surface Disruption?

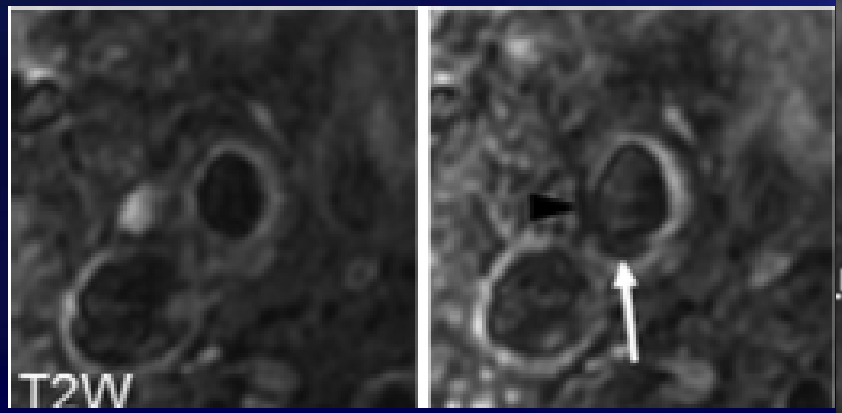
Lipid-Rich Necrotic Core (LRNC) - MRI

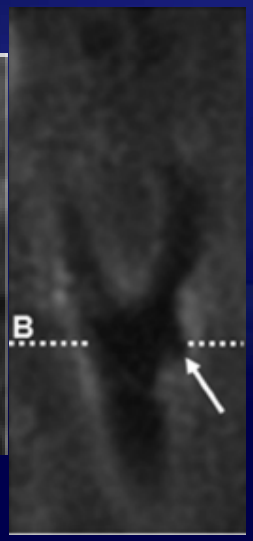
Baseline

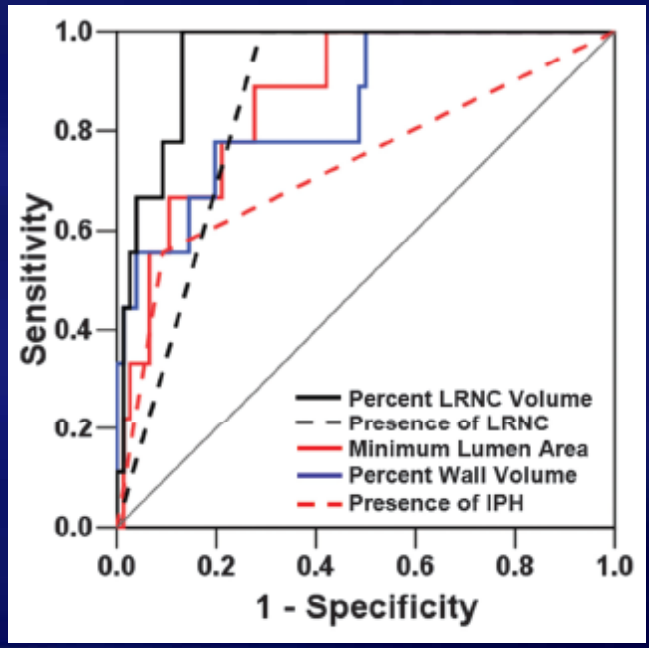




3-yr







Prediction of Carotid Plaque Surface disruption

Underhill Hr et al. AJNR Am J Neuroradiol 31:487–93 Mar 2010

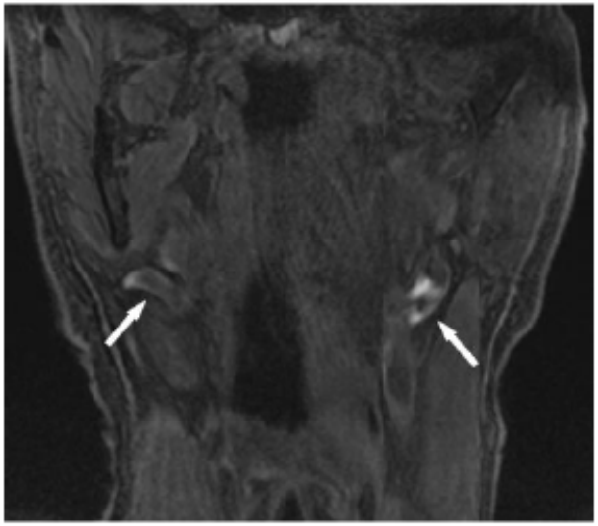
Carotid Plaque Morphology

What Predicts Cerebrovascular Ischemic Events?

Intra Plaque Hemorrhage (IPH) - MRI

Figure 3

a.



b.

Figure 3: (a) Axial and (b) coronal MF images of a 77-year-old man with bilateral carotid artery vessel wall hyperintensities signifying MR-depicted IPH (arrows).

Figure 4

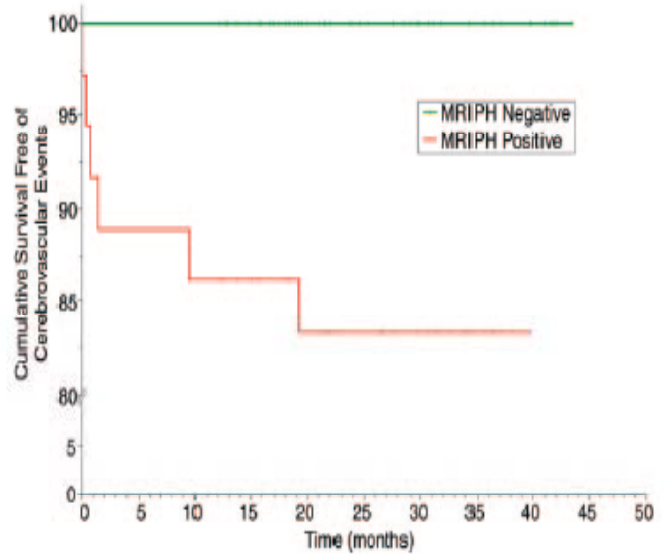
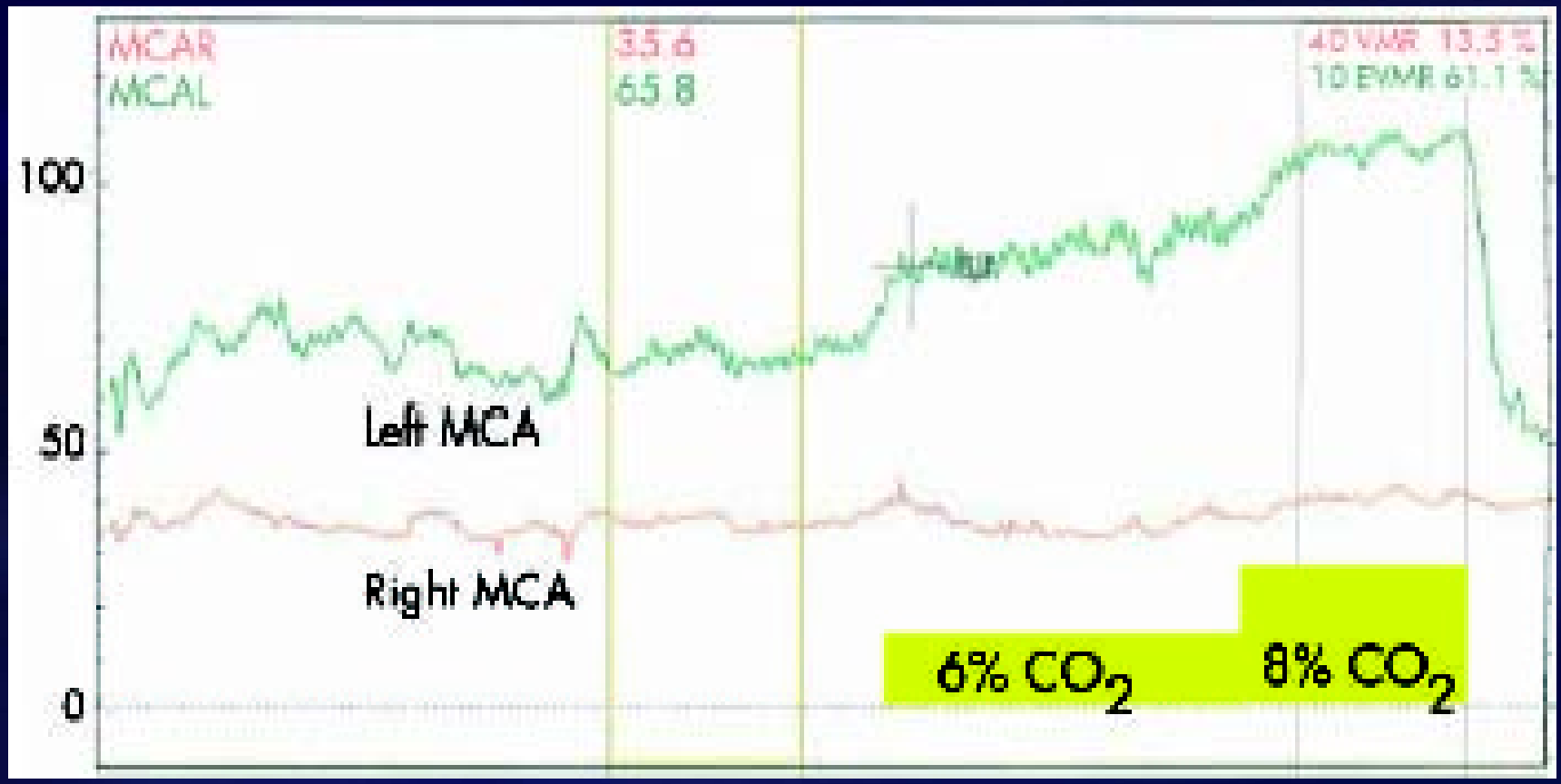


Figure 4: Kaplan-Meier plot of the incidence of cerebrovascular events between arteries with *(MRIPH Positive)* and those without *(MRIPH Negative)* MR-depicted IPH.

*Singh N et al. Radiology. 2009;*252 (2).

CEREBROVASCULAR RESERVE (CVR)



Selection of Revascularization Technique for Carotid Artery Stenosis

2011 Clinical Practice Guidelines

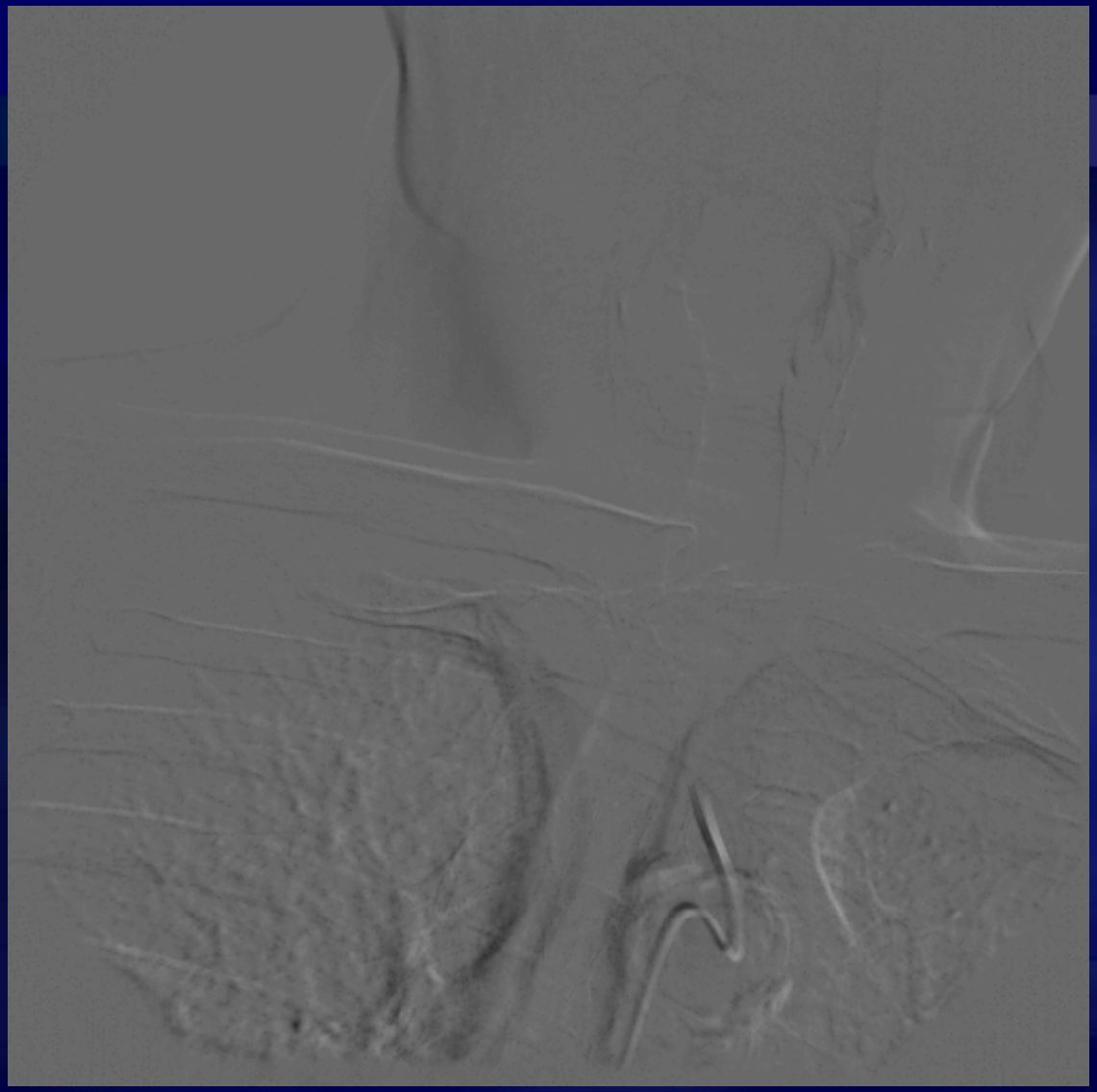
	Symptomatic Patients		Asymptomatic Patients
	50% to 69% Stenosis	70% to 99% Stenosis*	70% to 99% Stenosis*
Endarterectomy	Class I LOE: B	Class I LOE: A	Class IIa LOE: A
Stenting	Class I LOE: B	Class I LOE: B	Class IIb LOE: B

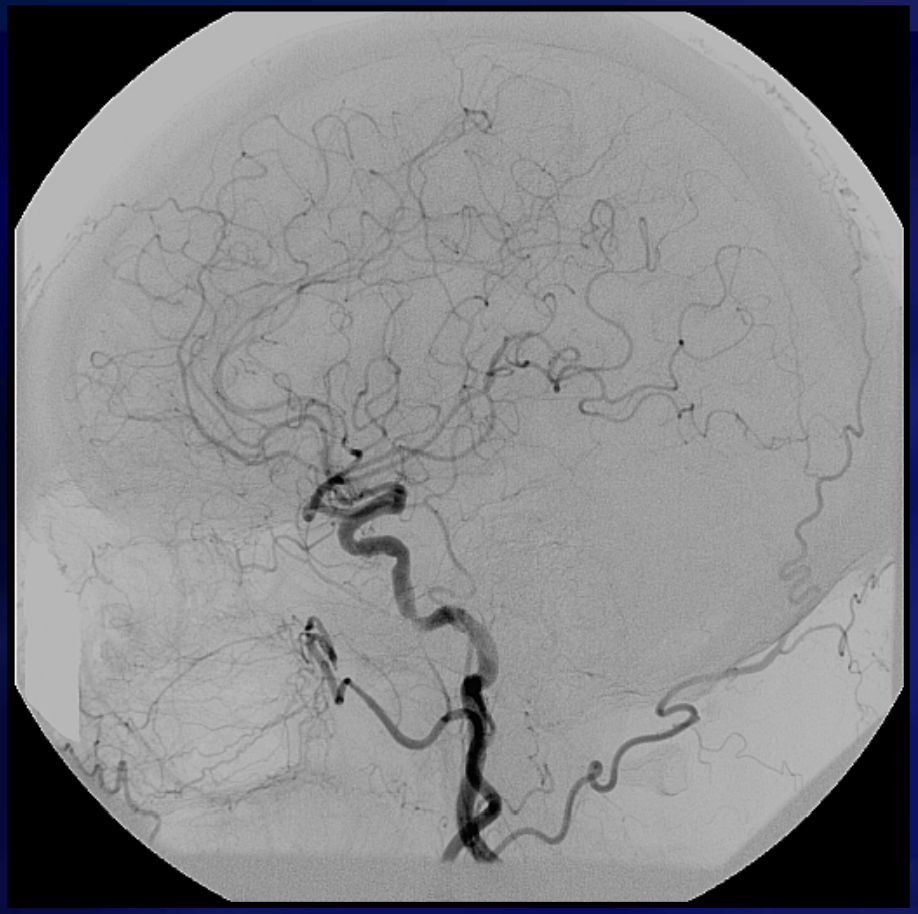
Brott TG et al, ACC/AHA guidelines. JACC. 2011;Vol. 57, No. 8.

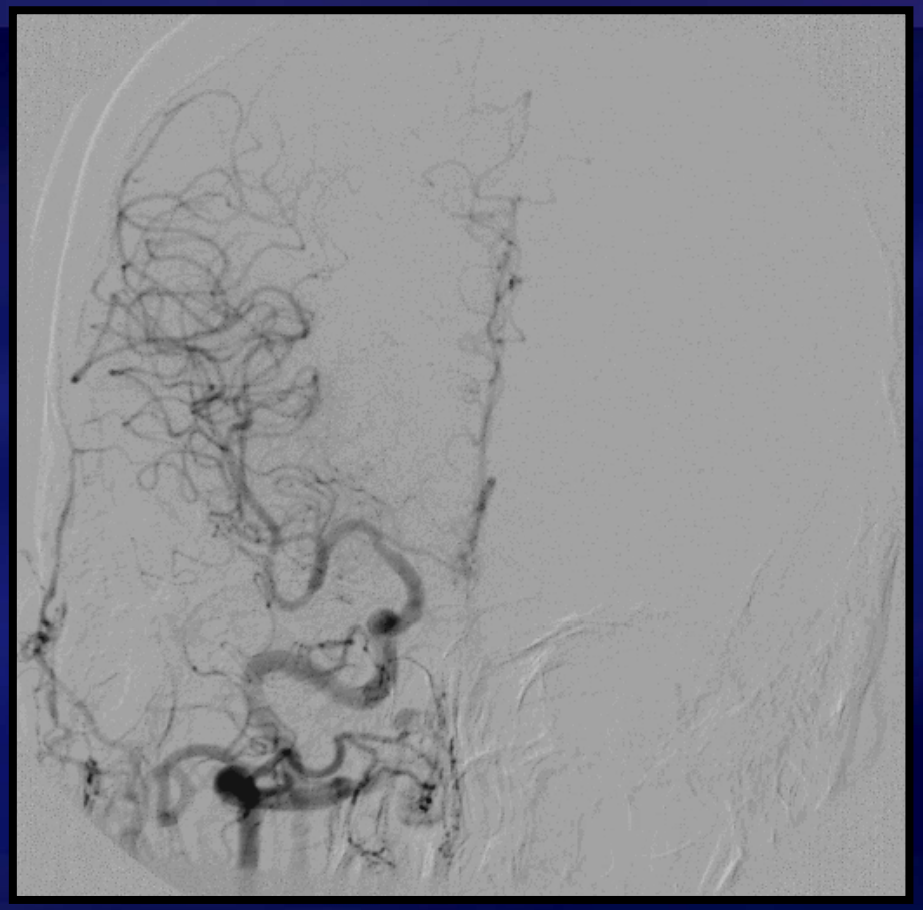
The CREST trial

Primary Endpoint

	CAS vs. CEA	Hazard Ratio	95% CI	P value
All Stroke	4.1% vs. 2.3%	HR=1.79	1.14-2.82	0.01
Major Stroke	0.9% vs. 0.7%	HR=1.35	0.54-3.36	0.52
MI	1.1% vs. 2.3%	HR=0.50	0.26-0.94	0.03
Cranial nerve palsey	0.3% vs. 4.8%	HR=0.07	0.02-0.18	<0.0001

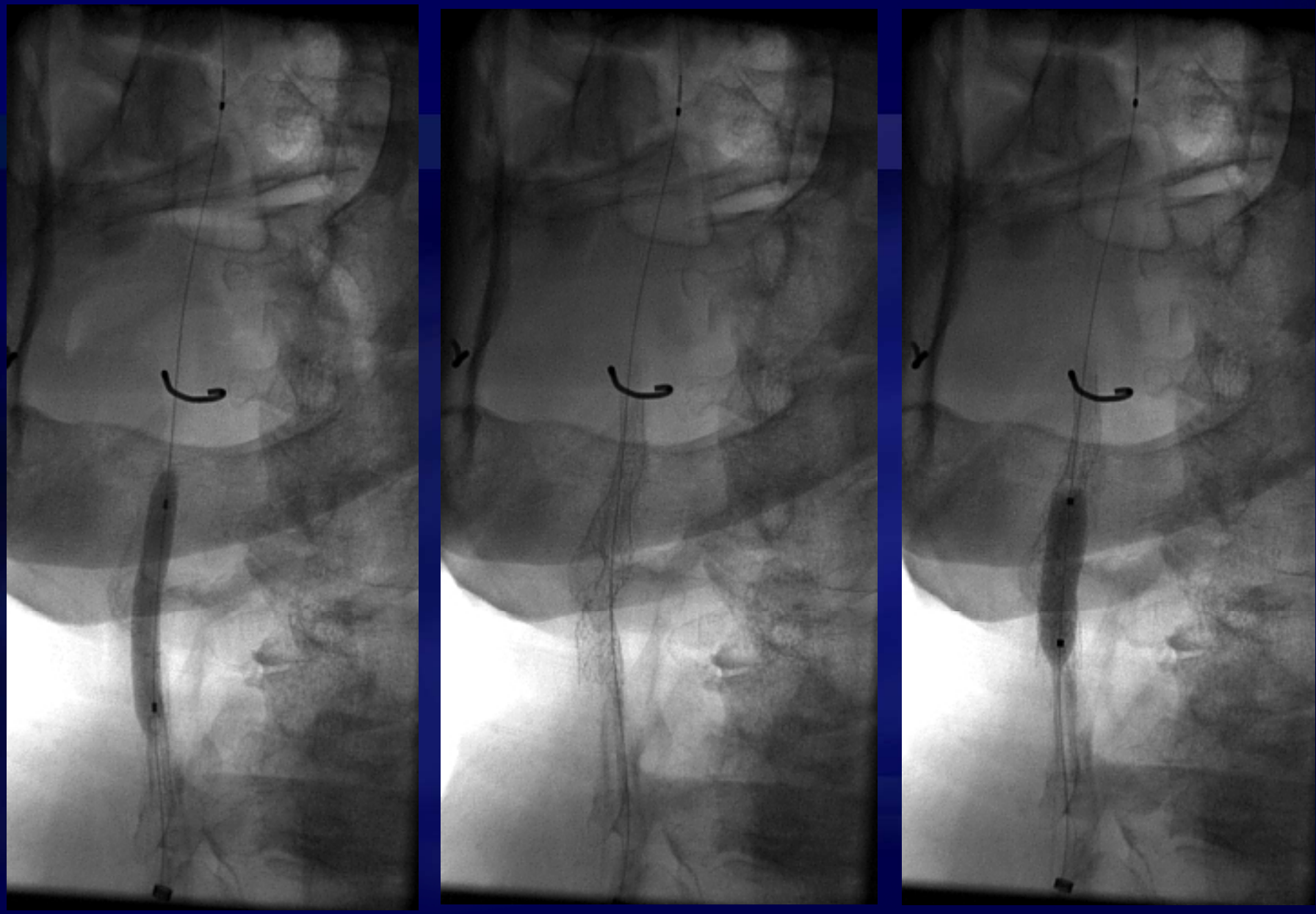






Treatment Protocol

- CAPTURE Protocol
  - Acculink Filter
  - Acculink stent



Take Home Message

- The assertion that one therapeutic modality (medical therapy alone or carotid revascularization) is superior in *all* patients with asymptomatic carotid artery stenosis (>60%) is invalid
- There is mounting evidence that patients with asymptomatic carotid artery stenosis can be risk-stratified using non invasive methods
- The time has come to test risk-stratification guided treatment strategies vs. standard of care.