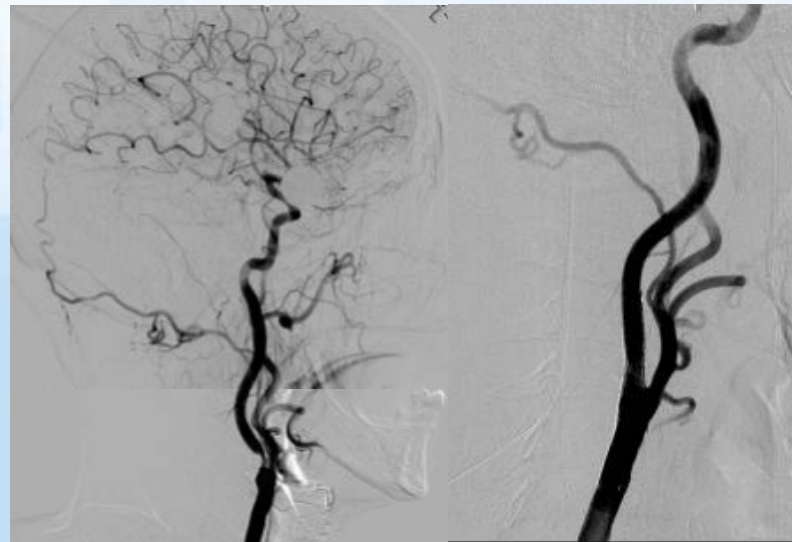




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Why the emodinamic depression should be identified



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Background



- Carotid Artery Stenting (CAS) is still under clinical investigation as an alternative treatment for carotid stenosis
- CAS studies mainly address neurological complications
- Hemodynamic depression (HD), such as severe hypotension and bradycardia, has been reported in up to 68% of CAS
- HD may increase the risk of periprocedural complications
- Indiscriminate use of vasopressors could itself lead to ischemic myocardial complication



Is Haemodynamic Depression during Carotid Stenting a Predictor of Peri-procedural Complications?

E. Cieri,¹ P. De Rango,¹ M.R. Maccaroni,² A. Spaccatini,² V. Caso³ and P. Cao^{1*}

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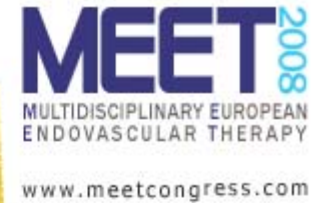
To evaluate the incidence and clinical relevance of HD during CAS

To investigate HD predictors



Patients

March 2006-June 2007



Prospective protocol

Routine prophylactic atropine before stent deployment
0.4 mg/iv

Inclusion criteria:

- Symptomatic or asymptomatic carotid stenosis requiring treatment

233 CAS

Exclusion criteria:

- Restenosis
- Anti-arrhythmic drugs
- Pace-maker holders
- Beta-blockers
- Acute or unstable symptoms



Hemodynamic Depression (HD)



Any symptomatic or asymptomatic
Hypotension (systolic blood pressure < 90 mmHg)
or
Bradycardia (heart rate < 50 beats/min)

HD requiring support

HD symptomatic or not spontaneously
reversing within 10"



Plaque morphology

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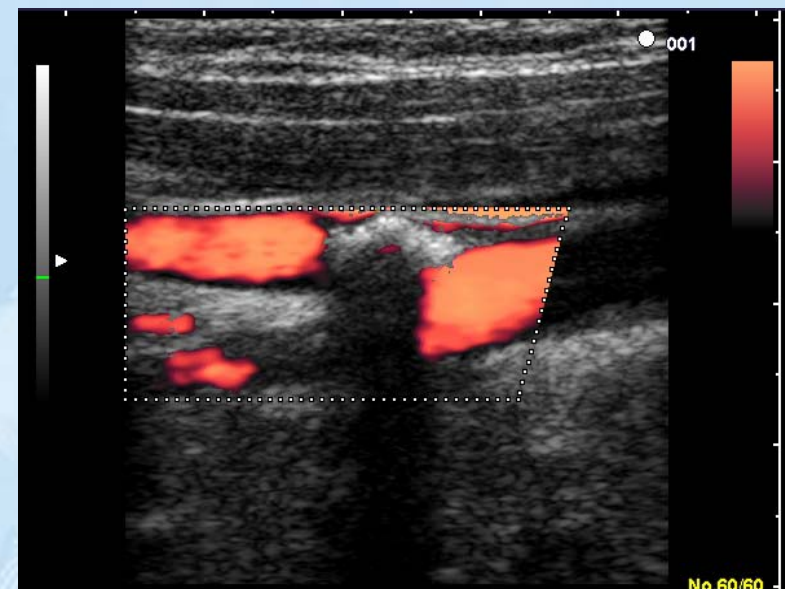
Echolucent

Low echogenic or non calcified plaques appearing fully black or with spotty white areas representing less than 25% of the total



Hyperechoic/calcified

High echogenic or calcified plaques, appearing white or almost white with anechoic areas representing less than 25% of the total

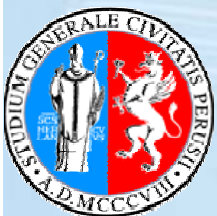


Procedure

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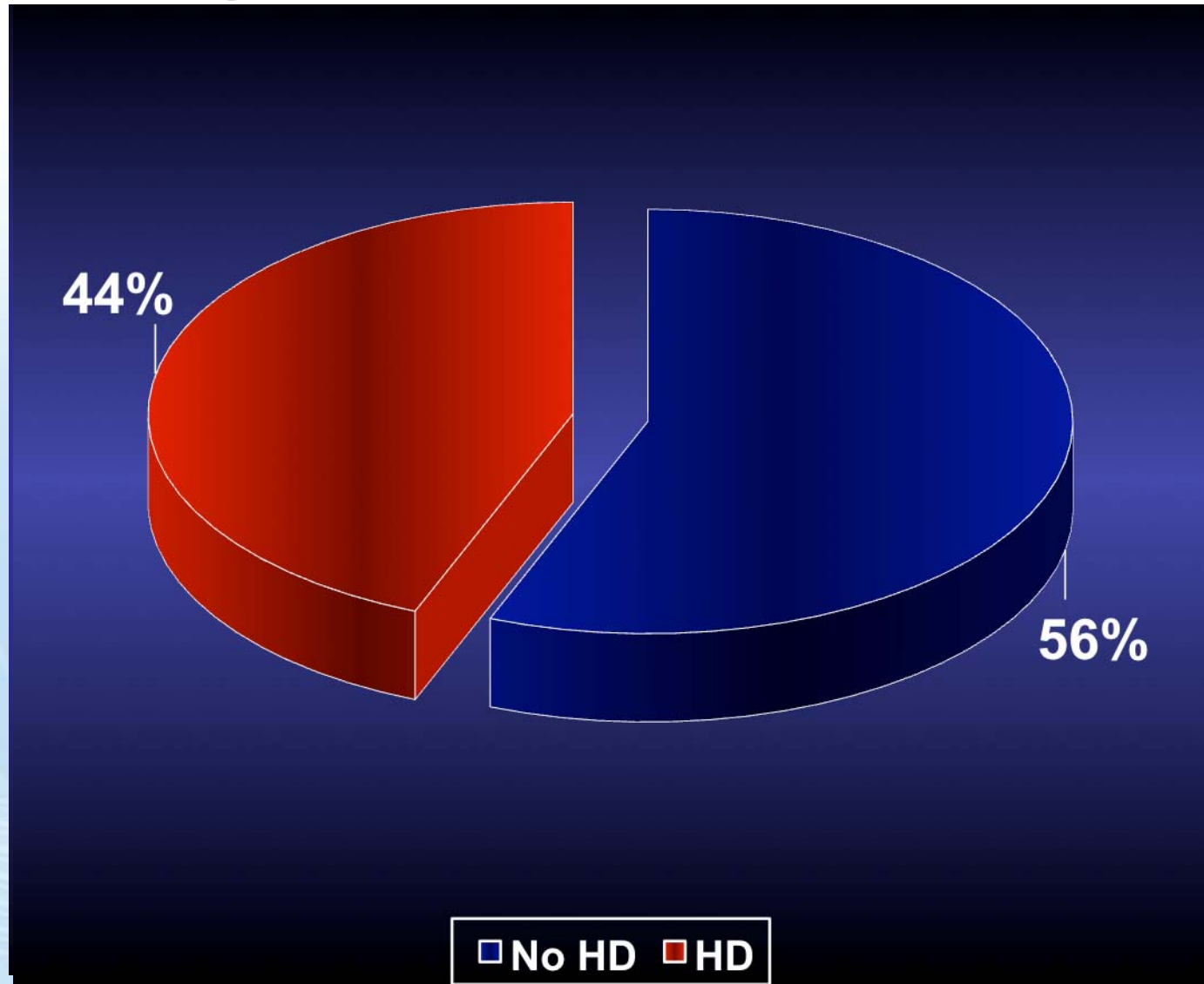
- Local anesthesia
- Endovascular operating room equipped with high quality fixed imaging system
- Cerebral protection device
- Self expanding stent
- Continuous neurological and hemodynamic monitoring





Results

Hemodynamic Depression Incidence



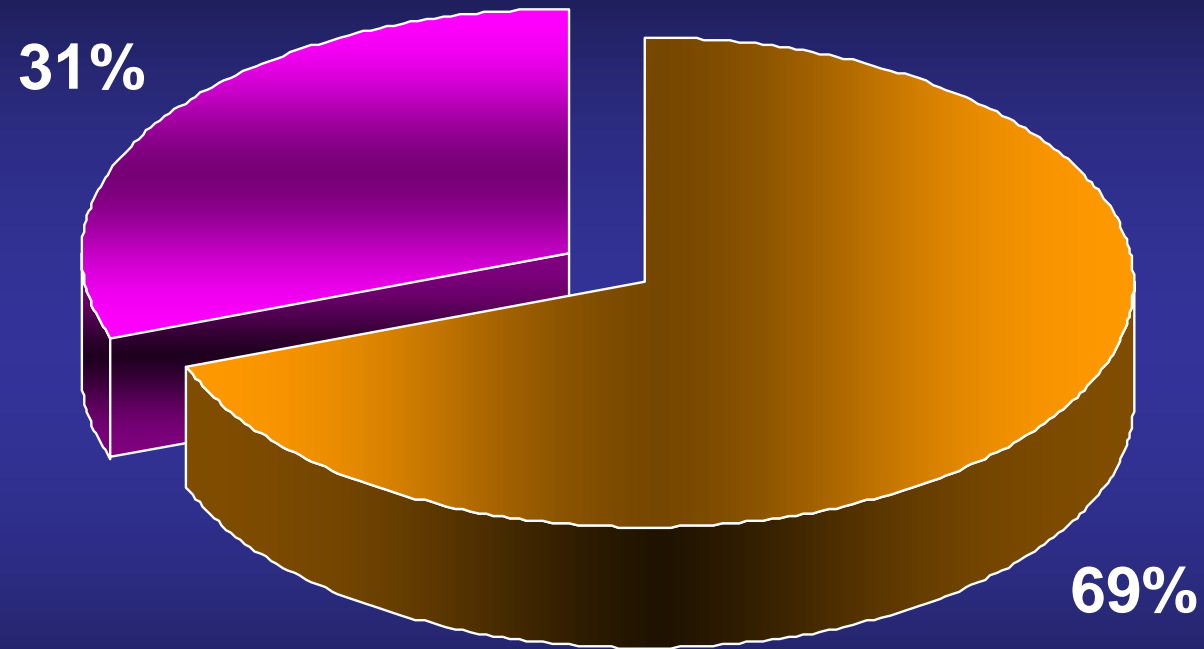


Results

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HD requiring support Incidence



■ HD requiring support ■ HD not requiring support



Results

Adverse periprocedural events

	Tot. (223)	No HD (125)	HD (98)	P value
Any Stroke	7 (3.1%)	3 (2.4%)	4 (4%)	0.7
Major Stroke	3 (1.3%)	2 (1.6%)	1 (1%)	1
TIA	4 (1.8%)	4 (3.2%)	0	0.1
MI	1 (0.4%)	1 (0.8%)	0	1
MACE	8 (3.6%)	4 (3.2%)	4 (4%)	0.73



Results

Univariate analysis



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	No HD (125)	HD (98)	P value	HD requiring support (68)	P value*
Hyperechoic/calcified plaque	40 (32%)	80 (81.6%)	<0.0001	57 (83.8%)	<0.0001
Lesion length cm (mean)	1.78	1.96	0.007	1.97	<0.0001

*HD requiring support vs no HD



Logistic regression analysis

Independent predictors of HD and HD requiring support

- Age
- Gender
- Hypertension
- Smoking
- Diabetes
- Coronary artery disease
- Previous MI
- Previous symptoms
- Degree of carotid stenosis
- Contralateral CEA
- Contralateral CAS
- Calcified/hyperechoic plaque
- Plaque length
- Stent oversizing
- Type of stent
(open vs. close cell design)



Logistic regression analysis

Independent predictors of HD:

Hyperchoic/calcified plaque

(HR 9.593; $p < 0.0001$; 95% CI 5.039-18.260)

Lesion length

(HR 1.779; $p = 0.038$; 95% CI 1.034-3.061)

Independent predictors of HD requiring support:

Hyperchoic/calcified plaque

(HR 8.143; $p < 0.0001$; 95% CI 3.917-16.928)



What we learned

June 2007-May 2008 (196 CAS)

2008
AN
PY
3m

STENERGIES

HD reduction

27%

($p < 0.001$)

Hyperechoic
0,8-1 mg

Echolucent
0,4 mg

Atropine



Conclusions



- The presence of calcified and long carotid plaque are strong predictors of hemodynamic changes
- HD does not appear to predispose to periprocedural adverse events
- Carefully monitoring and adequate pharmacological support of hemodynamic changes are crucial to achieve safe outcome during CAS