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**University at Buffalo**  
*State University of New York*

# Some Octogenarians Must Be Treated With CAS

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## *Potential Conflicts*

### Consultant & research support:

Boston Scientific, Cordis, Bard,  
Abbott

### Financial interest:

Boston Scientific, Access Closure Inc.,  
Micrus, Square One

# **Elderly Patients Need CAS Because...**

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**At Higher Risk for STROKE**

**Often Poor Candidates for CEA**

**Medical Therapy Inadequate**

**Good Pt Selection → Good Results**

# **Elderly Patients...**

**What is the Role of CEA?  
What is the Role of CAS?**

**Making Treatment Safe**

# Should We Treat Elderly Patients?

- Stroke is the most expensive and devastating disease
- Risk of Stroke increases dramatically with age
- Most studies show increasing numbers of older pts undergoing treatment
- Baby Boomers are coming!

# Why Treat Elderly Patients?

## Elderly Patients (75-79)

*NASCET Analysis (> 80 excluded)*

Absolute risk reduction (ARR) overall = 17%

**ARR in pts 75-79 = 30%**

# Asymptomatic Patients??

- People are living longer, and...
- Risk of stroke increases with age
- So consider treatment if life expectancy > 5 year and if treatment risk is low



# Some Stroke Facts...

## *Asymptomatic Patients*

- Only **1/3** of strokes are preceded by **TIA**

*Caplan et al*

- Many TIA's are **never diagnosed**

*Castaldo, Tool et al, Arch neurol, 1997*

- Many Stroke are **never diagnosed**

# Stroke Facts...

## *Asymptomatic Patients*

- Silent infarcts (CT&MRI) noted in 12-70% of asx pts  
*(ACST) Halliday*
- Silent infarcts seen in 15% of ACAS patients

## Other “Non Symptom” Symptoms

- Neurocognitive function impaired in asymptomatic patients...improved after CAS  
Raabe, SIR March '06  
Grunwald, ICCA 08
- Dizziness ???

- **CEA is higher risk in elderly patients**
- **We thought CAS would replace CEA in elderly patients**
- **All of the CAS high risk (for CEA) registries listed age > 80 as one inclusion criterion**
- **CAS in Elderly proved to be a major risk factor for CAS... especially in symptomatic patients**

## CAS vs CEA

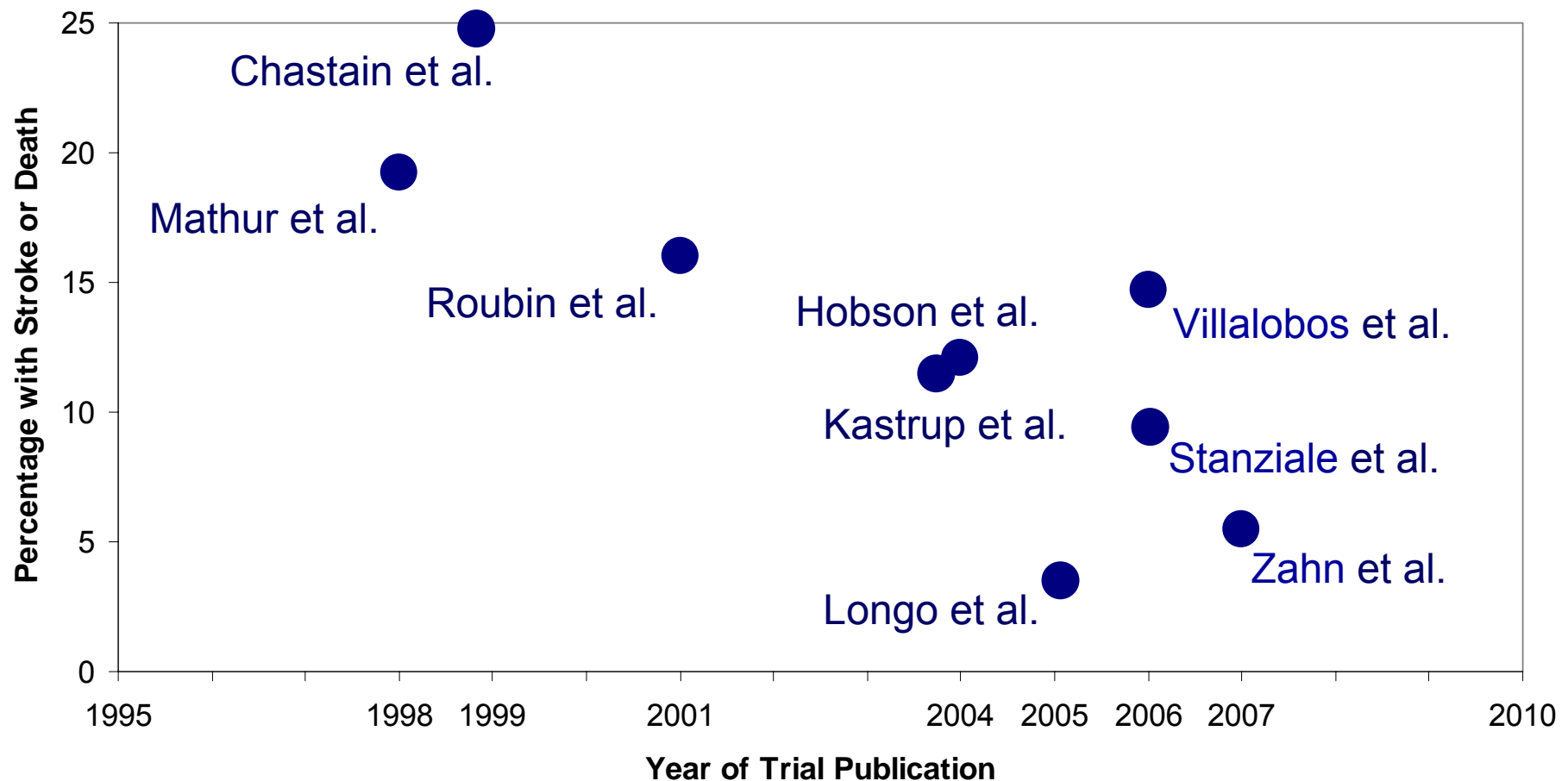
Trials show CAS risk in elderly

8-12%...

CREST, Capture, SAPPHIRE, ALKK,  
Kastrup, Stanziale, SPACE, etc

# CAS Among Octogenarians: *Earlier Data ?? Trending Down*

Stroke and Death Rates for CAS among Octogenarians



# More Recent Data

*Stroke and Death Still 8-10%*

- CAPTURE I
- CAPTURE II
- EXACT
- SAPPHIRE WW
- SPACE

# A Major Wake Up Call

*What We Needed*

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## What To Do ?

- Better pt selection
- Learning who NOT to stent
- Experience/Improved technique
- New technology
- **Modification based on trials**



# CAS: Personal Experience- All Ages SUNY Buffalo

<b>30 Day M&amp;M</b>	<b>CAS</b>	<b>CEA</b>
Death	1.7%	1.1%
Stroke	0.8%	0.0%
Myocardial infarction	0.8%	3.2%
MAE	3.3%	3.2%

**CAS**

**We Are Learning...**

**Every Trial Teaches Something**

**No Single Trial Has  
All the Answers**

**Every Pt Deserves a Trial...  
ie. We Need More Data**

# ALKK Registry

## *321 Octogenarians vs Younger Pts*

- CAS longer duration in elderly
- Higher residual stenosis
- CAS more often aborted
- Fewer elderly pts on statins
- Access site complications same
- Higher in hospital death/stroke rate(5.5v3.2)
- Case volume increasing yearly

# CAS Risk Factors

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*From All Trial Data*

- 1. Sx (hot) lesion...** *Prox EP, CEA*
- 2. Low GSM...** *Prox EP, CEA*
- 3. Renal Failure??...** *??*
- 4. Multiple stents...** *Tech*
- 5. Duration Filter...** *Tech, CEA*
- 6. Pre dil without EP...** *Tech, Prox EP*
- 7. Tortuosity- severe...** *CEA*
- 8. Concentric calcium...** *CEA*
- 9. Aortic Arch disease...** *CEA*
- 10. Early Learning Curve...** *Judgement*

# CAS

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## *Non Predictors of Risk*

- 1. Sex**
- 2. Calcification**
- 3. Residual stenosis**
- 4. Contralateral occlusion**
- 5. Smoking**
- 6. Diabetes**
- 7. Statins**

# Complications

## *Procedure Stage*

1. Groin
2. Femoral/Iliac/Aorta
3. Angio/Contrast
4. Arch/ CCA Access
5. Crossing Lesion
6. Straightening kinked ICA
7. Predil, Stent & Post Dil
8. EP Deploy & Retrieval
9. Periop Management

# Age and Timing of CAS “Hot Lesions”

For **symptomatic** patients, both increasing **age and treatment within 2 weeks** of neurologic symptoms were associated with increased risk for perioperative stroke or death.

\* Topakian, et al. Timing of stenting of symptomatic carotid stenosis is predictive of 30-day outcome. European Journal of Neurology, June 2007.

# Elderly Patients...

## Can CAS Compete with CEA?

*Recent 30 Day Stroke and Death Rates*

- Setacci 2.12%
- Roubin 3.3%
- Kadkhodayan 0%

**Skilled operators with  
good patient selection and improving technology  
can make the difference**



# **What about Risk Factors for CEA??**

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# Carotid Stenosis

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## *Red Flag For CEA*

- Contralateral ICA occlusion \*\*
- Left-sided lesion
- CT evidence of CVA pre-op \*
- Diabetes mellitus...esp female \*
- Diastolic BP > 90 mm/Hg \*
- No history of MI or angina
- No perioperative aspirin

NASCET

# CEA

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## *Risk Factors for Stroke & Death*

- Hemispheric TIA vs. ocular
- Female
- Hypertension  $\geq 180\text{mm/Hg}$
- Peripheral vascular disease

*ECST*

# Medical Comorbidity

- Pre-op CABG \*
- Angina pectoris \*
- CHF \*
- Recent or evolving MI \*

# Surgical Contraindications

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- Recurrent carotid stenosis \*\*
- Previous perilesional surgery \*
- Contralateral laryngeal palsy \*
- Tracheostomy\*
- Post cervical XRT\*

# Anatomical Contraindications

- Lesion above C2 \*
- Lesion below clavicle \*
- 'No neck' / high bifurcation \*

- Common Sense

## CEA Higher Risk

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### Limited Reserve/ Poor Collateral

- Contralateral carotid occlusion \*
- Severe tandem intracranial stenosis \*

# CEA M&M - High Risk Patients

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## *Neurologic Risk Factors*

- Crescendo TIAs
- Stroke in evolution
- TIAs on heparin/recent TIAs
- Multiple strokes
- Recent stroke
- Acute carotid occlusion

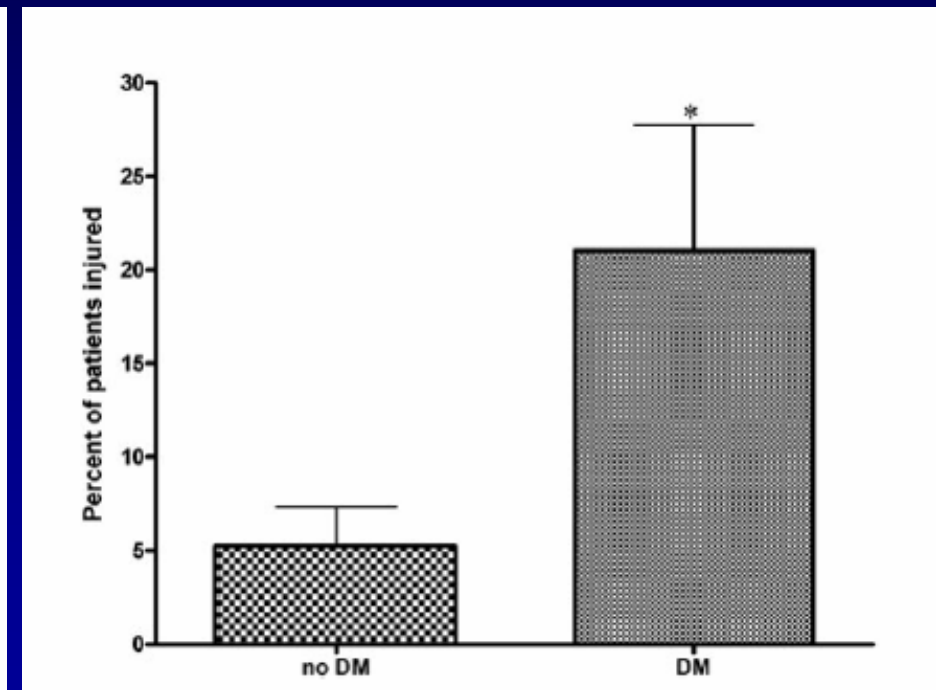
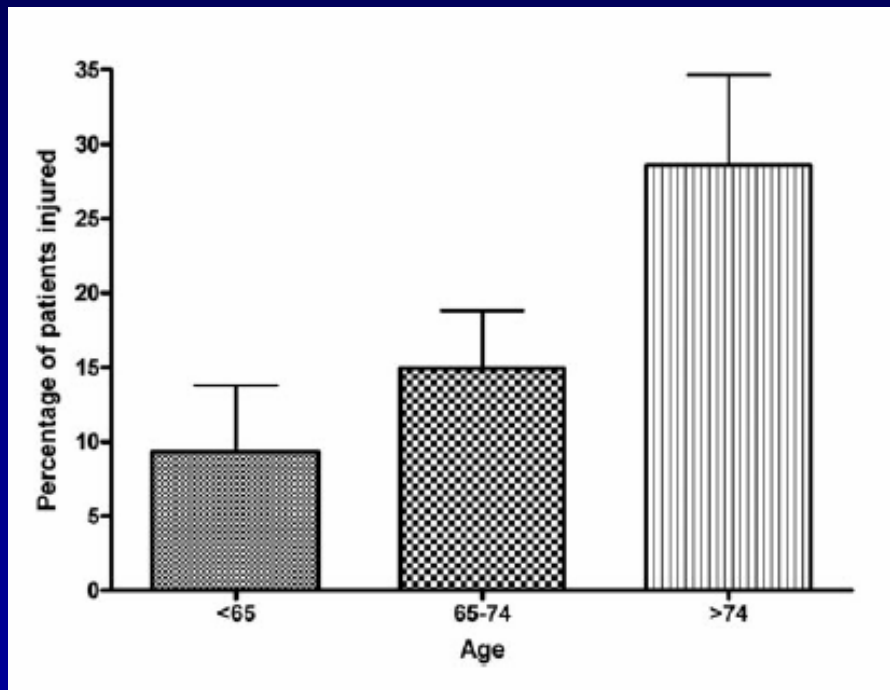


# Other Issues

- Neurocognitive decline after CEA
- DWI hits after CAS...most from arch ds

# Predictors of Neurocognitive Decline after CEA

Advanced age and Diabetes predicted dysfunction on POD 30





***The Bottom Line...***

# **CEA and CAS Are Complimentary**

*Even in Octogenarians*

**Consider all the Issues  
If One is High Risk...  
Likely the other is not**



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# CAPTURE 3500

- > 2/3 of ischemic events occur after the procedure...most in the first 24 hrs
- 1/5 in contralateral hemisphere

# ACT I: Outcomes in Lead-in Patients

(Adjudicated by CEC)

Event	30 days, N=118
Death, Stroke and MI*	1.7%
All Stroke and Death*	1.7%
Major Stroke and Death*	0.0%
Death	0.0%
All Stroke	1.7%
Major Stroke	0.0%
Minor Stroke	1.7%
MI	0.0%
	31-365 days, N=77
Ipsilateral Stroke	0.0%

\*Hierarchical – Includes only the most serious event for each patient

**ACT I**

**Low Risk Patients**