Conclusions From Completed Trials in High Risk Carotid Stenting

Jay S. Yadav MD

Chairman, CCF Innovations

Director, Vascular Intervention

The Cleveland Clinic Foundation

YADAV

Randomized Data

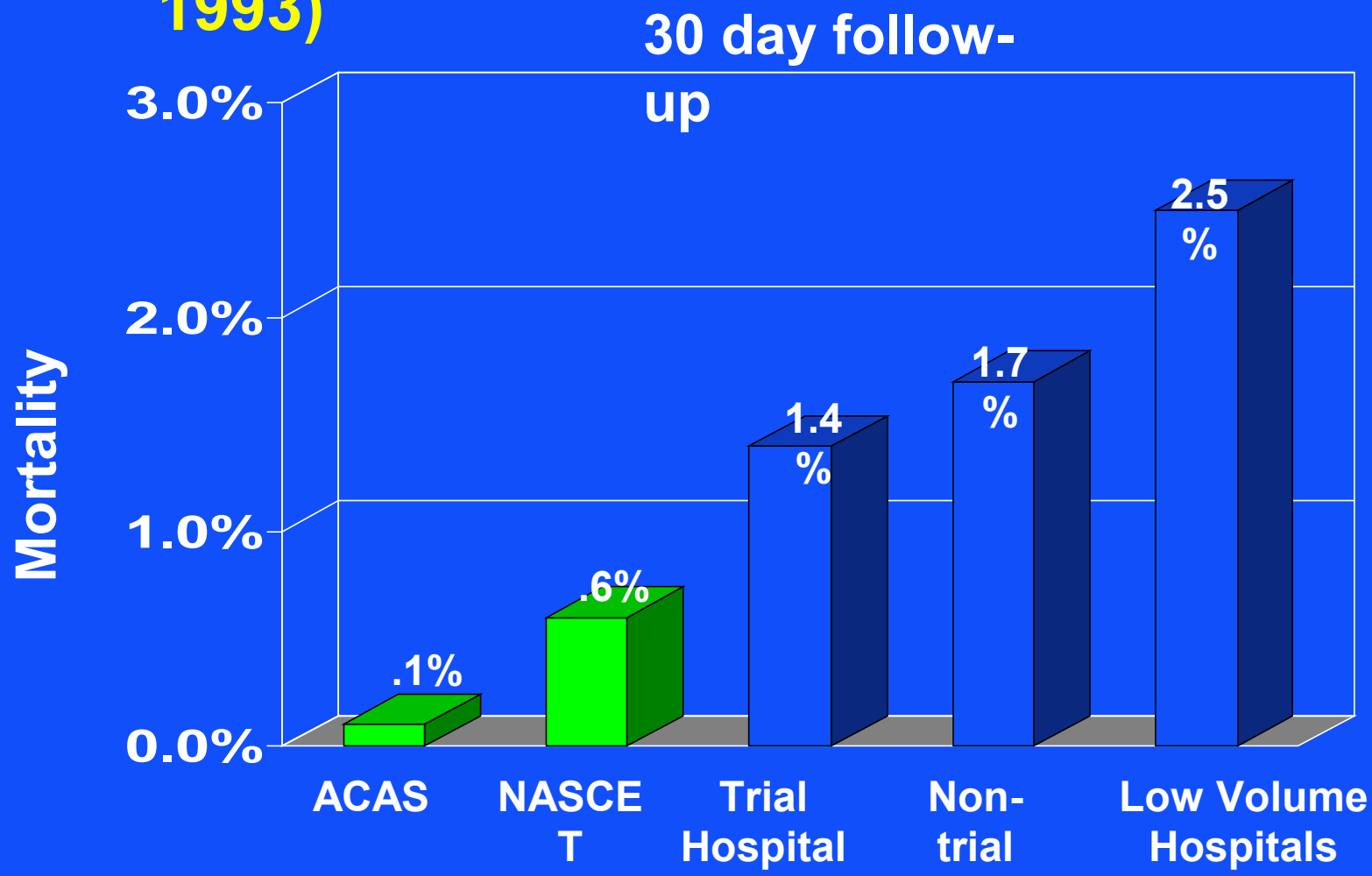
- Carotid Endarterectomy – 1954*
  - 40 years for proof of efficacy
    - 1991 NASCET/ECST
- Carotid Artery Stenting – 1994
  - 2001 CAVATAS (angioplasty)
  - 2002 SAPPHIRE
  - 2004 FDA Approval

*Eastcott HH et al. Lancet 1954;267:994-996

YADAV

CEA Mortality

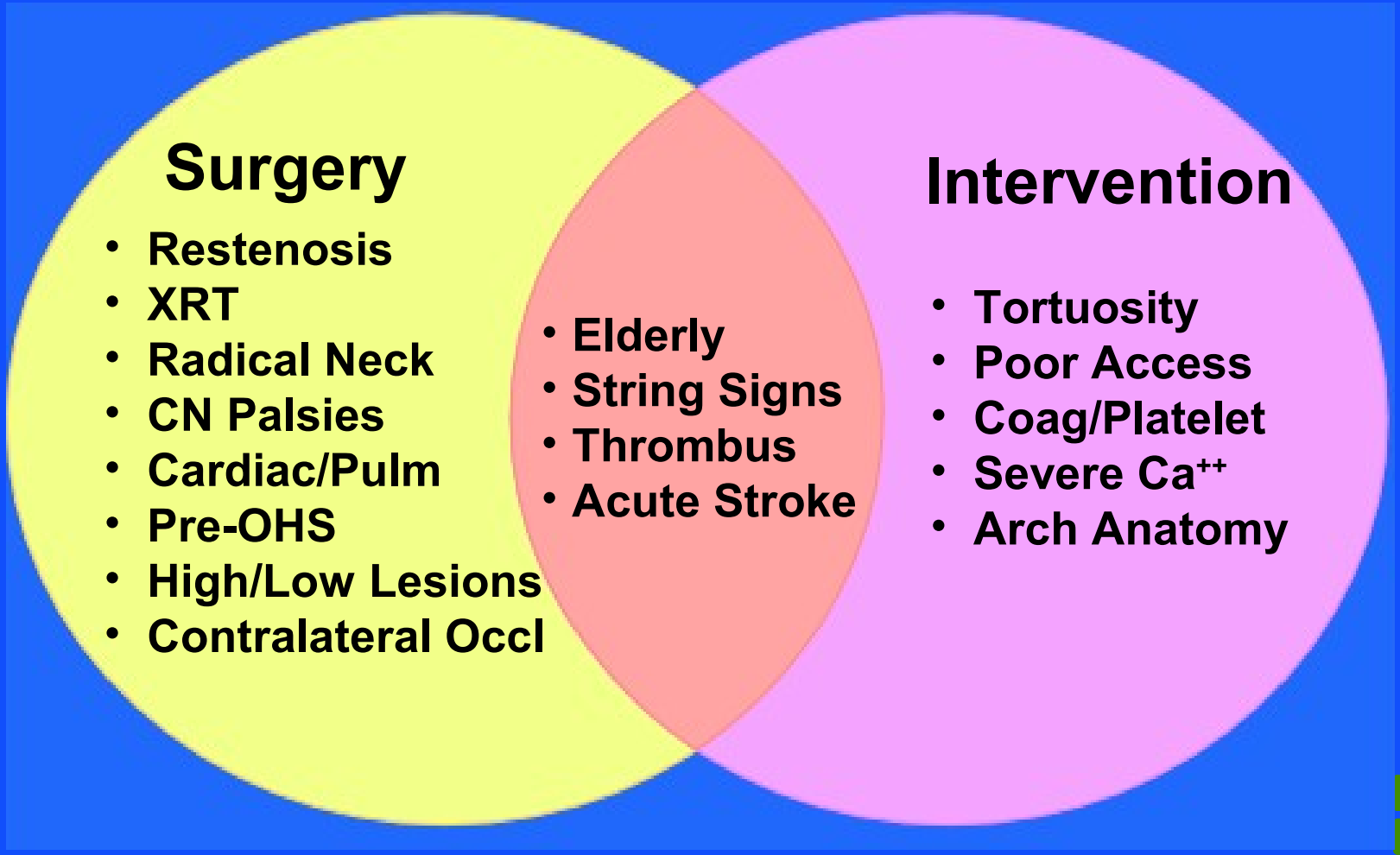
113,000 Medicare Patients (1992-1993)



WENNBERG, JAMA,1998:16:279:1278

YADAV

High Risk Features



YADAV

High-Risk Patient Trials:
Carotid Stenting with Emboli Protection

- Randomized against Surgery
  - SAPPHIRE
- Non-Randomized Registries
  - ARCHER
  - SHELTER / BEACH
  - MAVERICK
  - CABERNET
  - SECURITY

YADAV

US trials in carotid stenting with embolic protection

Name of filter	Manufacturer	Trial (n >3100)	Trial Status
Angioguard	Cordis Endovascular	SAPPHIRE	Completed
Accunet	Guidant	ARCHeR	Completed
Neuroshield	MedNova/Abbott	SECURITY	Completed
FilterWire	Boston Scientific/EPI	BEACH-Wallstent	Completed
FilterWire	Boston Scientific/EPI	CABERNET-Endotex NexStent	Completed
Interceptor	Medtronic	MAVeRIC	Ongoing
Spider	ev3	CREATE	Completed
Accunet	Guidant	CREST	Ongoing
Rubicon	Rubicon	RULE-Carotid	Planned

High-Risk Patient Trials: Data to be Presented at TCT

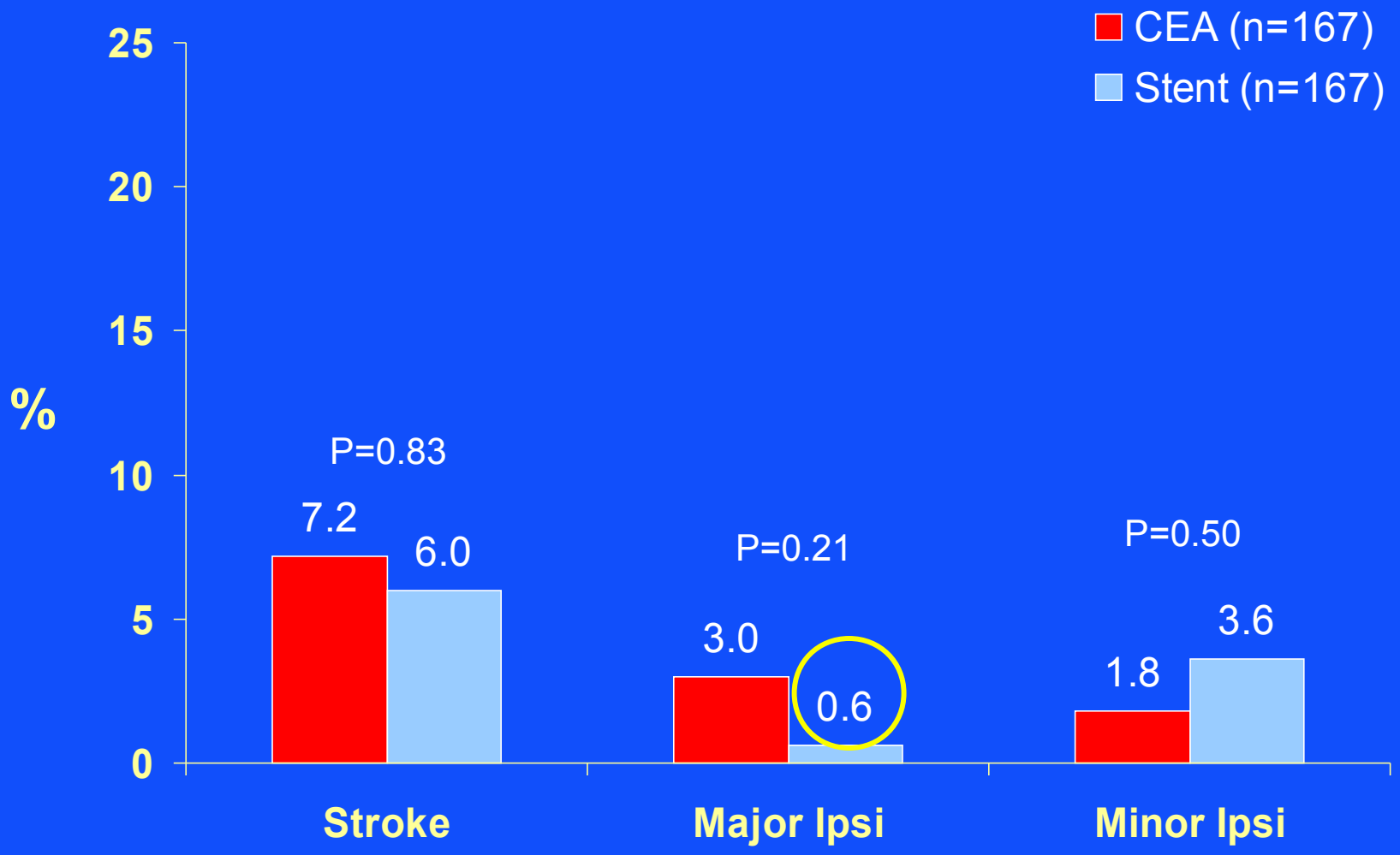
- **CAPTURE:**
  Guidant PMS Study
  Largest, prospective study to date

- **SAPPHIRE**
  3 Year Follow-up

YADAV

SAPPHIRE STUDY: Stroke at 360 Days

Yadav, NEJM,2004

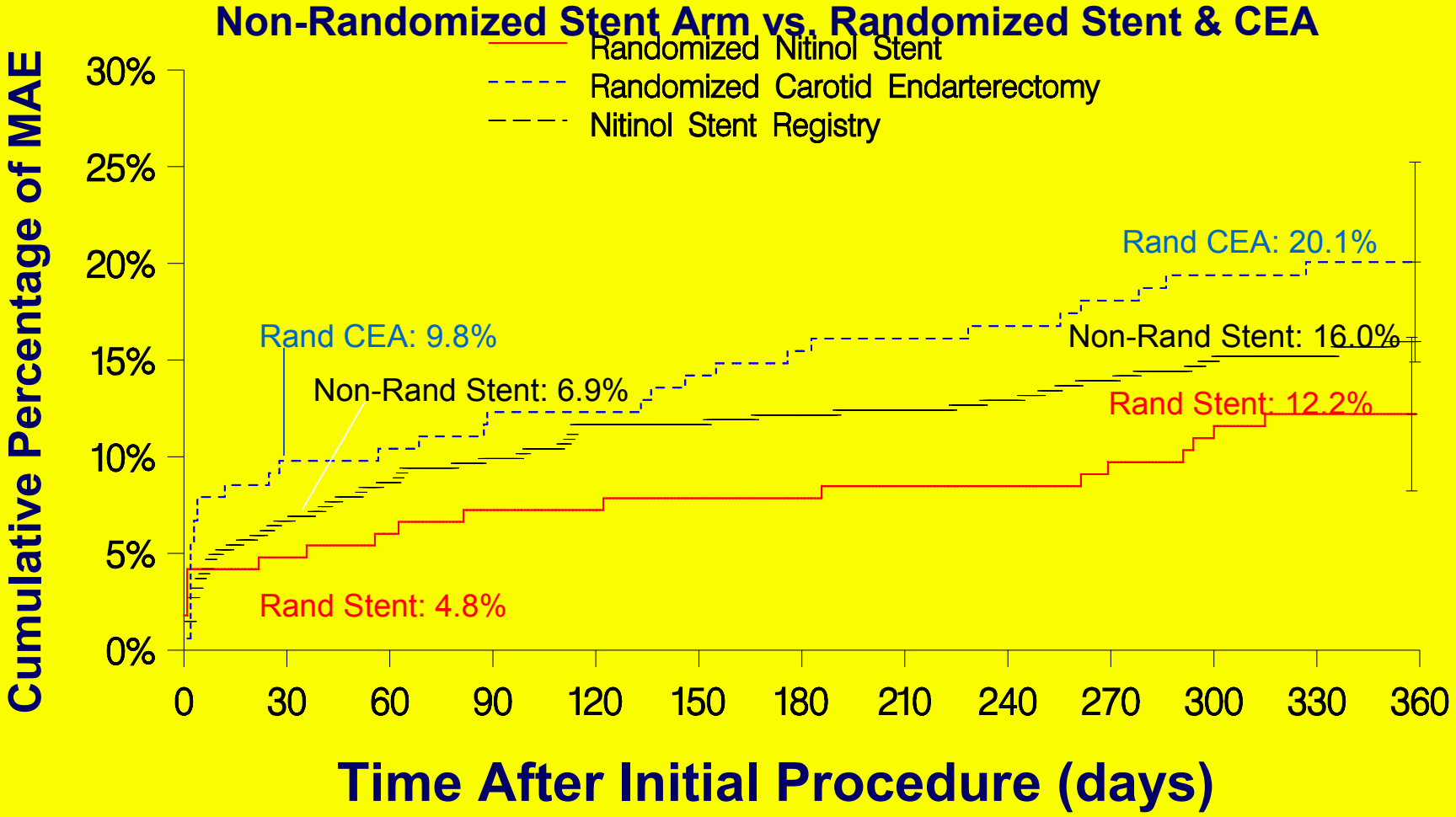


Note: 2/3 of all minor strokes resolved within one year.

YADAV

SAPPHIRE STUDY

MAE at 360 Days



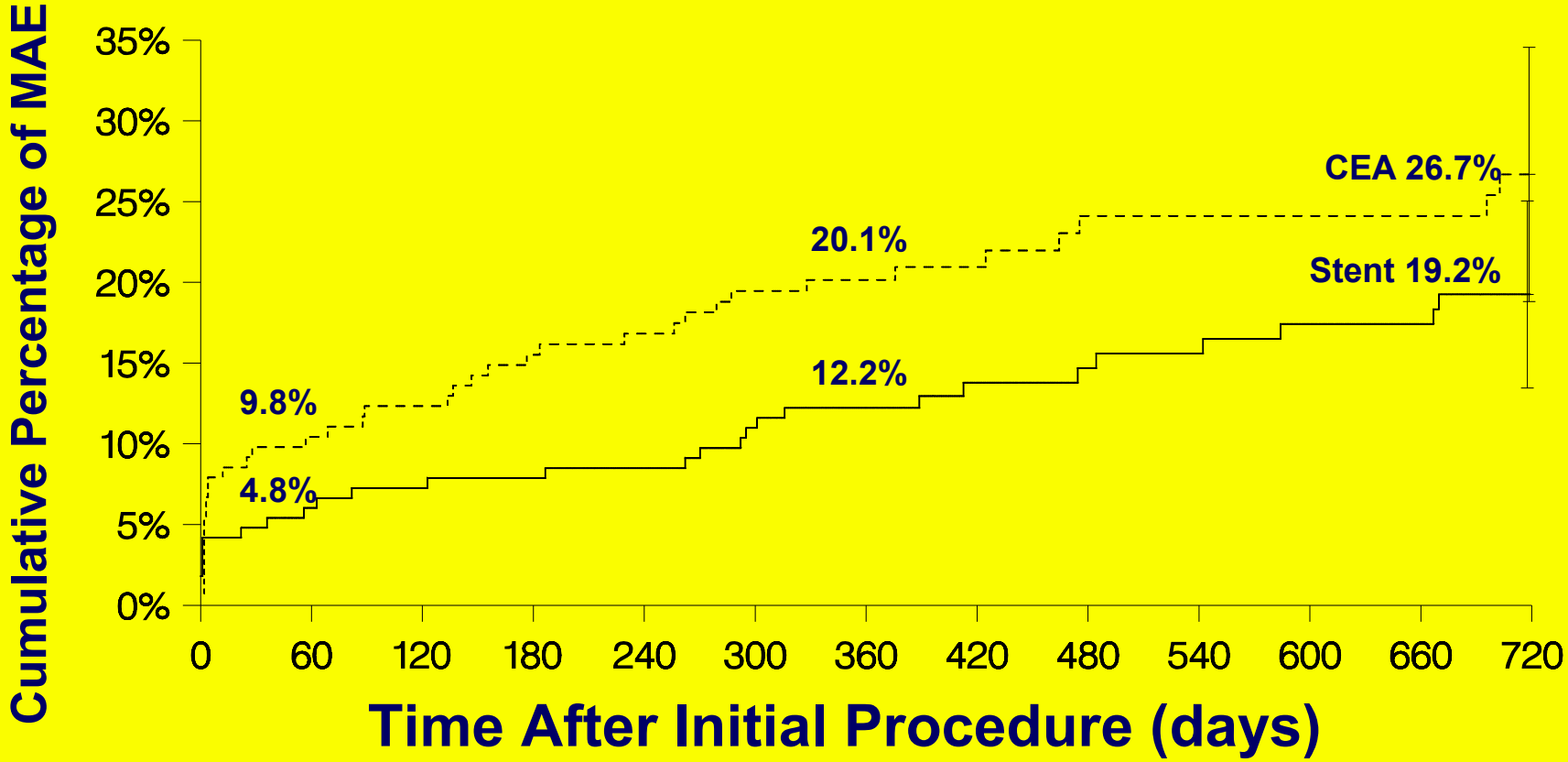
Yadav, NEJM,2004

YADAV

SAPPHIRE STUDY

Cumulative % of MAE to 720 Days
Randomized Patients – Kaplan Meier Analysis

Yadav, NEJM,2004



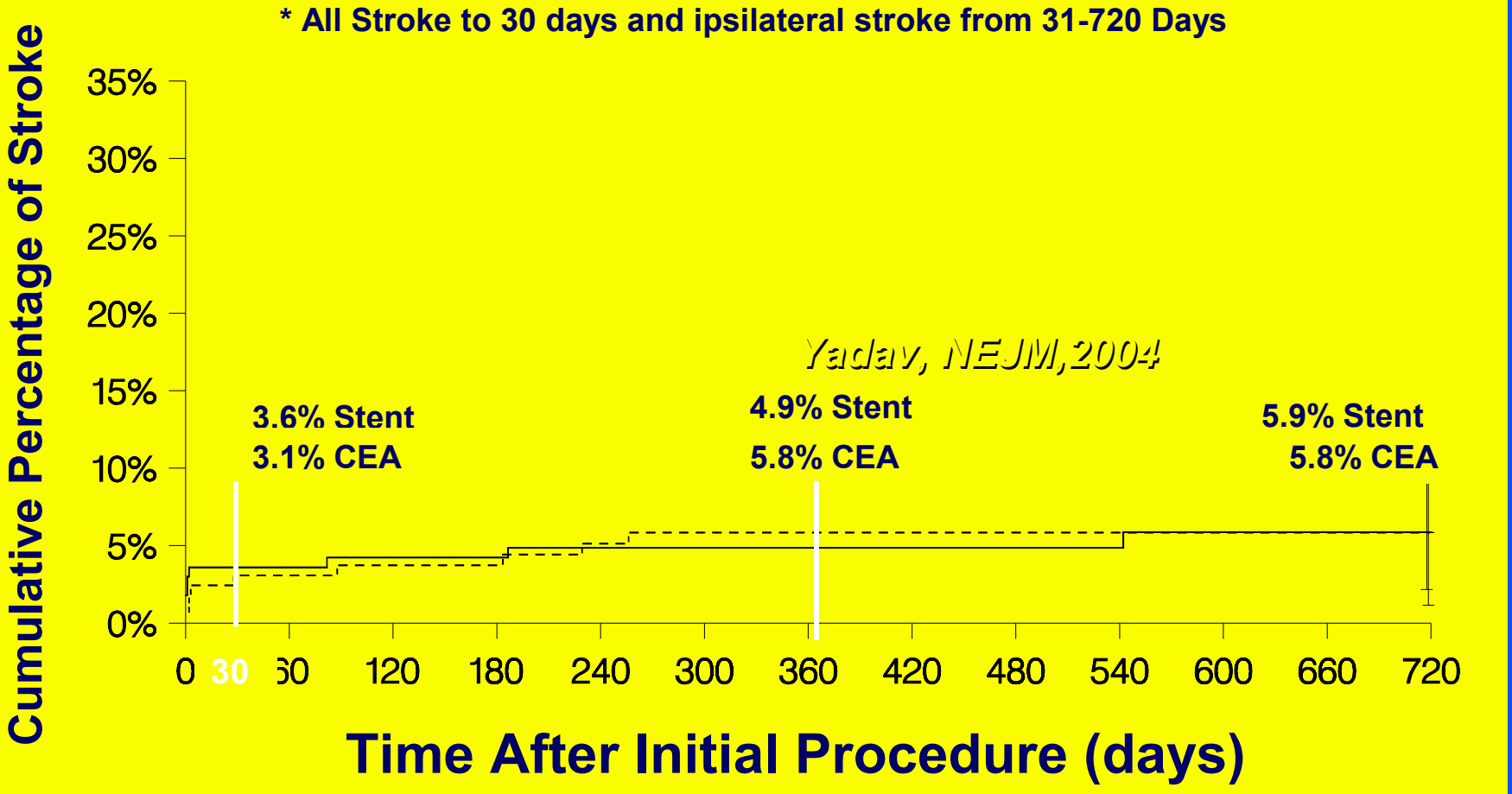
Days:	30	360	720
N at Risk (CEA):	161	125	59
N at Risk (Stent):	163	147	88

YADAV

SAPPHIRE STUDY

Cumulative % of Stroke to 720 Days*
Randomized Patients - Kaplan Meier Analysis

Yadav, NEJM,2004



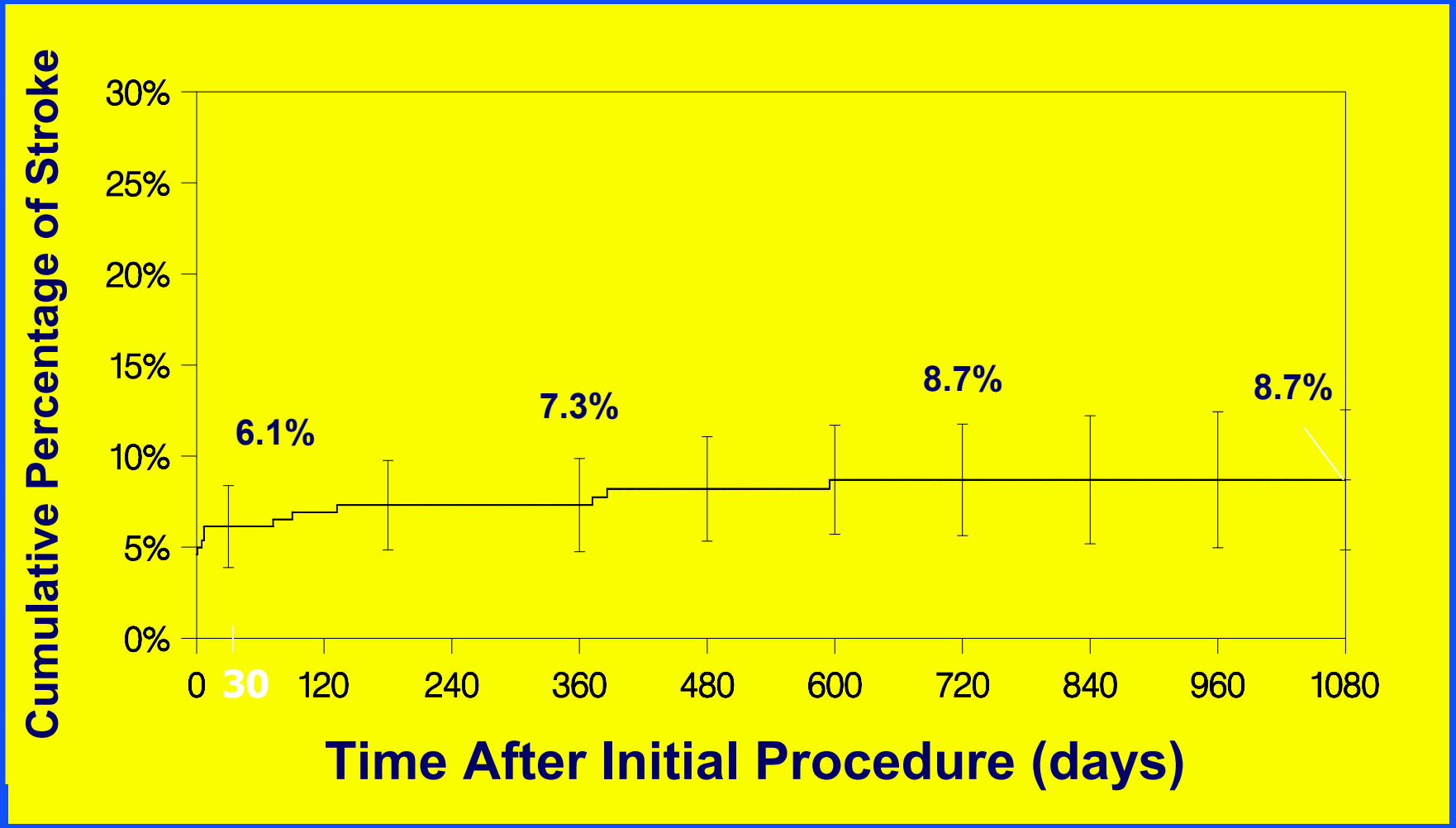
Days:	30	360	720
N at Risk (CEA):	159	130	59
N at Risk (Stent):	162	145	88

YADAV

US FEASIBILITY STUDY

Cumulative Percentage of All Stroke to 30 Days and Ipsilateral Stroke from 31-1080 Days

Yadav, NEJM,2004



Days:	30	360	720	1080
N at Risk:	247	218	176	113

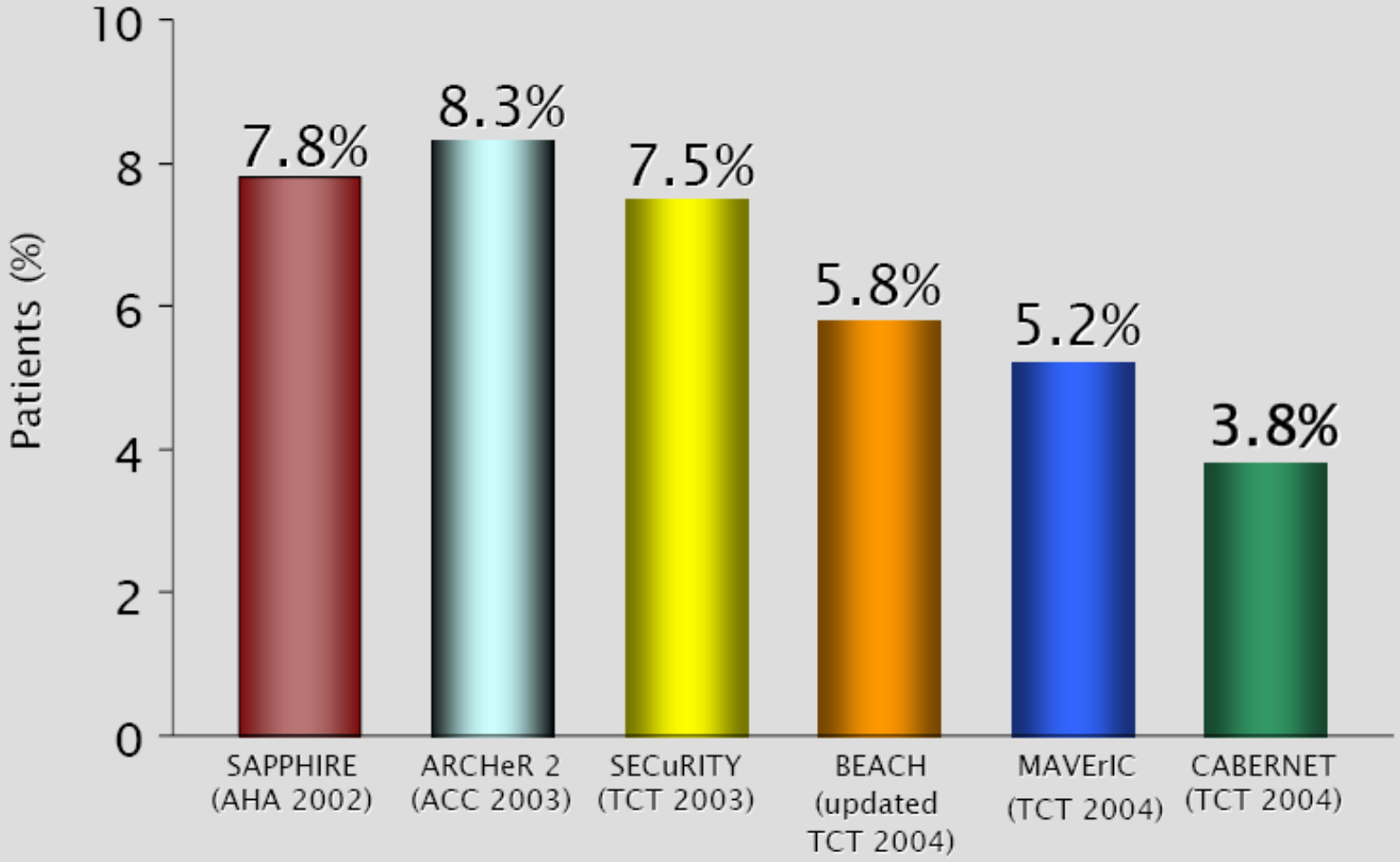
YADAV

High-Risk Patient Trials:
Carotid Stenting with Emboli Protection

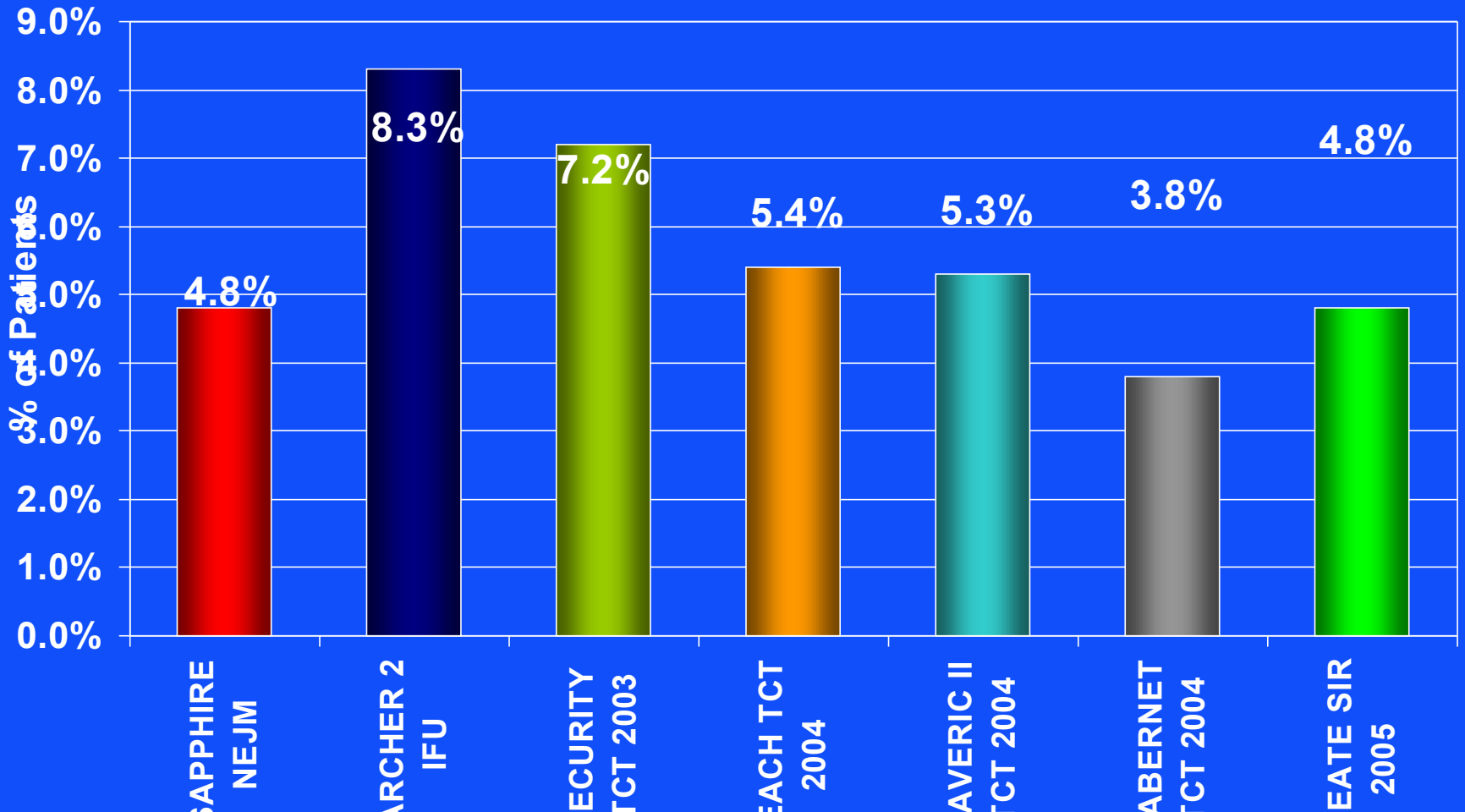
- Difficult to Compare Even 30 Day Results
  - Varying Definitions / Methodologies
  - Inclusion of Device Failures
  - All Stroke Vs Ipsilateral Stroke Vs Procedure Related Stroke
- At 1 year, many do not count death or count only neurological death
- Not Published (except SAPPHIRE)

YADAV

30-Day Composite Endpoint in U.S. Carotid Stenting Registries 2002-2004

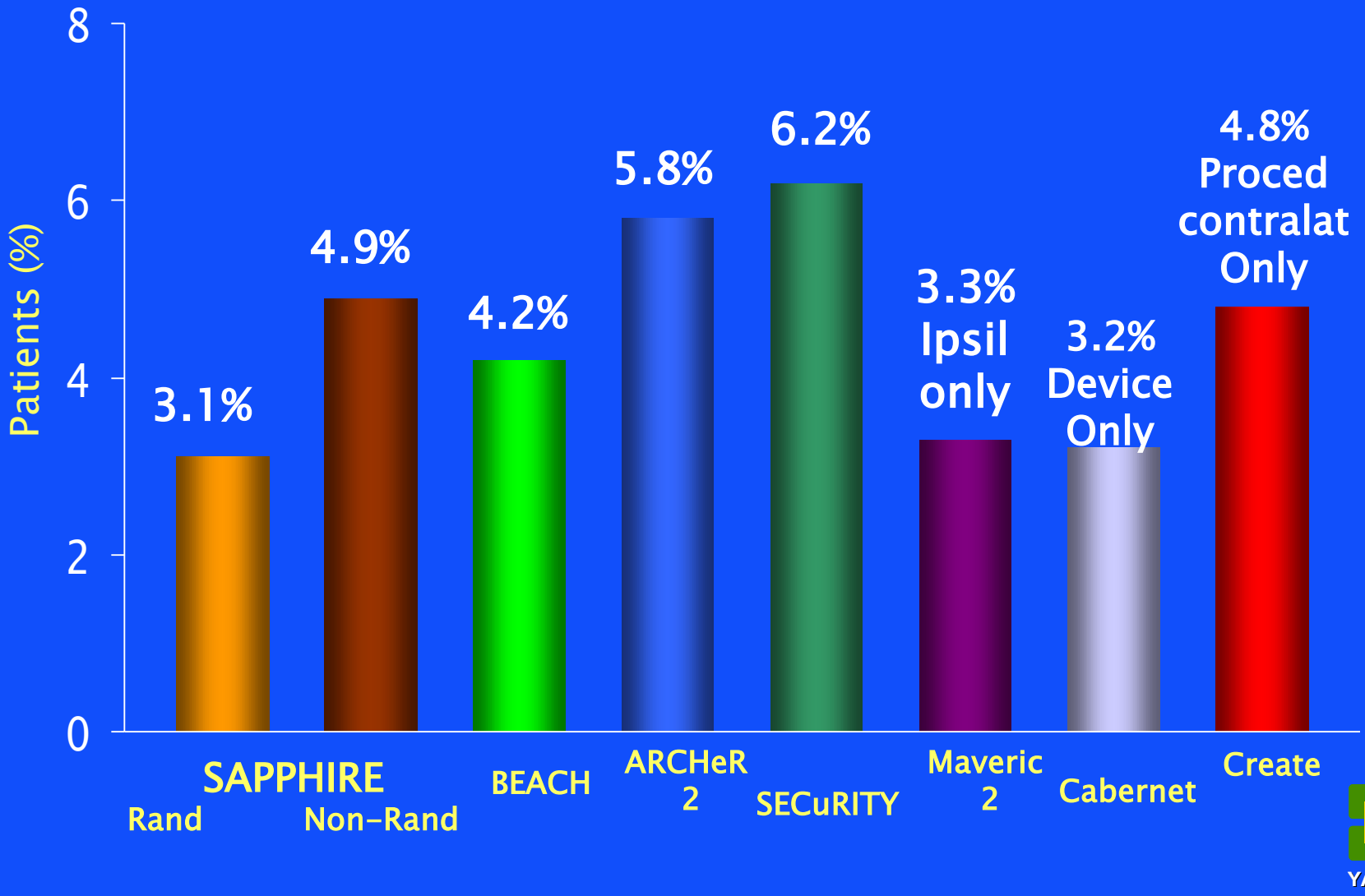


30 Day MAE-Composite Endpoint in High Risk Carotid Stenting Trials



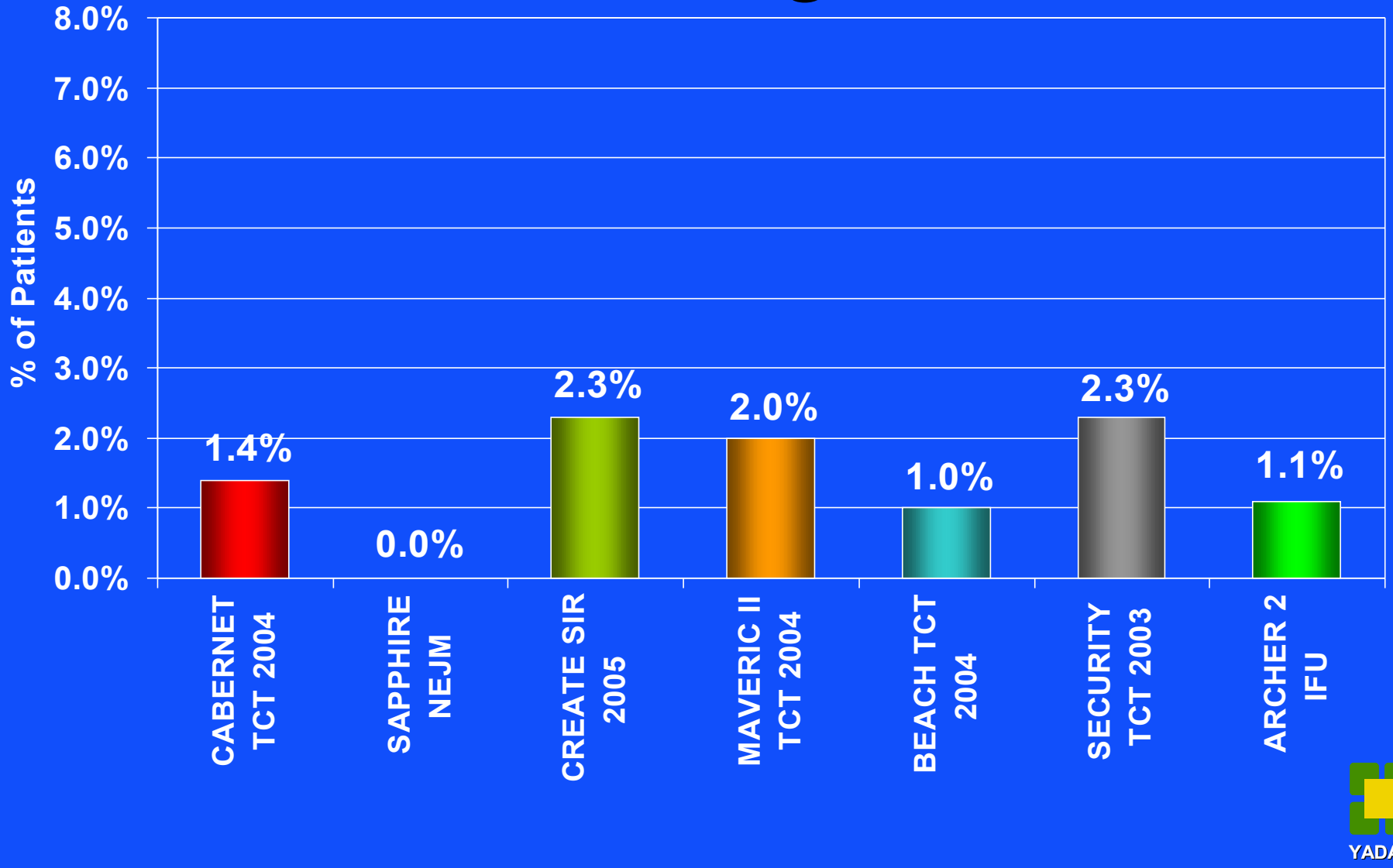
YADAV

30-Day Risk of Stroke in High Risk Carotid Stenting Trials



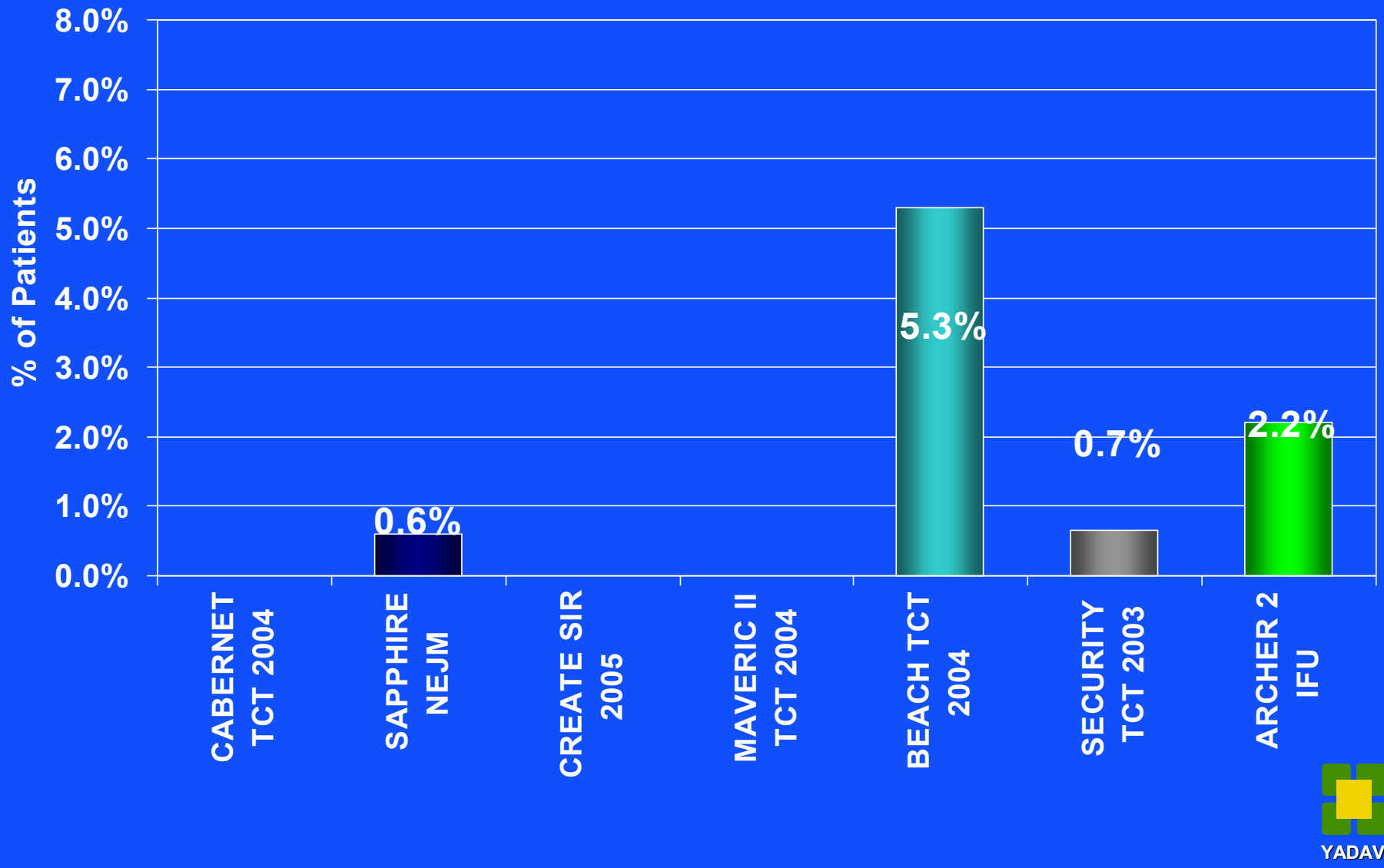
YADAV

30 Day Risk of Major Stroke in High Risk Carotid Stenting Trials



YADAV

1 year clinically driven TLR in High Risk Carotid Stenting Trials



YADAV

Carotid stenting with cerebral protection:
Pooled analysis of perioperative outcomes
Yadav, Balzer, Beyssen, Cleveland, Cremonesi, Daoud

- 32 studies of CEA, Stenting
- 30 Day Stroke/Death and Stroke/MI/Death

Cea	3369 pts
PCAS	1222 pts
UPCAS	1638 pts

YADAV

Carotid stenting with cerebral protection:
Pooled analysis of 30 Day perioperative outcomes
Yadav, Balzer, Beyssen, Cleveland, Cremonesi, Daoud

TX	# Pts	Sx Pts (%)	S/D (%)	S/D/MI(%)
CEA	3,369	1,253 (62.8)	87 (2.6)	64 (2.8)
PCAS	1,222	656 (46.3)	33 (2.7)	25 (2.6)
UPCAS	1,638	723 (55.9)	88 (5.4)	77 (6.1)
ALL	6,229	2,636 (57.7)	208 (3.3)	166 (3.7)

YADAV

Carotid stenting with cerebral protection:
Pooled analysis of 30 Day perioperative outcomes
Yadav, Balzer, Beyssen, Cleveland, Cremonesi, Daoud

Treatments	Symptomatic patients [95% CI]	30-day stroke-death [95% CI]	30-day stroke-MI-death [95% CI]
Endarterectomy	62.78% [61.15% ; 64.41%]	2.58% [2.05% ; 3.12%]	2.81% [2.25% ; 3.37%]
Protected stenting	46.32% [43.52% ; 49.11%]	2.70% [1.79% ; 3.61%]	2.64% [1.74% ; 3.54%]
Unprotected stenting	55.86% [53.46% ; 58.27%]	5.37% [4.28% ; 6.46%]	6.11% [4.95% ; 7.27%]
Protected stenting versus Endarterectomy		p-value >.82	p-value >.78
Protected stenting versus Unprotected stenting		p-value <.00045	p-value <.00012

YADAV

Conclusions

- One randomized study and many registries completed
- SAPPHIRE: superiority of protected stenting
- Paucity of publications
- Variable endpoints / definitions
- No evidence of definite improvement in results
- Meta-analysis indicates need for protection and equivalent results to CEA

YADAV