Global Perspective in Embolic Protection and Stroke Prevention in TAVR

Mitigating Stroke Risk in TAVR: Role of SENTINEL Embolic Protection

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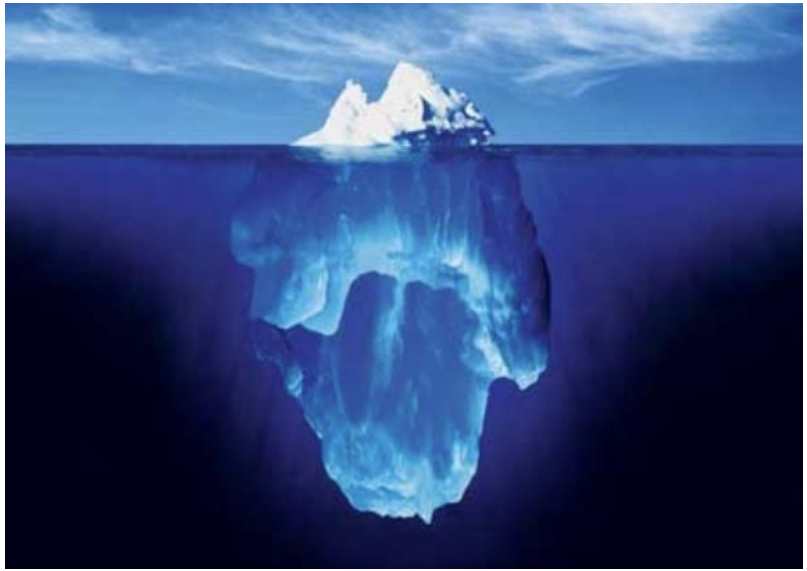
TCT® TRANSCATHETER CARDIOVASCULAR THERAPEUTICS®

Disclosure of Relevant Financial Relationships

I, Alexandra Lansky have the following potential financial relationships to disclose: Emboline, IVS, Encompass, Fliterlex, Abbott Vascular, Boston Scientific

Stroke and Brain Injury after TAVR



Stroke: 2-4%

- Death
- Disability
- Depression

Brain Injury:>90%

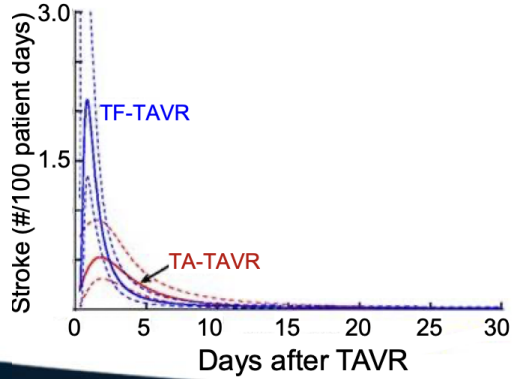
- cognition
- Dementia
- Depression

Why is Cerebral Protection Needed in TAVR?

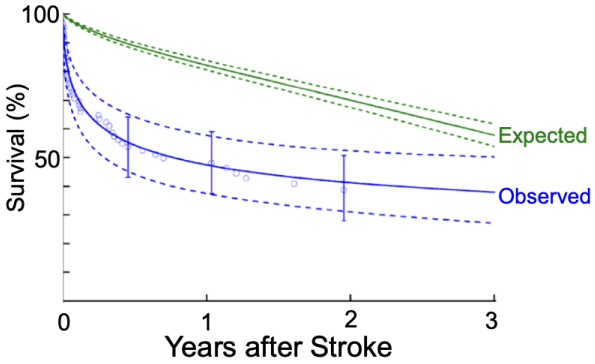
The risk of stroke during TAVR is primarily procedural
And is associated with high morbidity and mortality

PARTNER Trial [1]
(N=2,621)

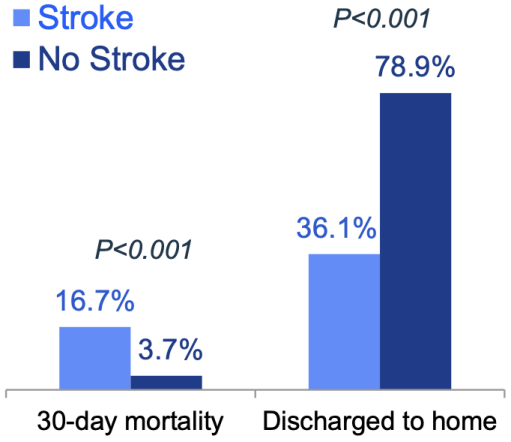
Stroke after TAVR



Survival after TF-TAVR in patients with stroke

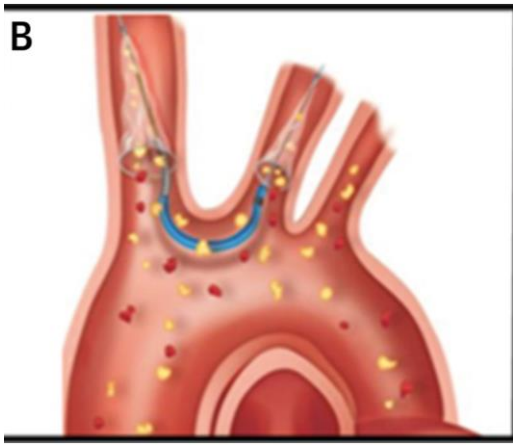


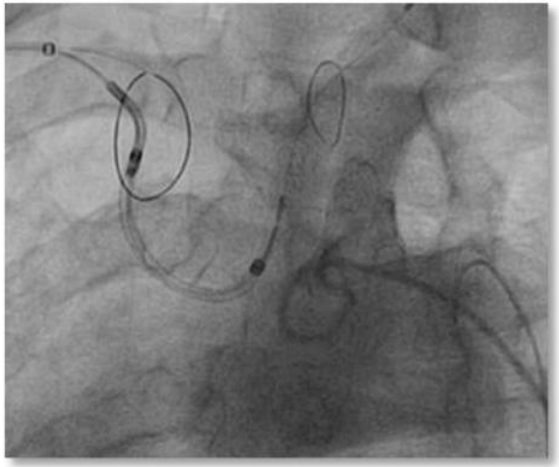
STS/ACC TVT Registry[2]
(N=101,430)



Kapadia SK et al Circ CI 2016; Huded CP et al JAMA 2019

SENTINEL™ Cerebral Protection System
The only Approved CEP device





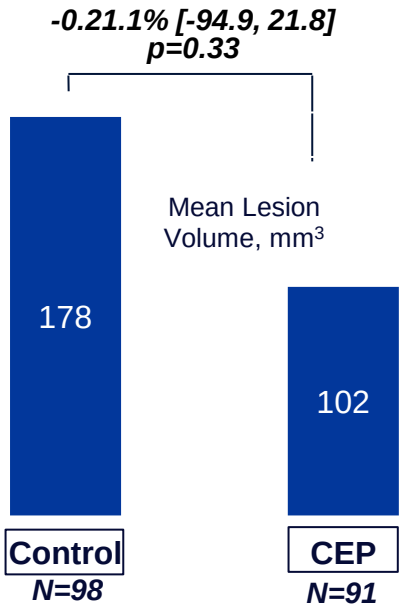
Indication for Use: FDA cleared, and CE Marked

The SENTINEL™ Cerebral Protection System is indicated for use as an embolic protection device to capture and remove thrombus/debris while performing TAVR (transcatheter aortic valve replacement) procedures.

Sentinel Studied in ≅ 11,000 patients in 3 RCTs

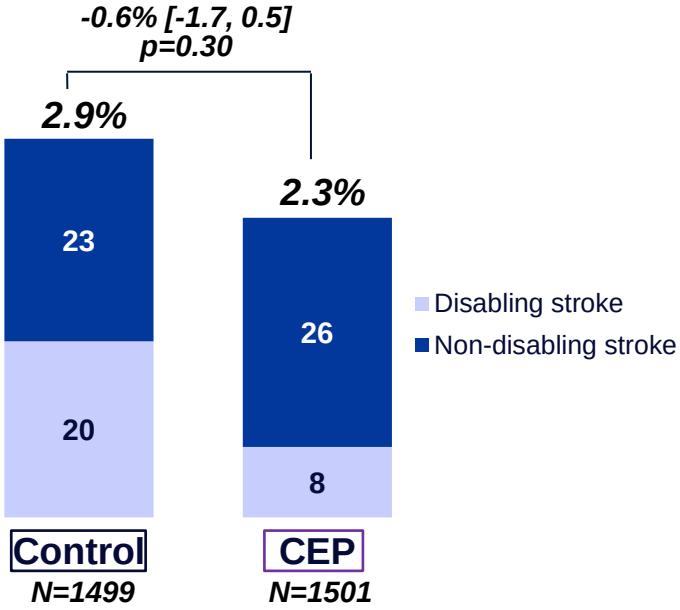
SENTINEL IDE

Kapadia, et al. JACC. 2017;69(4):367-377.



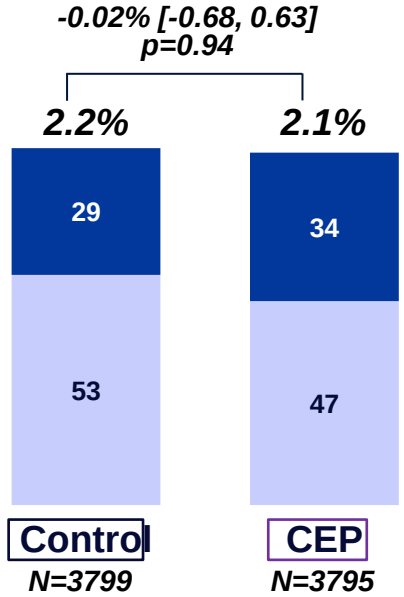
PROTECTED TAVR

Kapadia, et al. N Engl J Med. 2022;387(14):1253-1263.



BHF PROTECT-TAVI

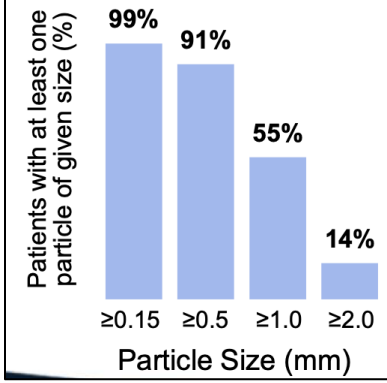
Kharbanda, et al. N Engl J Med. 2025.



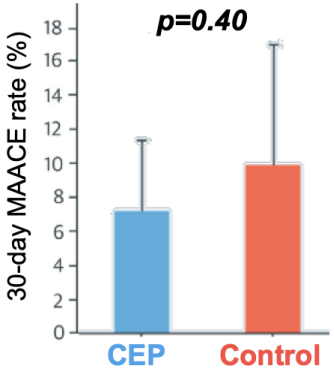
SENTINEL IDE Trial

N=345; 2:1 RCT of TAVR with or with no CEP

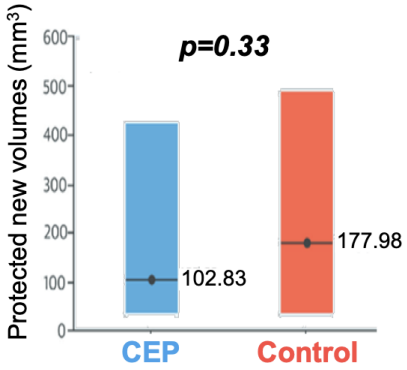
Debris capture 99%



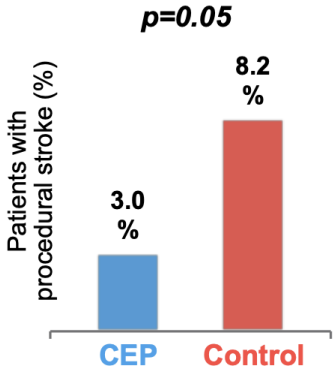
Sentinel is Safe



Less brain injury



Less stroke @ 72 hrs



Kapadia SK et al. JACC 2017

PROTECTED TAVR: Stroke at 72 hours

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Cerebral Embolic Protection during Transcatheter Aortic-Valve Replacement

Samir R. Kapadia, M.D., Raj Makkar, M.D., Martin Leon, M.D., Mohamed Abdel-Wahab, M.D., Thomas Waggoner, D.O., Steffen Massberg, M.D., Wolfgang Rottbauer, M.D., Ph.D., Samuel Horr, M.D., Lars Sondergaard, M.D., Juhana Karha, M.D., Robert Gooley, M.B., B.S., Ph.D., Lowell Satler, M.D.,

Patients undergoing commercial TF TAVR*, N=3000
*Patients of all risk categories eligible

↓

Neurological‡ exam in all patients pre-procedure

↓

1:1

TAVR without CEP N=1500

TAVR with Sentinel N=1500

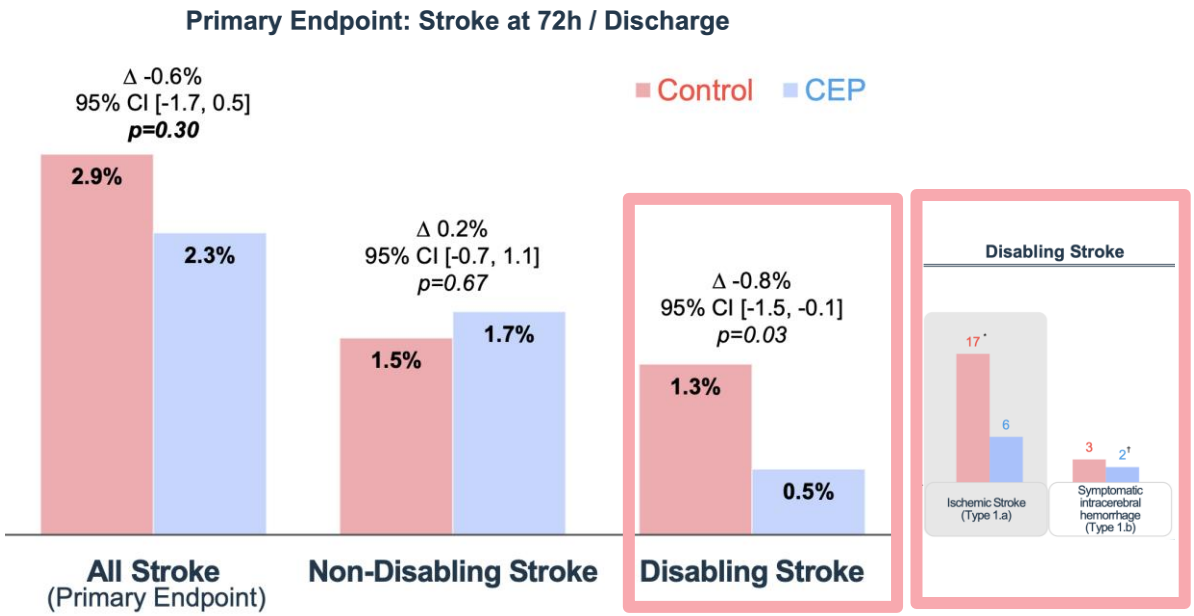
↓

Neurological‡ exam in all patients post-procedure

↓

Primary endpoint: Stroke at 72h or Discharge
Adaptive study design with interim analysis at 70% enrollment

*Any commercially available TAVR device; ‡ Neurological examination at baseline, and post-procedure and through 72 hours after TAVR or discharge (whichever comes first), performed by a neurology professional (board certified/board eligible neurologist, neurology fellow, neurology physician assistant, or neurology nurse practitioner)

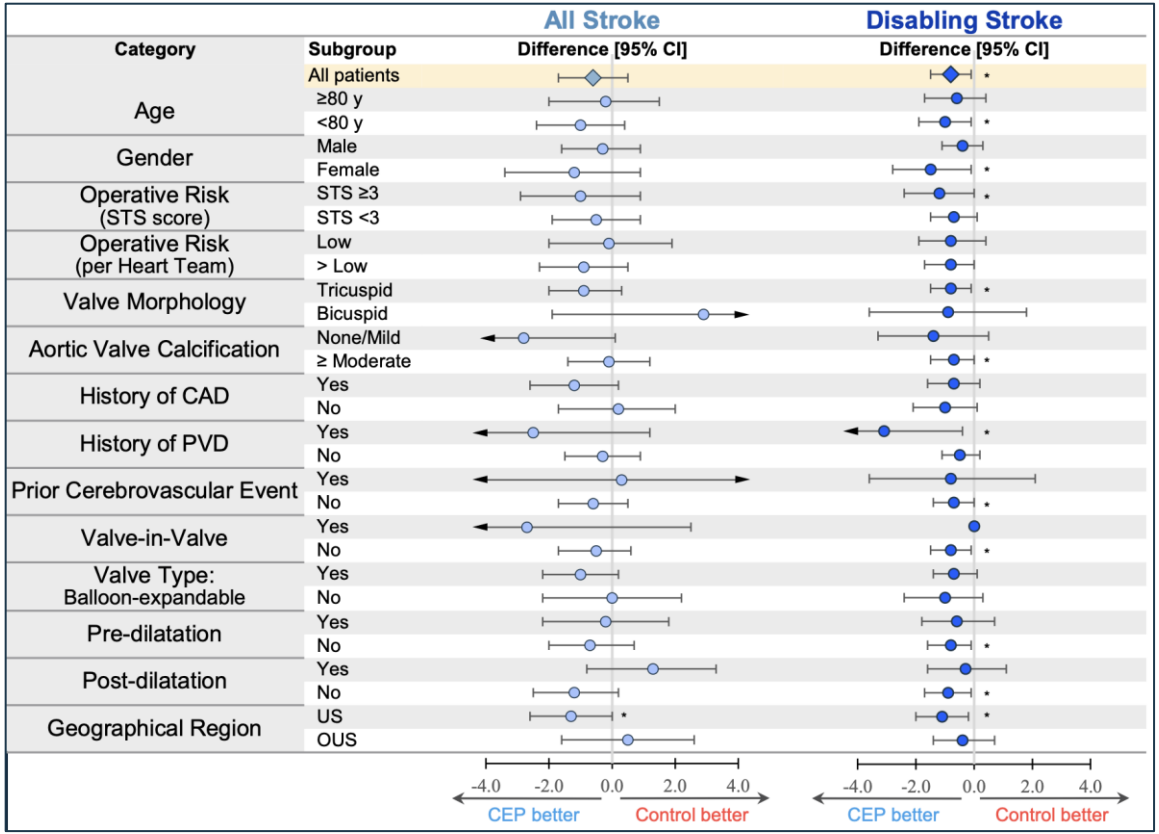


Sentinel CEP delivery was successful in 94%

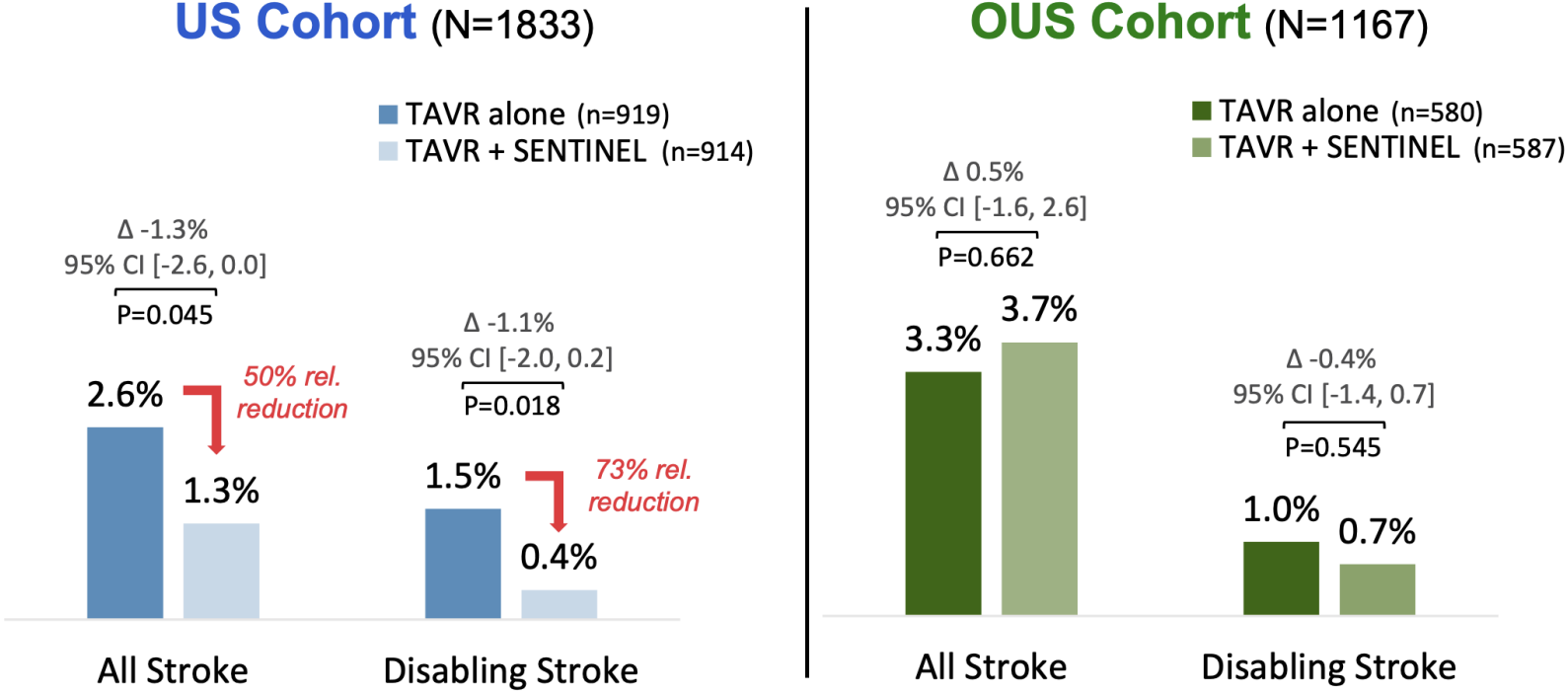
Kapadia et al. NEJM 2022

PROTECTED TAVR:
Subgroup Analysis

- Consistent reduction in disabling stroke across all subgroups



Stroke Outcomes by Geographic Region



Kapadia et al. NEJM 2022

BHF PROTECT-TAVI

The British Heart Foundation (BHF) PROTECT-TAVI Trial

Routine Cerebral Embolic Protection during Transcatheter Aortic-Valve Implantation

7,730 patients undergoing TAVI

Prospective, Multicenter, Investigator initiated study

Blinded adjudication of outcomes

Inclusion: Suitable for SENTINEL CEP in opinion of treating physician

1:1 Randomized

TAVI without CEP (control group) n=3,820

Excluded n=21

Control group n=3,799

TAVI with CEP (CEP group) n=3,815

Excluded n=20

CEP group n=3,795

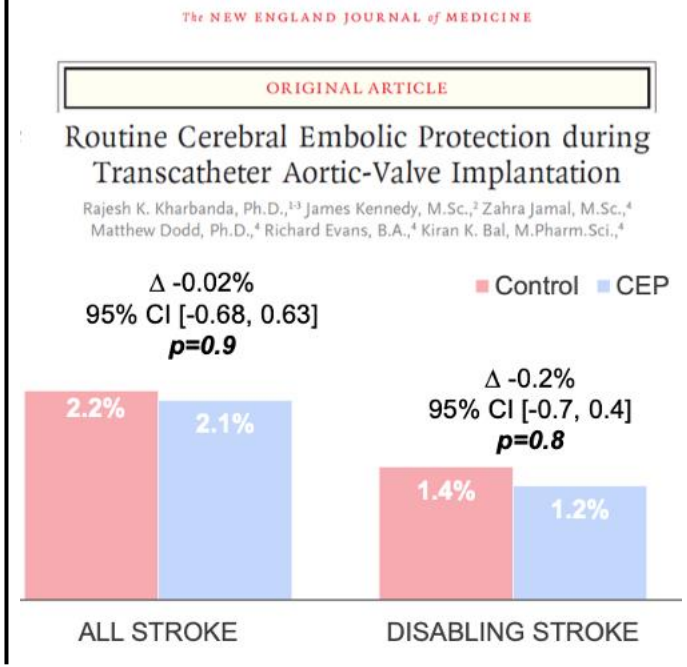
32 /33 UK NHS TAVI centers

~30% of TAVR cases enrolled

Primary outcome: Stroke at 72 hours post-TAVI (or discharge if sooner)

Stroke Definition:
- Neurological deficit that occurred after randomization
- Persisted for >24h (or resulted in death within 24 hours)
- Ischemic and haemorrhagic events

Standardized daily screening post-TAVR
- Further assessment by the local stroke team (if needed)



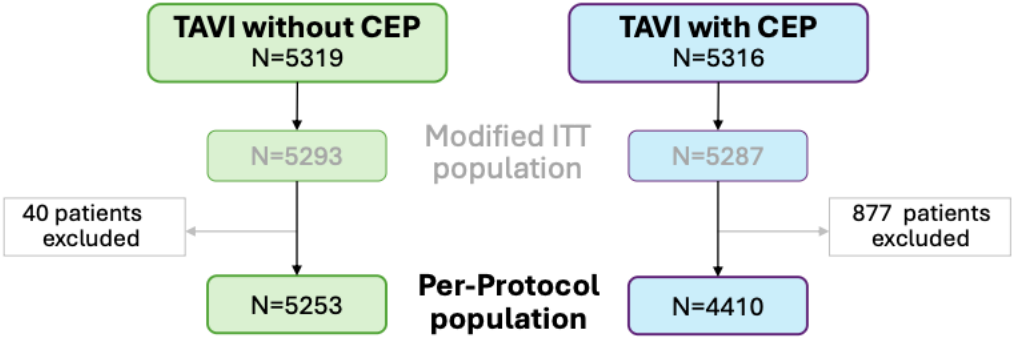
Sentinel CEP delivery was successful in 81%

Kharabanda et al. NEJM 2024

Prospective individual patient data (IPD) meta-analysis

Secondary Analyses

Is CEP effective when we account for non-adherence?



Primary analysis: Difference in incidence of stroke (72h post-TAVI or hospital discharge) between interventional (CEP) and control (no CEP) arms of the trials

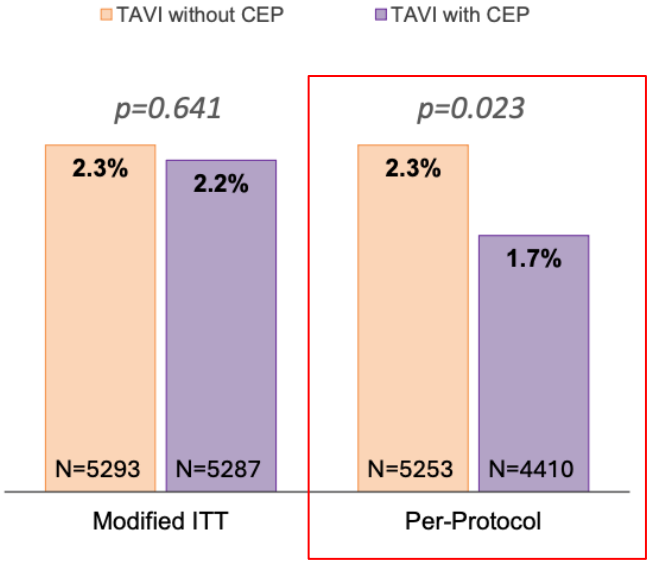
Meta-analysis plan registered prior to data unmasking: PROSPERO 2022 CRD42022324160

Primary mITT and Secondary Per-Protocol Analyses

Among randomized patients with successful CEP placement (81%)

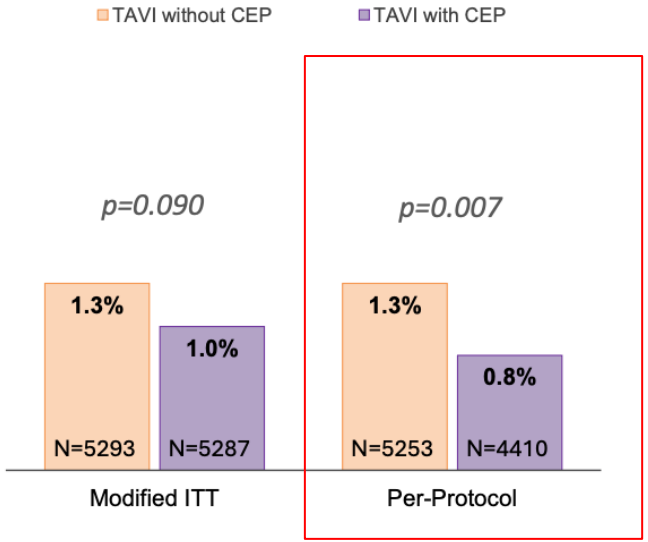
All Stroke

PP - 26% reduction



Disabling Stroke

PP - 38% reduction



SENTINEL™ is the Most Studied Cerebral Embolic Protection Device for TAVR

Study	Location	# Patients	Trial Type	Procedure	Data
First in Man	3 centers in Brazil & Germany	40	Registry	TAVR (CoreValve & Sapien)	EuroIntervention 2012
MISTRAL-I	Rotterdam, Netherlands	40	Registry	TAVR (CoreValve & Sapien)	Circulation 2013
CLEAN-TAVI	Leipzig University, Germany	100	Randomized	TAVR (CoreValve)	JAMA 2016
MISTRAL-C	4 centers in Netherlands	74	Randomized	TAVR (Sapien 3)	Eurointervention 2016
SENTINEL™-H	10 centers in Europe	220	Registry	TAVR (All-comers)	Presented at EuroPCR 2016
SENTINEL™ IDE	17 centers in USA & 2 in Germany	363	Randomized	TAVR (Sapien XT and 3, CoreValve, EvolutR)	JACC 2017
SENTINEL™-Ulm	University of Ulm, Germany	802	Registry Propensity-Score Matched	TAVR (All-comers)	JACC: CVInt 2017
SENTINEL-LIR	USA	50	Prospective	TAVR (all-comers, low- and intermediate-risk patients)	Circ: CVInt 2022
PROTECTED TAVR	USA, Europe, Australia	3000	Randomized	TAVR (All-comers)	NEJM 2022
TVT registry – disabling stroke	USA	414,649	Registry (STS/ACC TVT)	TAVR (All-comers)	Circulation Interventions 2024
SENTINEL™ in Valve-in-Valve	USA	19,090	Registry (Nationwide Readmissions Database)	ViV-TAVR (failed bioprosthesis)	JACC: Cardiovascular Interventions. 2024
NRD registry - RWE	USA	271,804	Registry (Nationwide Readmissions Database)	TAVR (All-comers)	JAHA 2024
BHF PROTECT-TAVI	UK	7635	Randomized	TAVR (All-comers)	NEJM 2025

Thank You