STROKE

SOLACI

OCTOBER 30, 2014 - CALI

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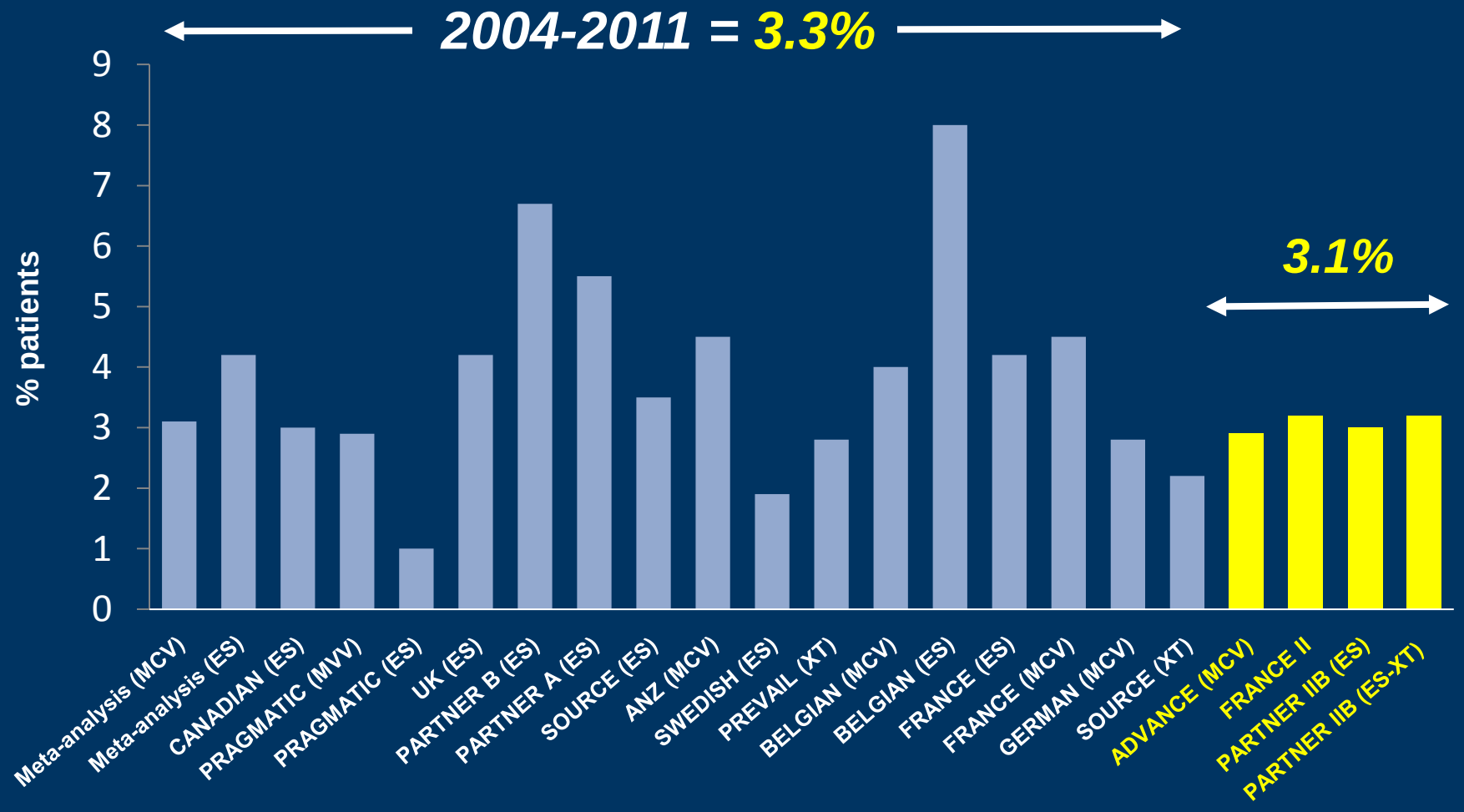
Overview

1. *Frequency?*

2. *Mechanisms?*

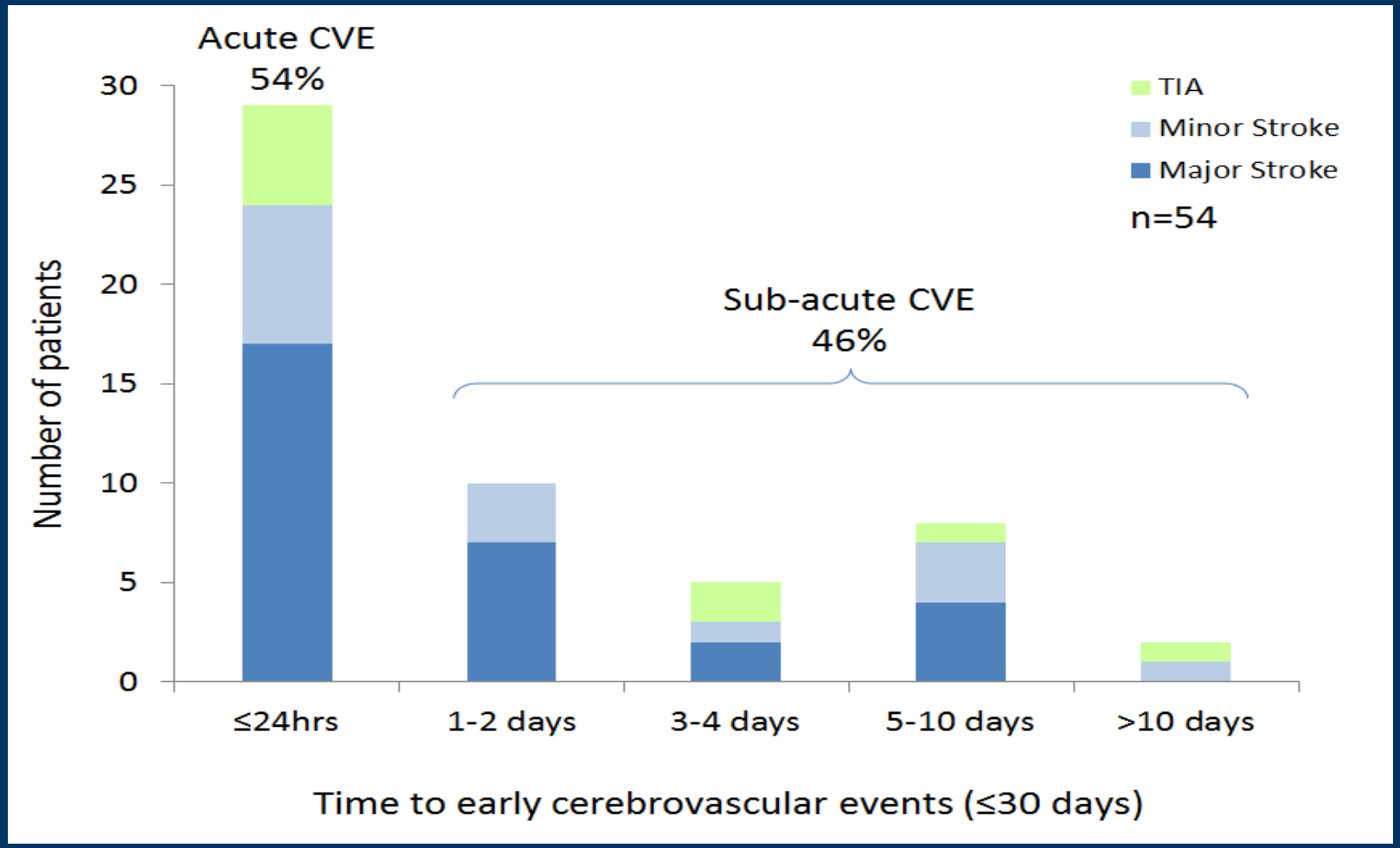
3. *Can Embolic Protection Devices Help?*

Stroke Frequency *(30 days)*



Fanning *et al.* Circulation 2014

Timing of stroke (54 / 1016 pts)



Nombela-Franco *et al.* Circulation 2012

Timing of stroke (3.191 pts)

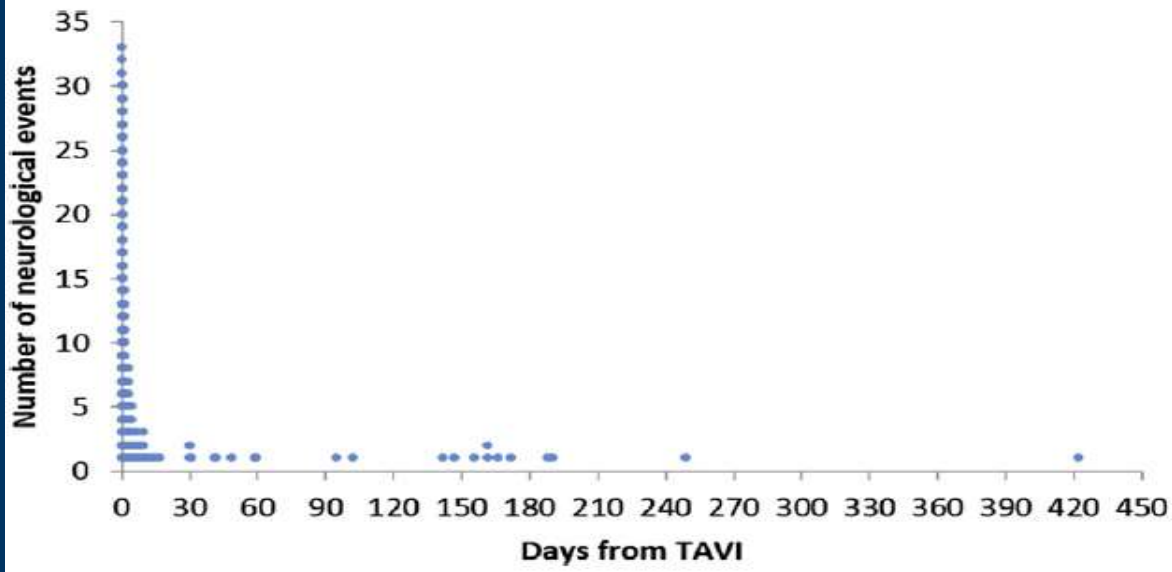


TABLE 2 Timing of the Occurrence of CVEs (Number of Days From the Index Procedure)

Time From Date of Valve Placement (in Calendar Days)	No.	Mean	SD	Median	Range
Overall	131	22.9	59.5	2	0–422
Major stroke	72	21.3	52.8	1	0–249
Minor stroke	19	28.2	96.3	2	0–422
Transient ischemic attack	40	23.1	48.8	2	0–188

3.98% Stroke

50% Acute Stroke

Majority of <u>major</u> strokes present acutely

Tchetche *et al.* JACC Intv 2014

Reporting Stroke

Circulation
JOURNAL OF THE AMERICAN HEART ASSOCIATION

American Heart Association®

Stroke After Aortic Valve Surgery: Results From a Prospective Cohort

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Circulation. 2014;129:2253-2261; originally published online April 1, 2014;

- **Stroke rate after surgical AVR assessed by <u>NEUROLOGISTS</u> and <u>DW MRI</u>**

- **Clinical strokes in-hospital: 17%**
- **Moderate / severe: 4%**

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- **Stroke rate after surgical AVR assessed by <u>NEUROLOGISTS</u> and <u>DW MRI</u>**

- **Clinical strokes in-hospital: 17% (in national registry: 7%)**
- **Moderate / severe: 4%**

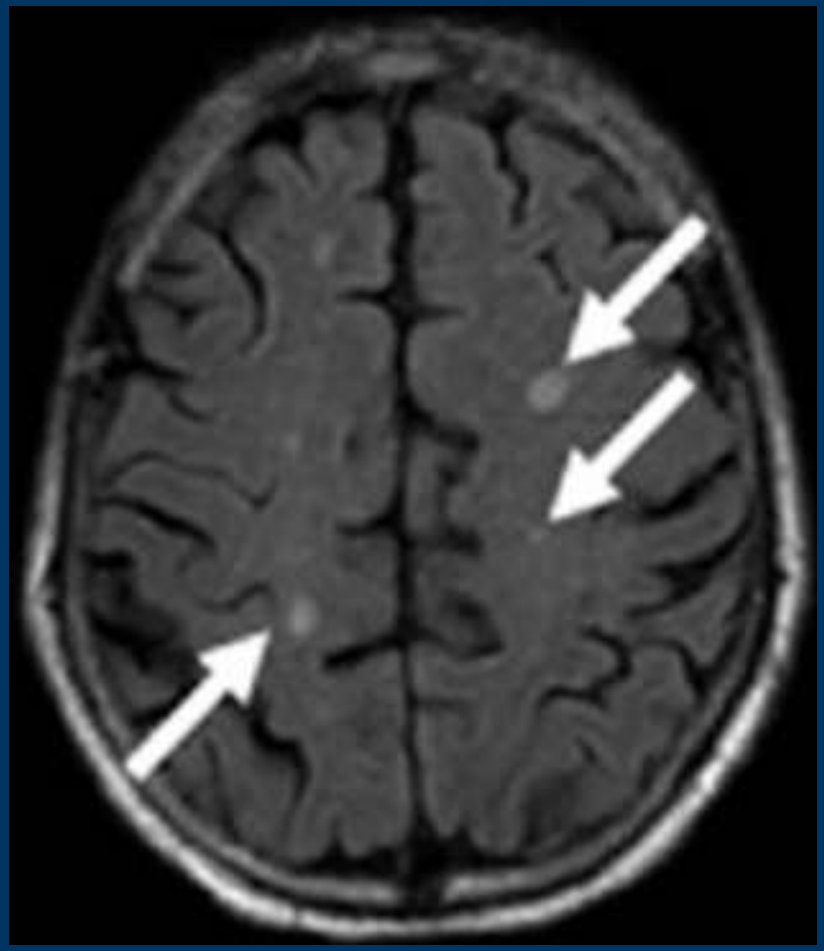
Stroke Frequency?

1. *Clinically apparent stroke is reported in 3%*

2. *The true stroke frequency is likely higher*

3. *Major strokes typically occur early after TAVI*

Acute *(<24 hrs)* – ***EMBOLIC***

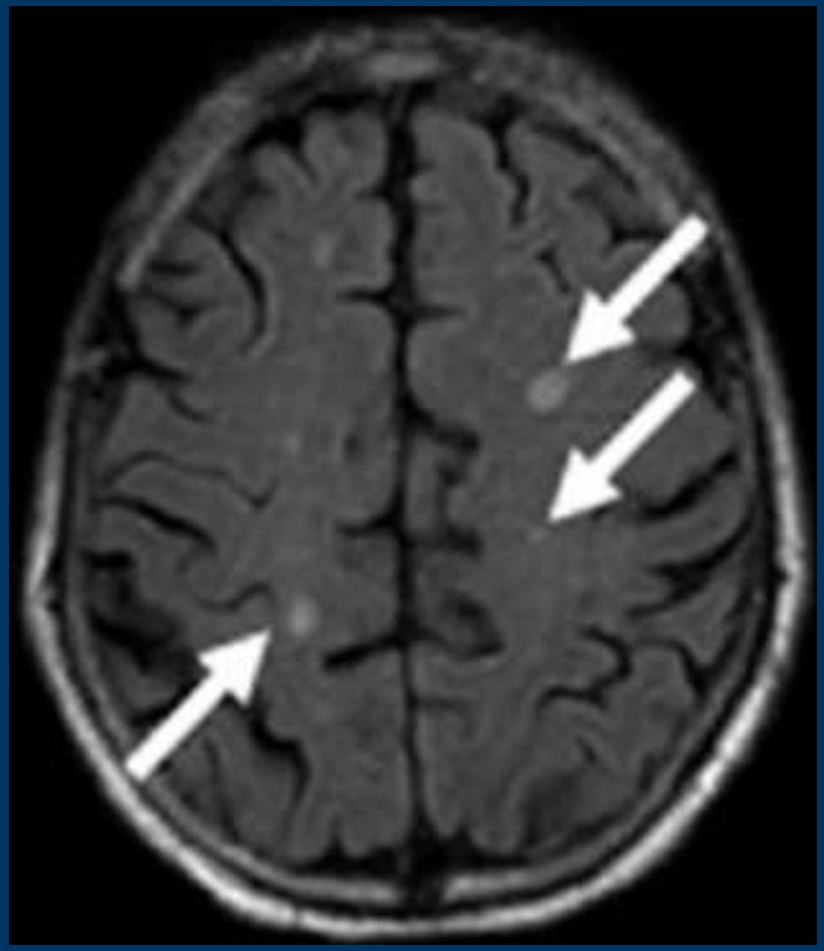


DW-MRI studies *

"…new micro-infarcts detected in 73-95% of pts…."

*** Kahlert 2010, Ghanem 2011, Astarci 2011, Stolz 2004, Rodes-Cabau 2011**

Acute *(<24 hrs)* – ***EMBOLIC***



DW-MRI studies *

"…new micro-infarcts detected in 73-95% of pts…."

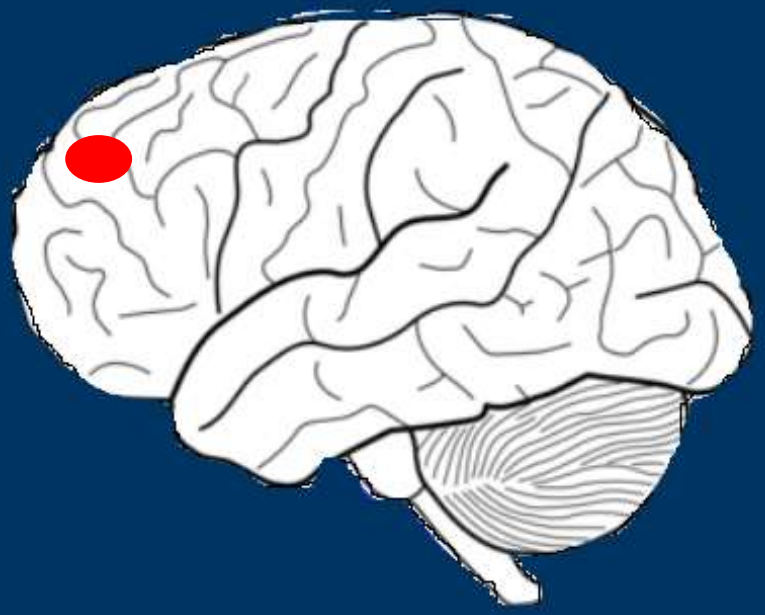
Nombela-Franco. 2012

"… predictors of acute stroke were balloon post-dilation and valve dislodgement.."

*** Kahlert 2010, Ghanem 2011, Astarci 2011, Stolz 2004, Rodes-Cabau 2011**

Acute *(<24 hrs)* – ***NON-EMBOLIC***

Regional Oxygen Saturation in frontal lobes is reduced during:

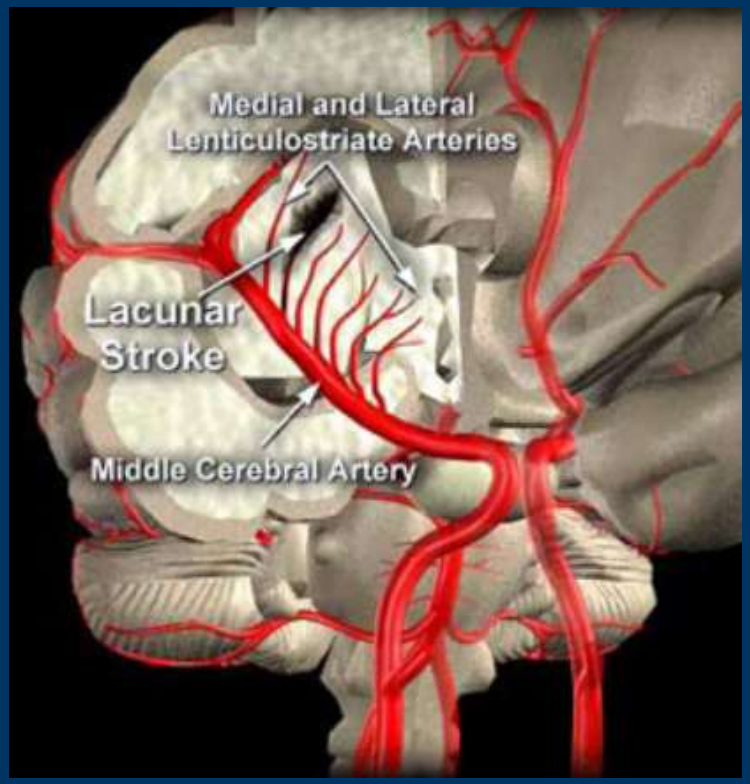


(i) Predilation : - 6 %

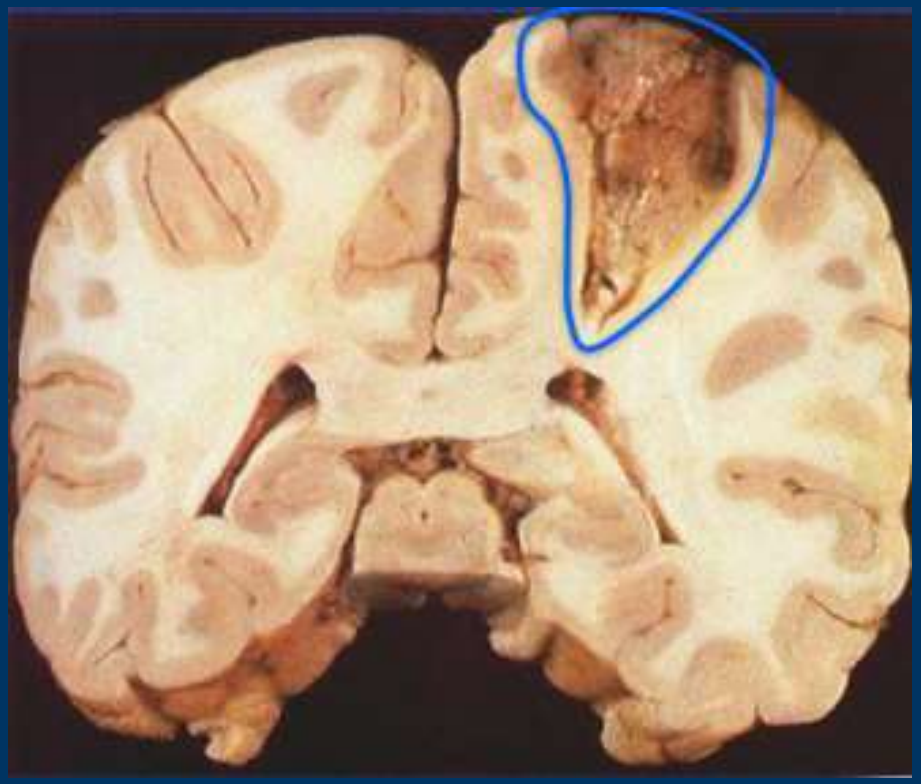
(ii) Valve deployment : - 3.5 %

Bila *et al.* Innovations Technol Techniques Cardiothorac Vasc Surg. 2012

Acute *(<24 hrs)* – ***NON-EMBOLIC***



Lacunar infarct (26%)



Watershed infarct (10%)

Nuis RJ *et al.* Am J Cardiol 2011

Sub-Acute *(1 > days < 30)*

New-onset atrial fibrillation (NOAF)

Study	Frequency	Timing (days)	Stroke >24 hr OR (95% CI)
Amat-Santos *et al.*	32%	2	3.9 (0.9-17.1)
Nombela-Franco *et al.*	18%	3	2.7 (1.1-6.3)
Nuis *et al.*	16%	3.5	4.4 (1.2-15.6)

Sub-Acute *(1 > days < 30)*

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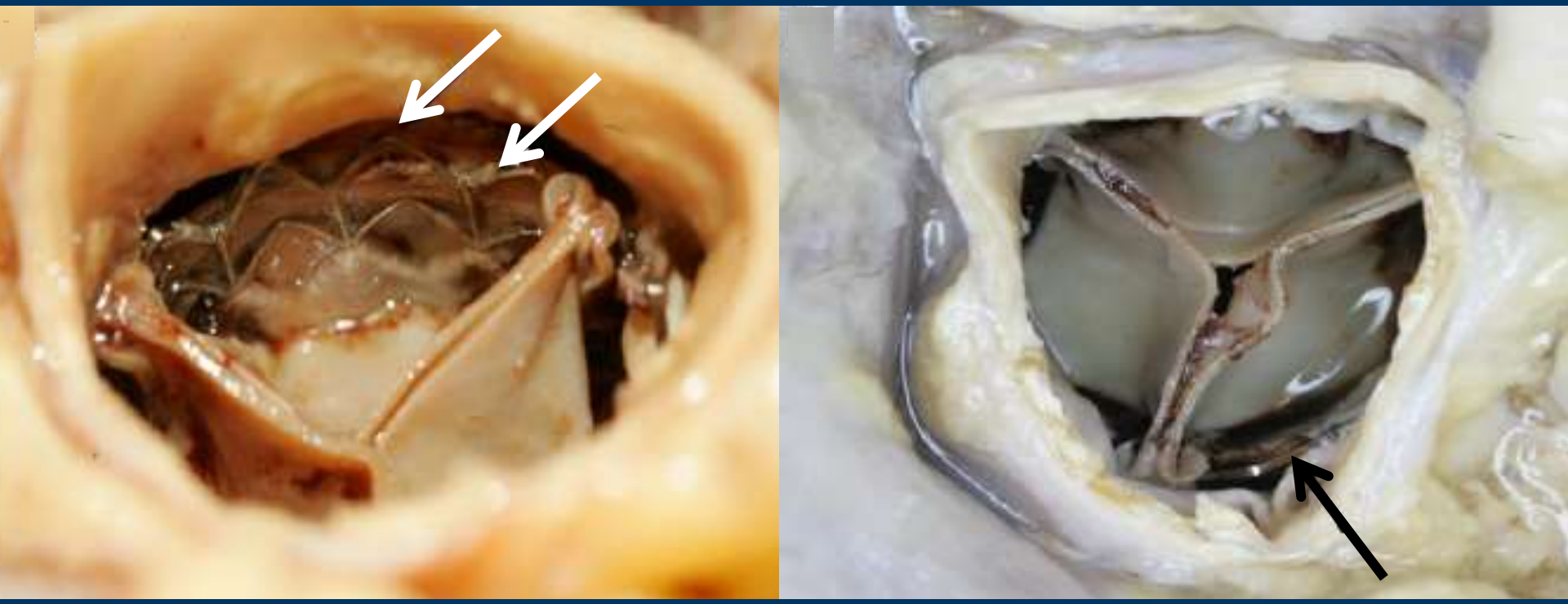
Rotterdam Cohort: in pts with NOAF but without anticoagulation, 40% developed sub-acute stroke



Incomplete endothelialization of prosthesis

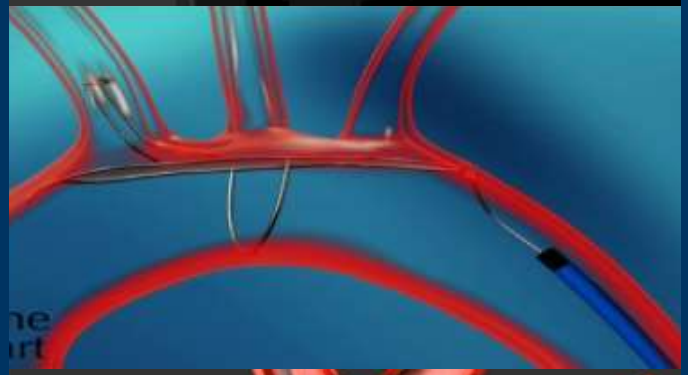
Tay *et al.* JACC Cardiovasc Intv. 2011

Can Embolic Protection Devices be helpful ?

Embolic Protection Devices

Embrella ™

Antebrachial



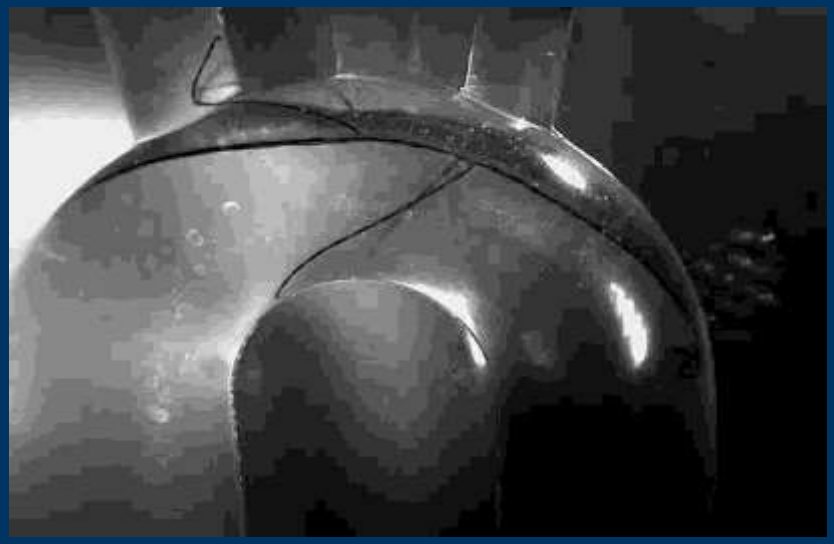
Triguard ™

Transfemoral

Claret ™

Antebrachial

EMBRELLA (PROTAVI-C trial, n=40)



Results:

- All pts had new lesions
- More lesions in Embrella group
- Smaller volume lesions

Vahanian et al. Presented at TVT 2013

TRIGUARD *(DEFLECT –I, MRI study n=28)*

Parameter	DEFLECT-I N=28
% of pts with new lesions	70%
No. of new lesions	5.1
Average new lesion volume (cm^3)	0.12
Max single new lesion volume (cm^3)	0.39
Total new lesion volume (cm^3)	0.70

TRIGUARD *(DEFLECT –I, MRI study n=28)*

Parameter	DEFLECT-I N=28	Historical Data N=150 *
% of pts with new lesions	70%	76%
No. of new lesions	5.1	4.4
Average new lesion volume (cm^3)	0.12	0.34
Max single new lesion volume (cm^3)	0.39	6.45
Total new lesion volume (cm^3)	0.70	1.64

** Kahlert 2010, Ghanem 2011, Astarci 2011, Stolz 2004, Rodes-Cabau 2011*

TRIGUARD *(DEFLECT –I, MRI study n=28)*

Parameter	DEFLECT-I N=28		Historical Data N=150 *
% of pts with new lesions	70%	=	76%
No. of new lesions	5.1	=	4.4
Average new lesion volume (cm^3)	0.12		0.34
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TRIGUARD *(DEFLECT –I, MRI study n=28)*

Parameter	DEFLECT-I N=28		Historical Data N=150 *
% of pts with new lesions	70%	=	76%
No. of new lesions	5.1	=	4.4
Average new lesion volume (cm^3)	0.12	<	0.34
Max single new lesion volume (cm^3)	0.39	<	6.45
Total new lesion volume (cm^3)	0.70	<	1.64

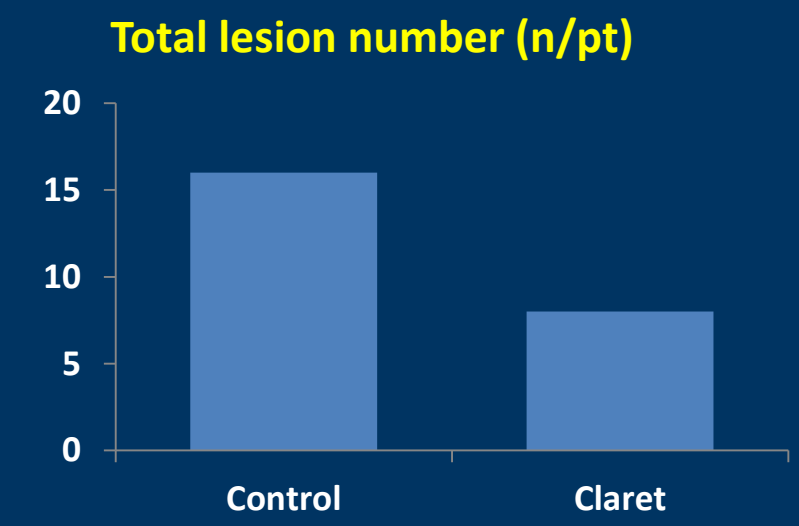
** Kahlert 2010, Ghanem 2011, Astarci 2011, Stolz 2004, Rodes-Cabau 2011*

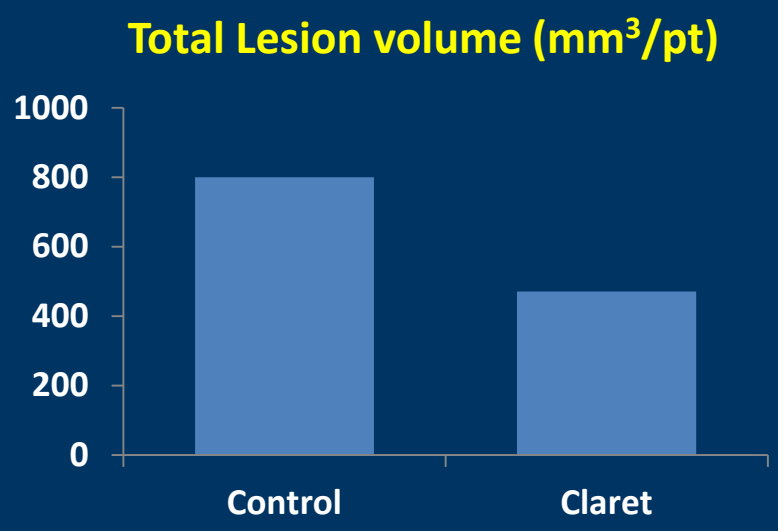
CLARET *(Observational, n=40)*

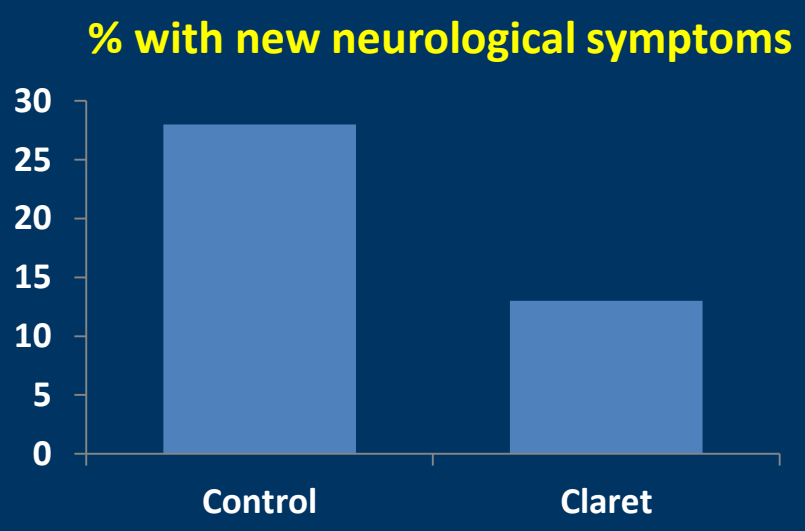
*" Embolic debris travelling to the brain captured in **75%** of TAVI procedures "*

Van Mieghem et al. Circulation 2013

CLARET *(CLEANTAVI RCT; n = 78)*

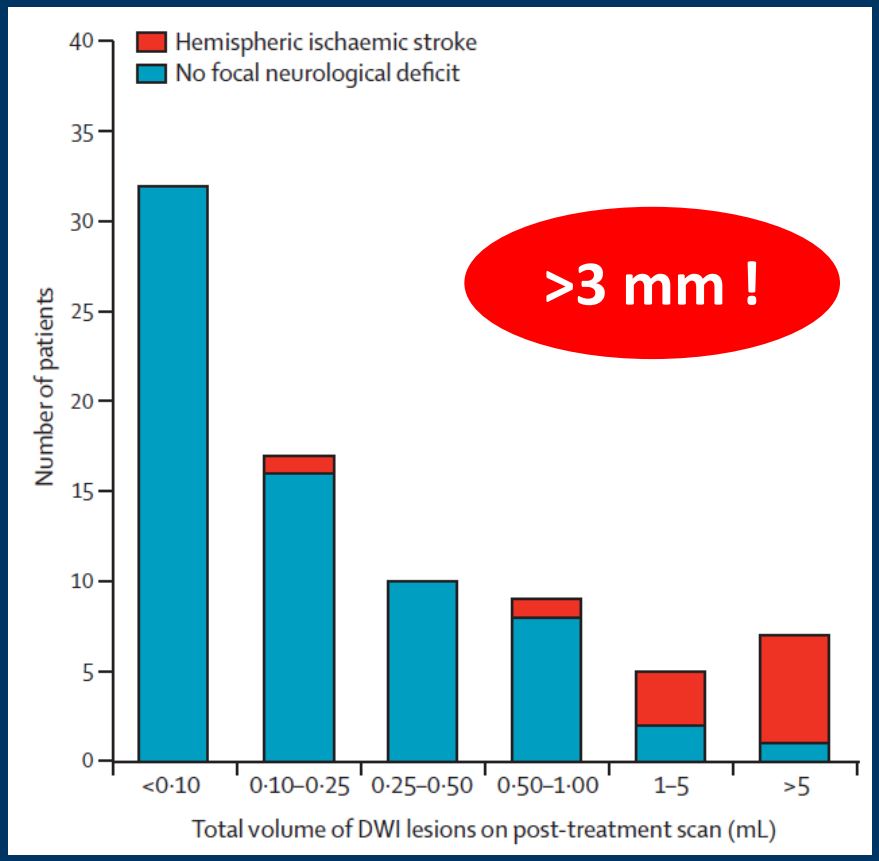






Linke *et al.* Presented at TCT 2014

Lesion Volume Matters



"…Larger total DWI lesion volumes are associated with significantly higher risk of clinically evident stroke (p<0,001)…"

Bonati *et al.* Lancet Neurol 2010

Summary

The reported stroke rate after TAVI is 3%

Increasing data contribute to our understanding of stroke mechanisms

EPDs may help to reduce stroke

Thank you !