

All You Need to Know About PFO Closure

Patient Selection and Device Selection

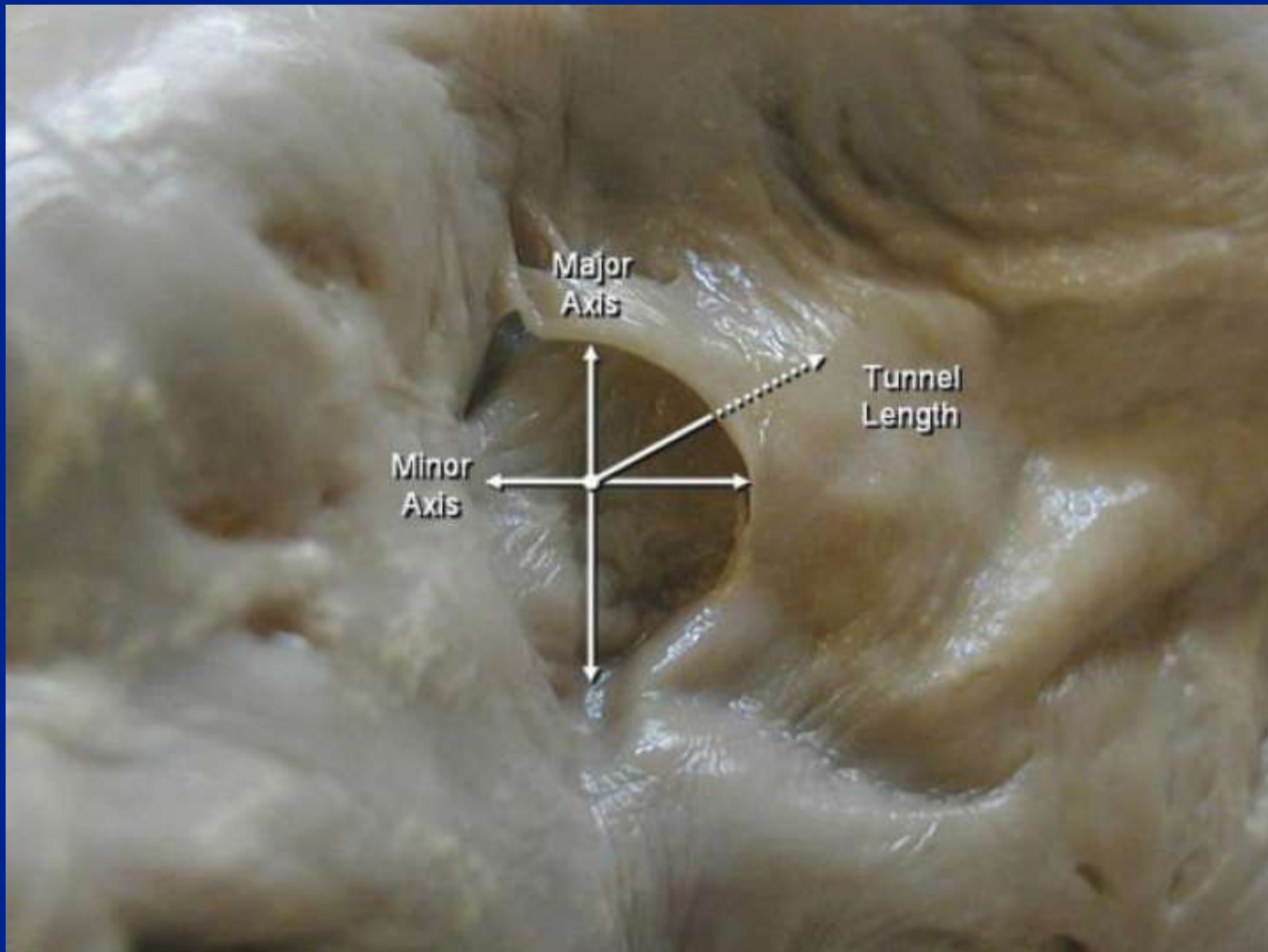
Teiji Akagi, MD, FACC

Adult Congenital Heart Disease Center

Okayama University Hospital

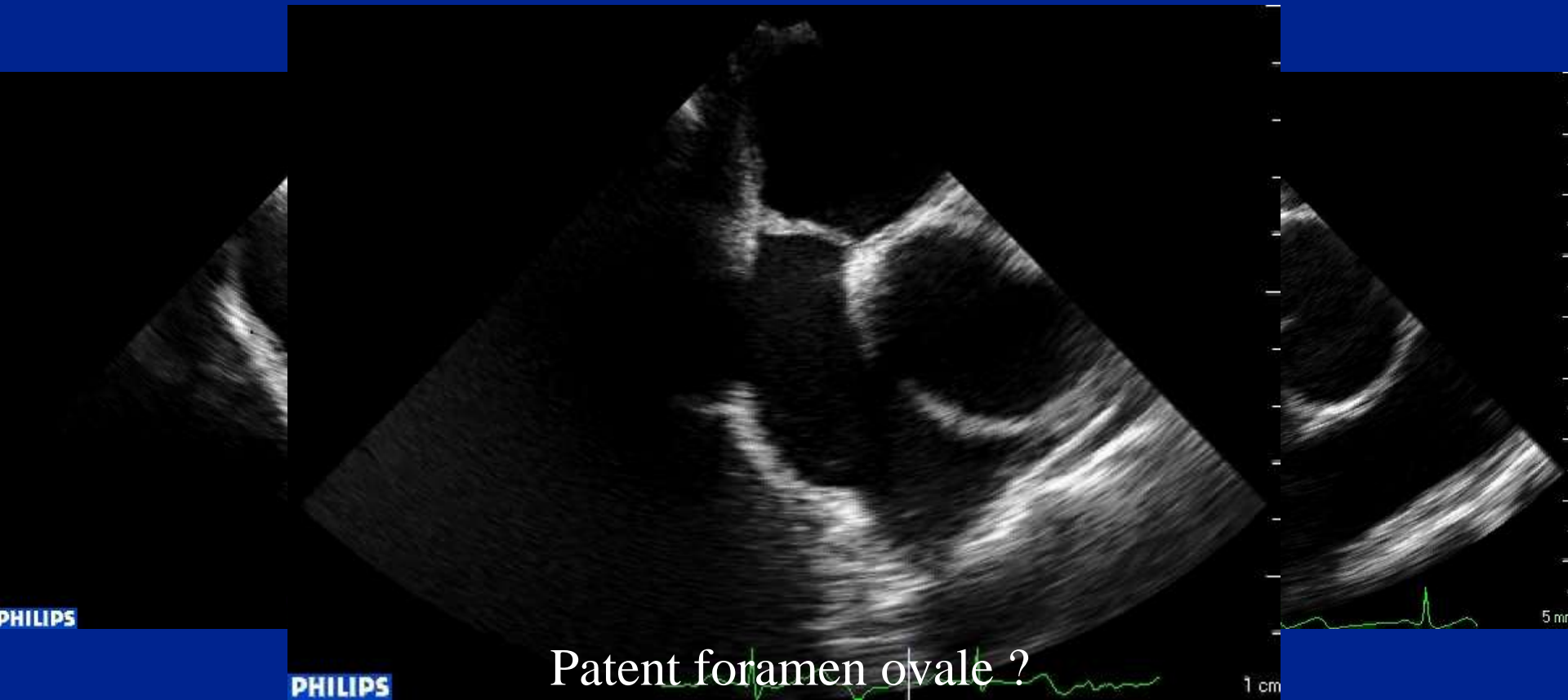
Okayama, Japan





Atrial Septal Defect / Patent Foramen Ovale

* Transesophageal echocardiographic image



Atrial septal defect

Patent foramen ovale

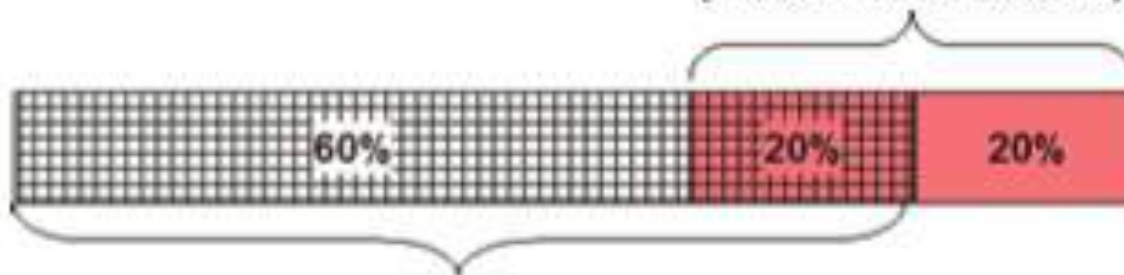
PFO in Incidental or Pathogenic?

Case A

Proportion of CS patients with PFO: 40%

Proportion of controls with PFO: 25%

Patients with CS & PFO
(50% of PFOs are incidental)



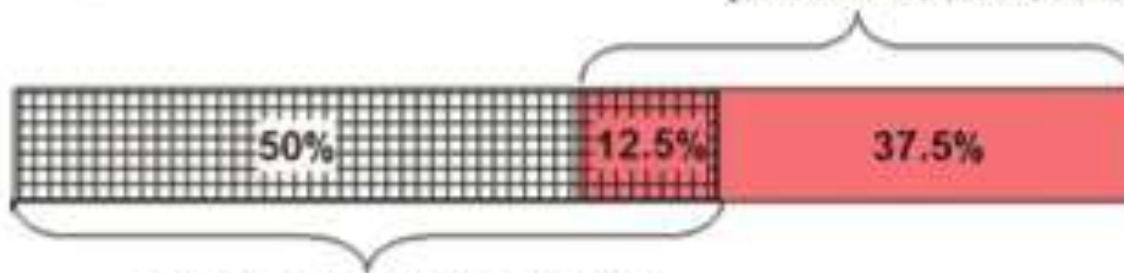
Patients with CS unrelated to PFO
(PFO rate=25%, identical to controls)

Case B

Proportion of CS patients with PFO: 50%

Proportion of controls with PFO: 20%

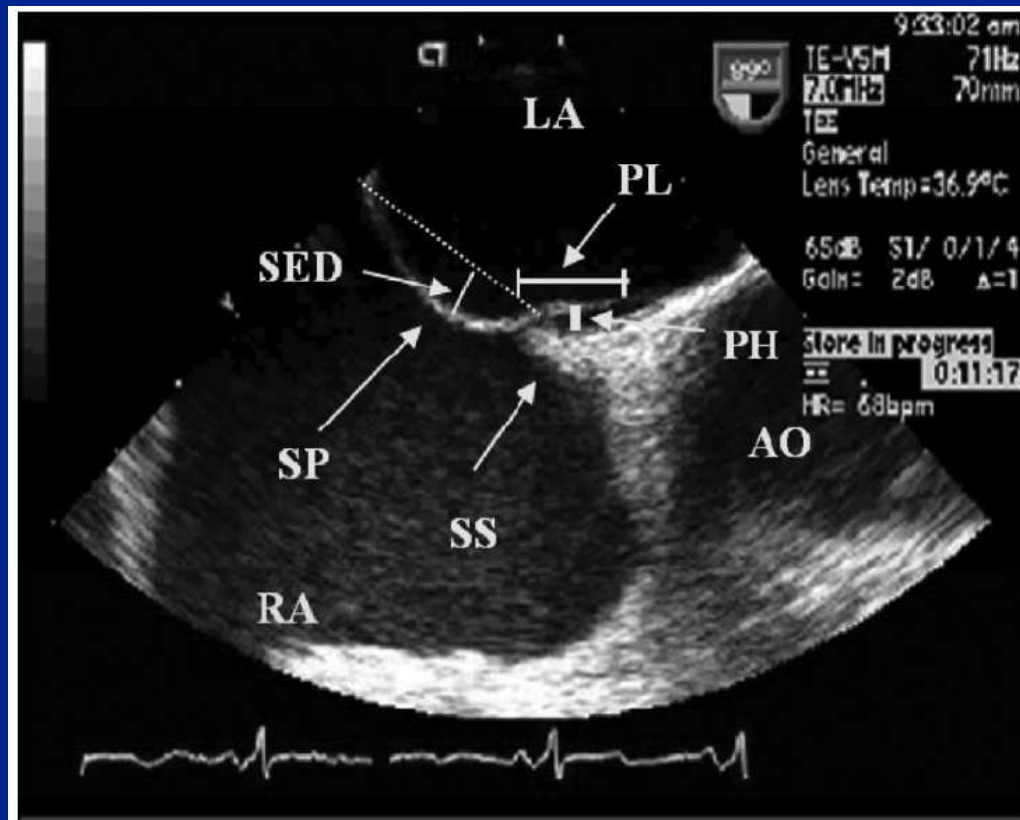
Patients with CS & PFO
(25% of PFOs are incidental)



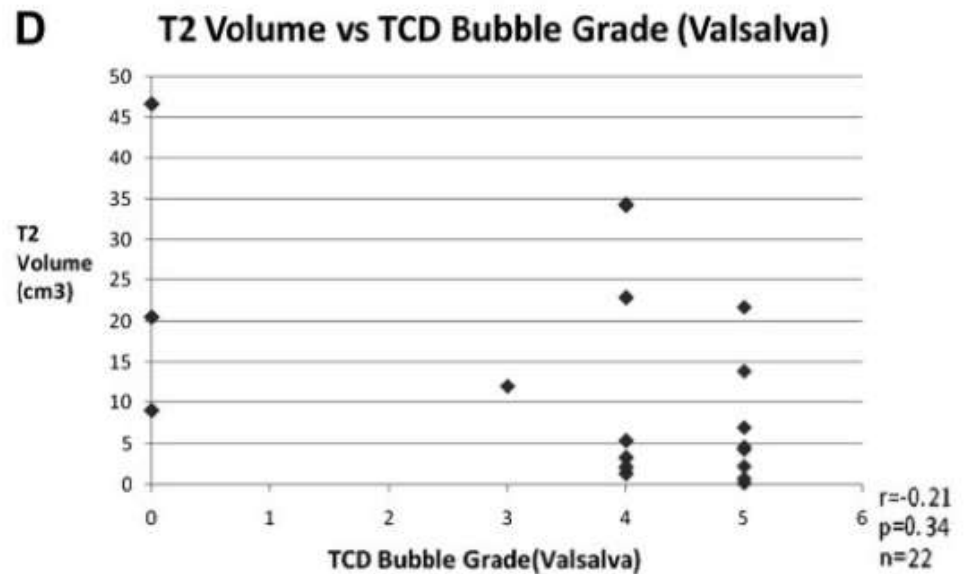
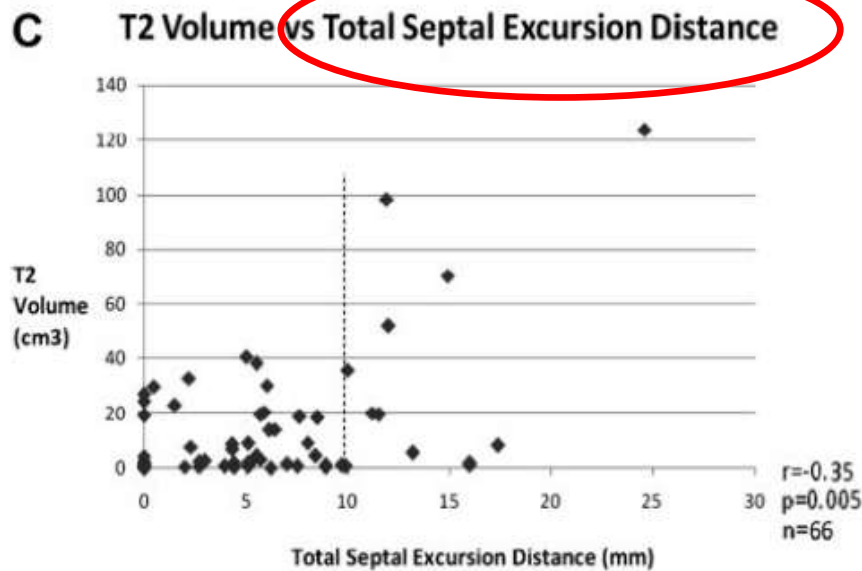
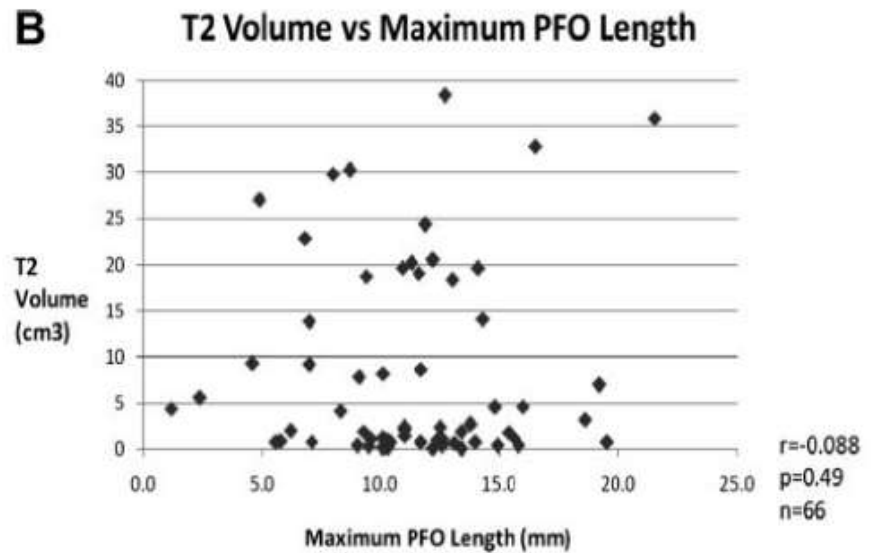
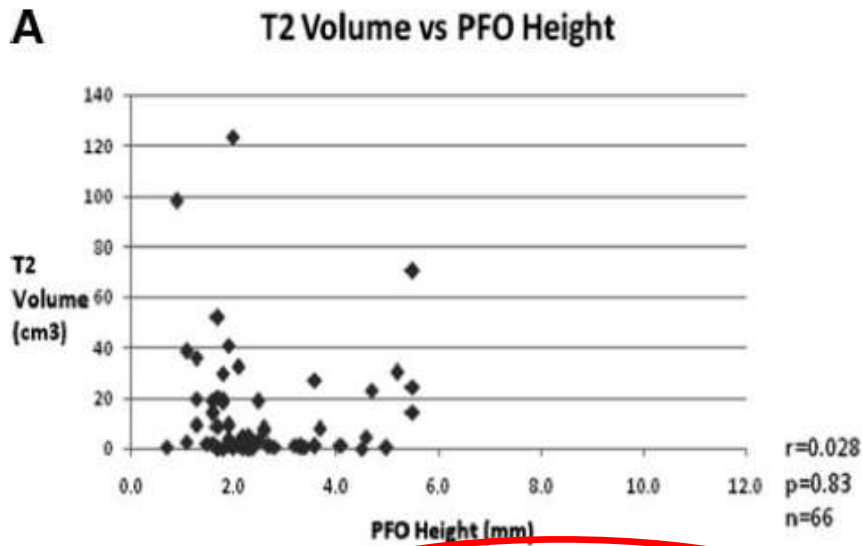
Patients with CS unrelated to PFO
(PFO rate=20%, identical to controls)

The Association of Patent Foramen Ovale Morphology and Stroke Size in Patients With Paradoxical Embolism

Andre Akhondi, MD; Rubine Gevorgyan, MD; Chi-Hong Tseng, PhD; Leo Slavin, MD;
Catherine Dao, MD; David S. Liebeskind, MD; Jonathan M. Tobis, MD

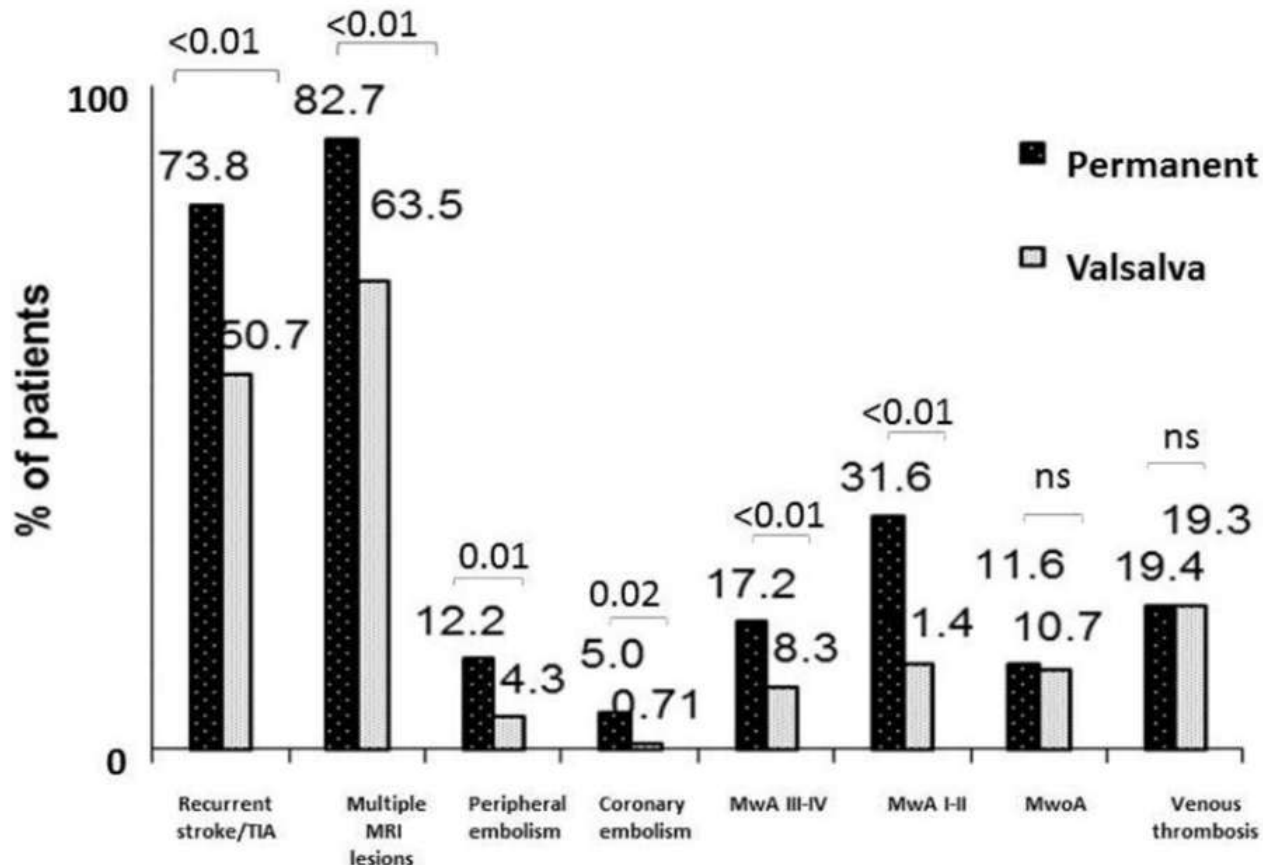


(*Circ Cardiovasc Interv.* 2010;3:506-510.)



Permanent Right-to-Left Shunt Is the Key Factor in Managing Patent Foramen Ovale

Gianluca Rigatelli, MD, PHD,* Fabio Dell'Avvocata, MD,* Paolo Cardaioli, MD,*
 Massimo Giordan, MD,* Gabriele Braggion, MD,* Silvio Aggio, MD,* Mauro Chinaglia, MD,†
 Sangeeta Mandapaka, MD,‡ John Kuruvilla, MD,‡ Jack P. Chen, MD,*§ Aravinda Nanjundappa, MD‡



Transesophageal Echocardiography in Cryptogenic Stroke and Patent Foramen Ovale

**Analysis of Putative High-Risk Features From the Risk of Paradoxical
Embolism Database**

(Circ Cardiovasc Imaging. 2014;7:125-131.)

RoPE Score for Detection of High risk PFO

Characteristic Points	RoPE Score
No history of hypertension	1
No history of diabetes mellitus	1
No history of stroke or TIA	1
Nonsmoker	1
Cortical infarct on imaging	1
Age, y	
18–29	5
30–39	4
40–49	3
50–59	2
60–69	1
≥70	0
Total score (sum of individual points)	
Maximum score (a patient <30 y with no hypertension, no diabetes mellitus, no history of stroke or TIA, nonsmoker, and cortical infarct)	10
Minimum score (a patient ≥70 y with hypertension, diabetes mellitus, previous stroke, current smoker, and no cortical infarct)	0

RoPE indicates Risk of Paradoxical Embolism; and TIA, transient ischemic attack.

(Circ Cardiovasc Imaging. 2014;7:125-131.)

Transesophageal Echocardiography in Cryptogenic Stroke and Patent Foramen Ovale

Analysis of Putative High-Risk Features From the Risk of Paradoxical Embolism Database

TEE Findings	All PFO Patients With At Least Some TEE Data (n=1294)	RoPE Score >6 (n=637)	RoPE Score ≤6 (n=657)	PValue*
Large no. of bubbles vs not large	64.4% (695/1079)	67.4% (347/515)	61.7% (348/564)	0.5286
Shunt at rest vs no shunt	69.6% (484/695)	67.6% (238/352)	71.7% (246/343)	0.4474
Hypermobility septum vs not	25.3% (320/1265)	23.0% (144/626)	27.5% (176/639)	0.1063

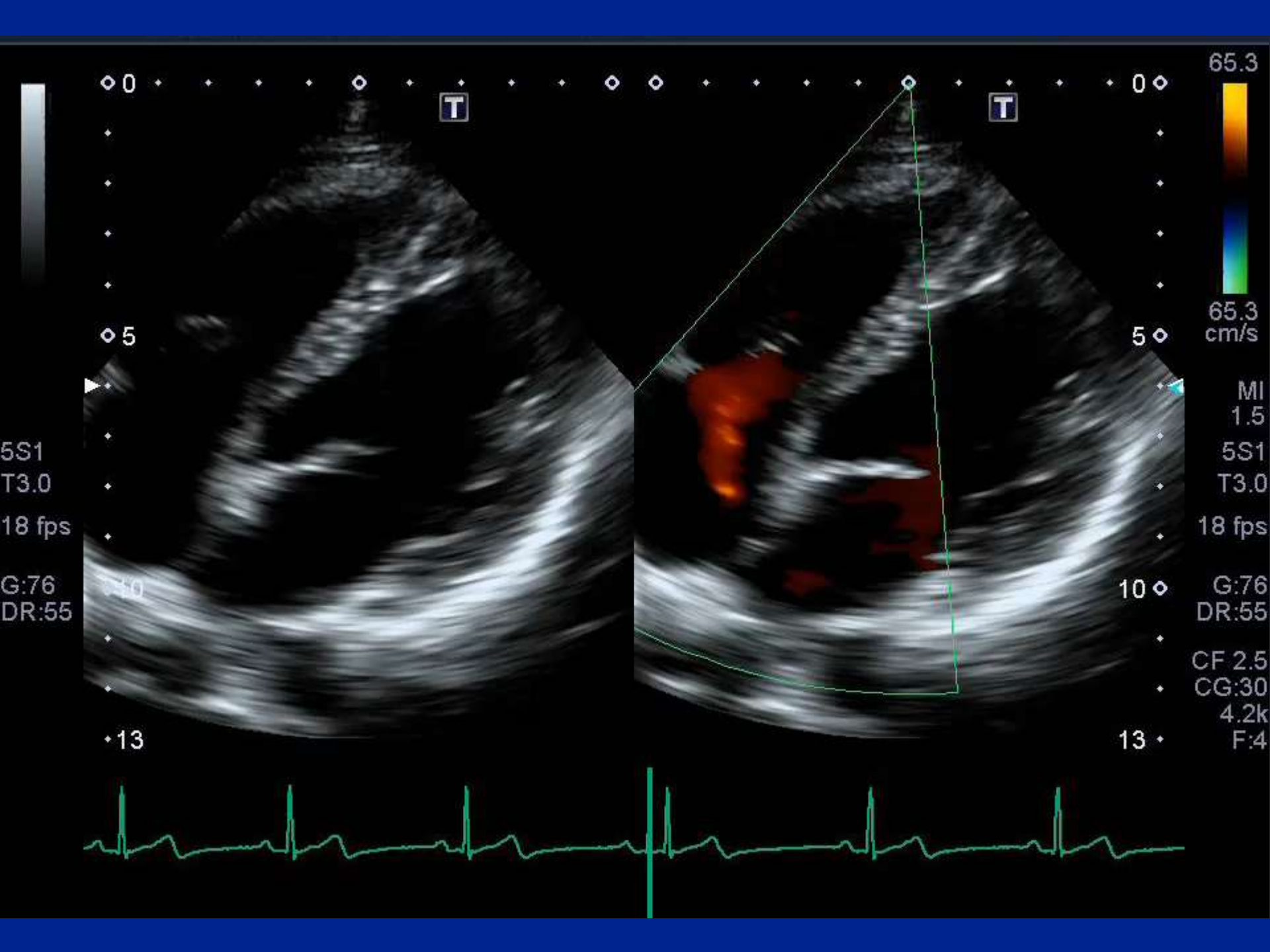
PFO indicates patent foramen ovale; RoPE, Risk of Paradoxical Embolism; and TEE, transesophageal echocardiography.

*P values from generalized mixed models (TEE variables only) after adjusting for random site effect.

(*Circ Cardiovasc Imaging*. 2014;7:125-131.)

32 years male

- Developed right side hemiplegia during the jogging
- MRI detected stroke and TTE finding suggested 4 mm ASD.
- Complicated typical migraine with aura 3 to 4 times per week. Self injection of Sumatriptan was used.



PHILIPS

TISO.0 MI 0.2

X7-2t/3DTEE

M4

FR 37Hz
7.0cm

2D
62%
C 50
P Off
Gen



JPEG

PAT T: 37.0C
TEE T: 37.0C

*** bpm

PHILIPS

TISO.0 MI 0.3

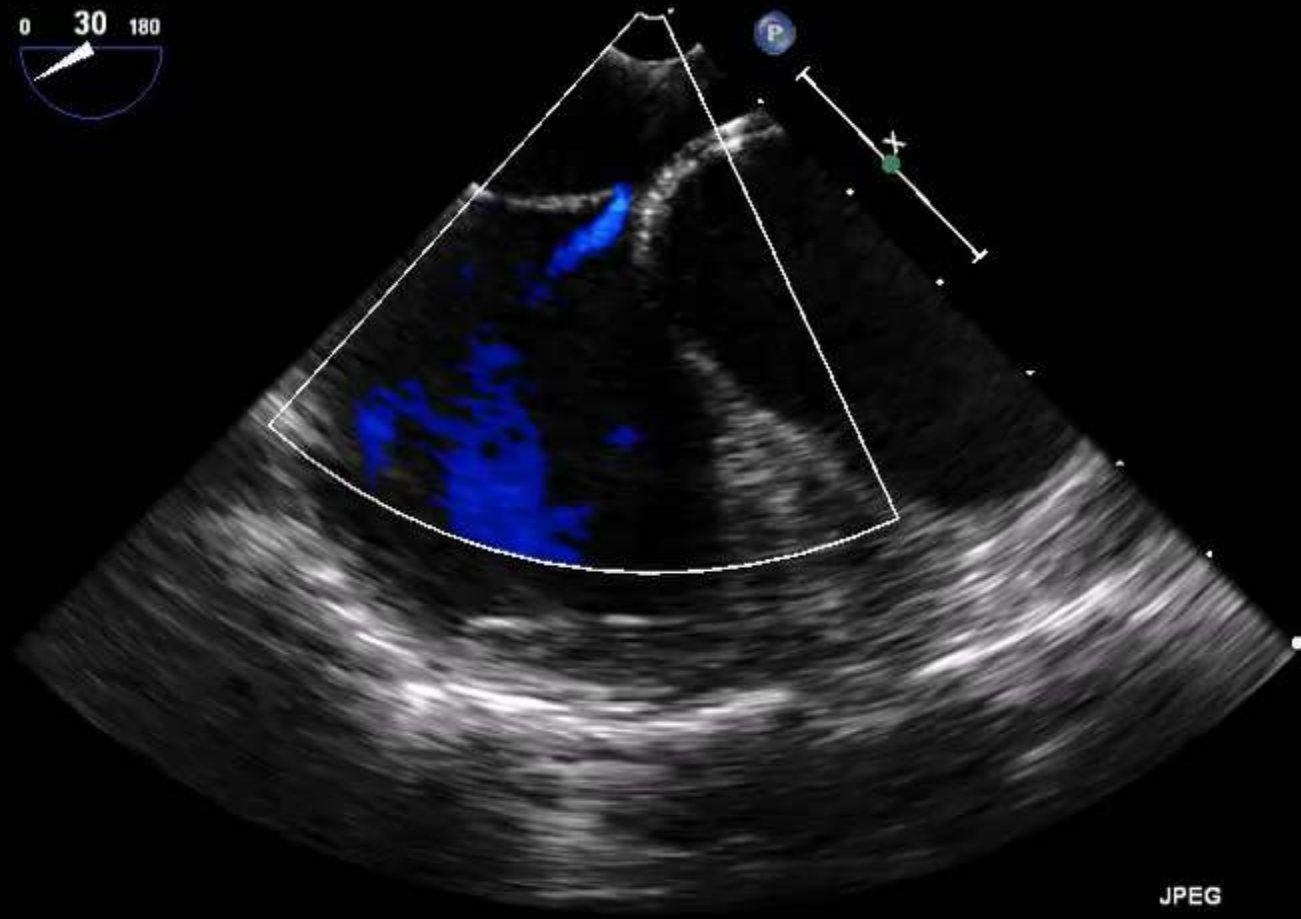
X7-2t/3DTEE

FR 13Hz
7.0cm

2D
65%
C 50
P Off
Gen



CF
59%
4.4MHz
WF High
Med



PAT T: 37.0C
TEE T: 38.0C

JPEG

71 bpm

PHILIPS

TIS0.0 MI 0.2

X7-2t/3DTEE

M4

FR 37Hz
8.1cm

2D
66%
C 50
P Off
Gen



JPEG

PAT T: 37.0C
TEE T: 37.7C

67 bpm

PHILIPS

TIS0.0 MI 0.2

X7-2t/3DTEE

M4

FR 37Hz
8.1cm

2D
66%
C 50
P Off
Gen



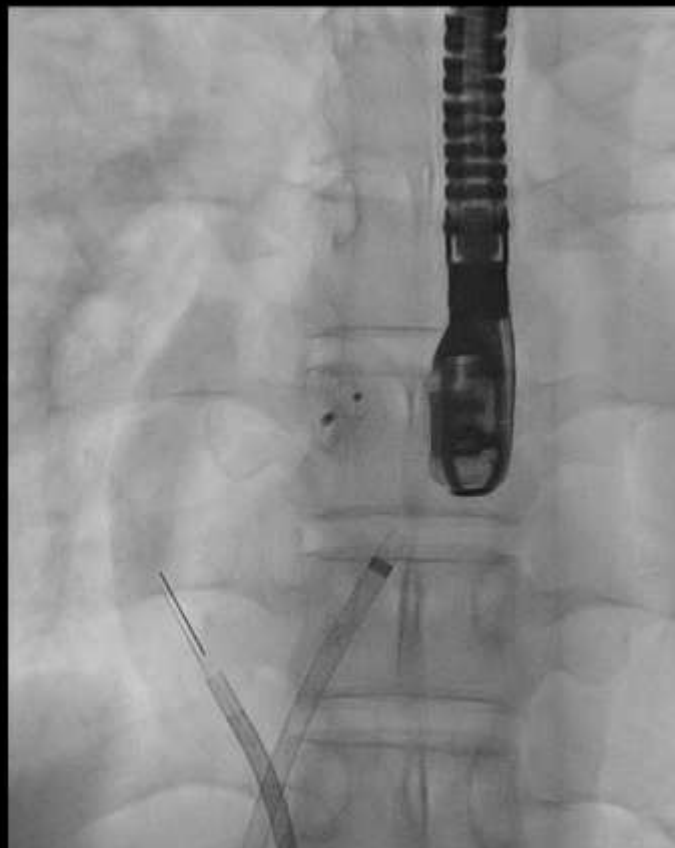
Valsalva



JPEG

PAT T: 37.0C
TEE T: 37.8C

69 bpm



PHILIPS

TIS0.1 MI 0.5

X7-2t/3DTEE

0:00:00

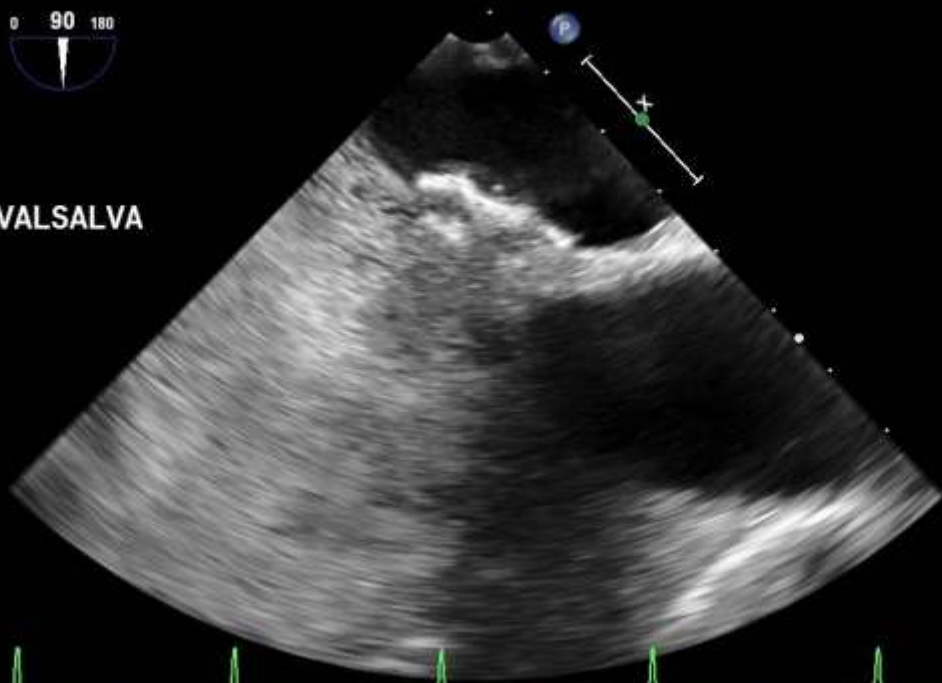
M4

FR 50Hz
8.1cm

2D
64%
C 49
P Low
Gen



VALSALVA

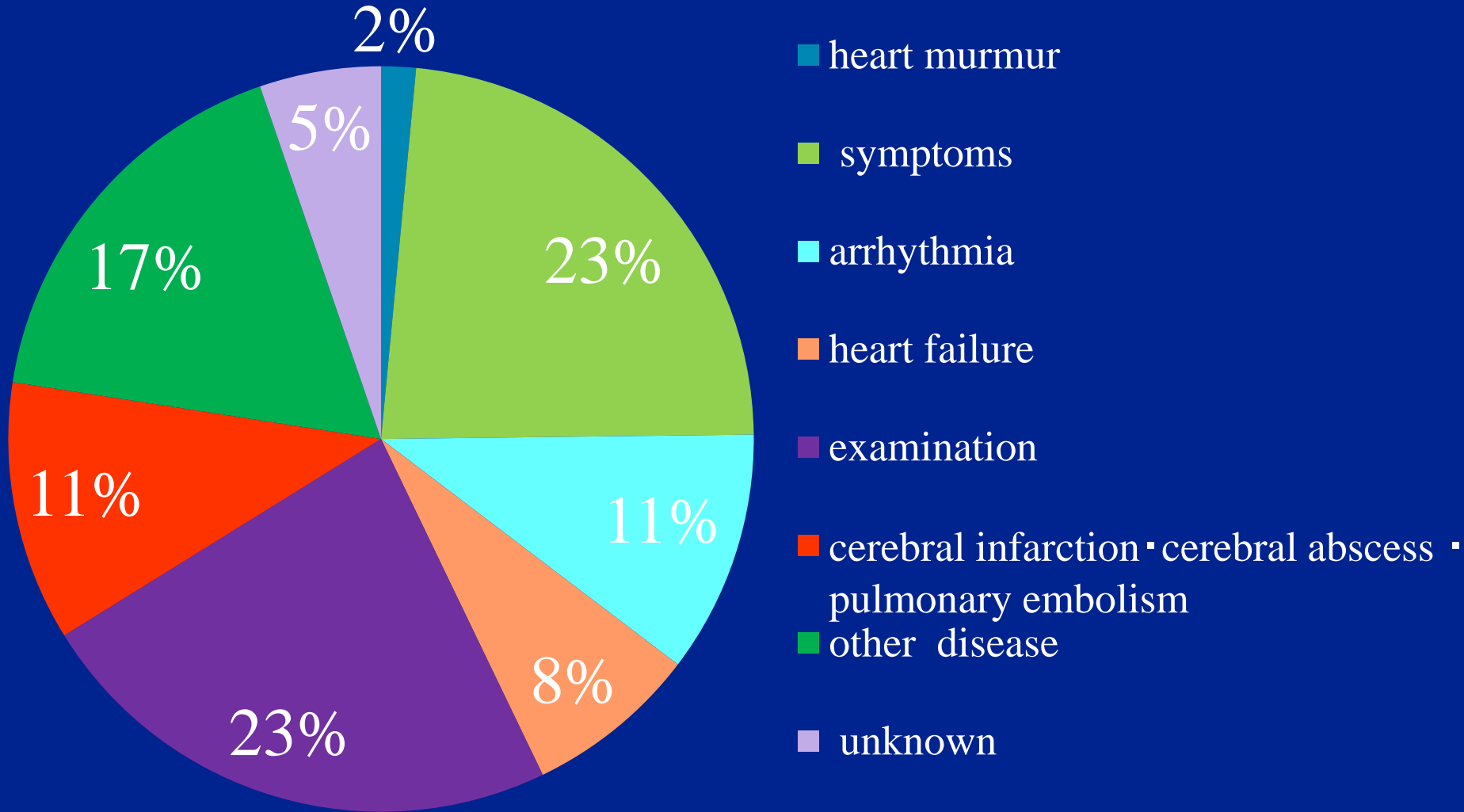


PAT T: 37.0C
TEE T: 38.3C

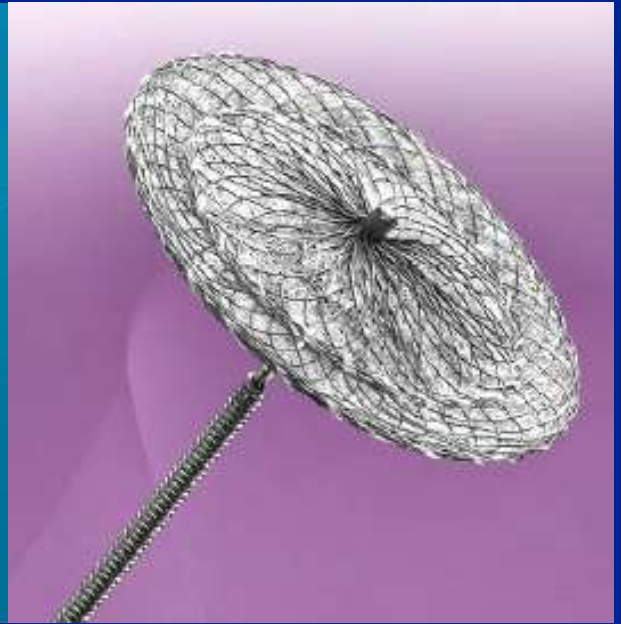
60bpm

46

Trigger of ASD diagnosis >40 years



Devices



Device deployment



Anesthesia: general anesthesia

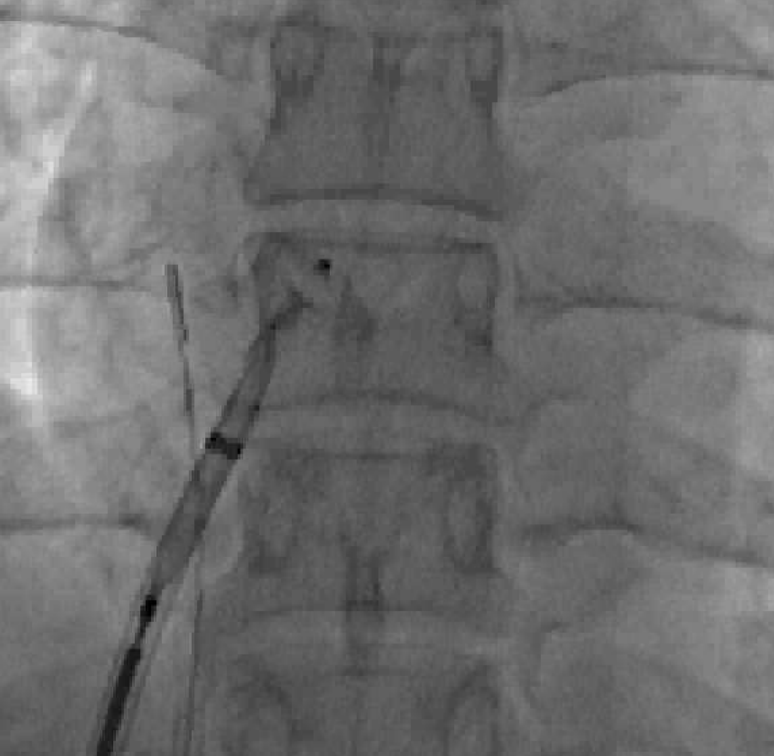
Guidance: TEE

Approach: Right femoral vein

Sheath: 8Fr AGA sheath

Device: 25mm Amplatzer Cribriform

Procedure



Anesthesia: general anesthesia

Guidance: TEE

Approach: Right femoral vein

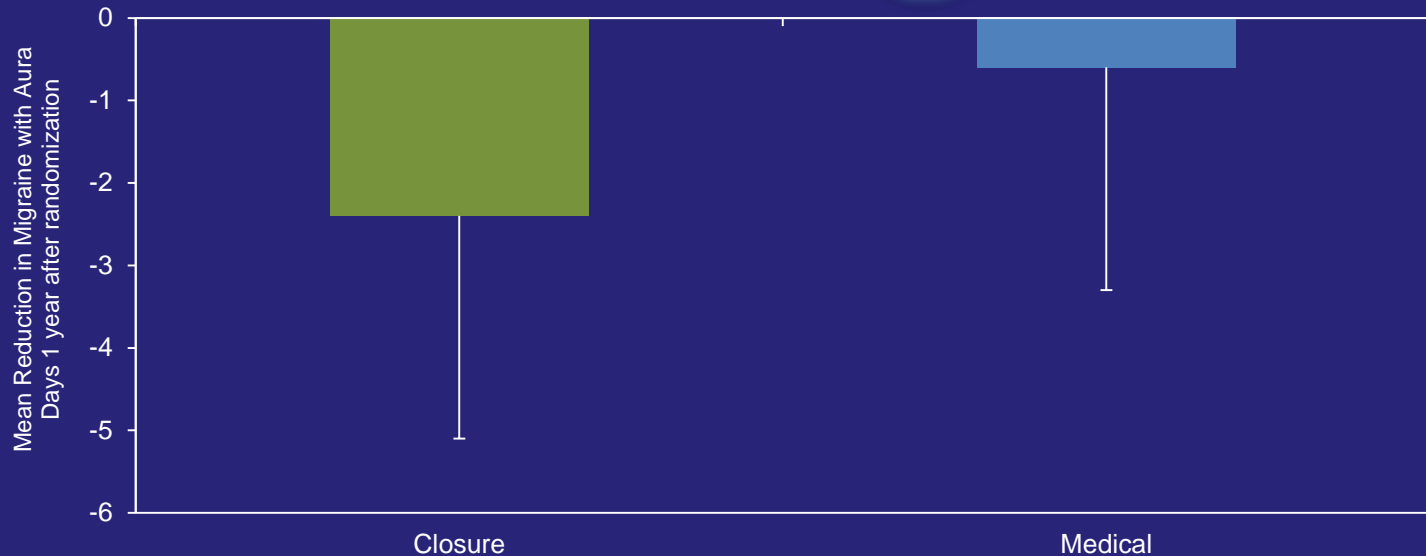
Sheath: 8Fr AGA sheath

Device: 25mm Amplatzer PFO Occluder

Secondary Endpoint

Reduction in Migraine with Aura Days

	N	Mean at Baseline	Mean at Months 10-12	Mean Reduction	Std Deviation (Min, Max)	P-Value
Closure	40	4.1	1.7	-2.4	3.6 (-9.7, 7.3)	0.01
Medical	40	4.0	3.4	-0.6	2.7 (-9.1, 5.5)	



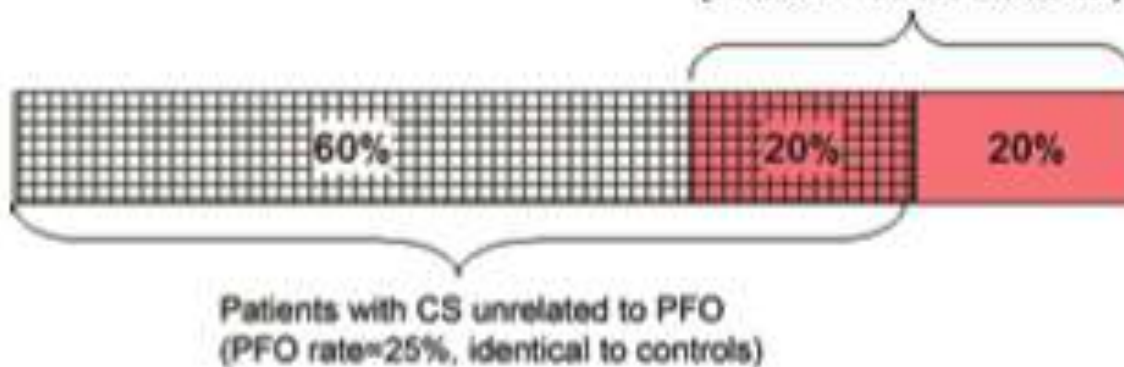
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