



# 3DTEE and Transcatheter Closure of ASD

: Clinical advantage of 3DTEE in patients with complex shaped ASD

Manabu Taniguchi, MD, PhD, Teiji Akagi, MD, PhD

Division of Cardiac Intensive Care Unit,  
Okayama University Hospital, Okayama, Japan



# Disclosure

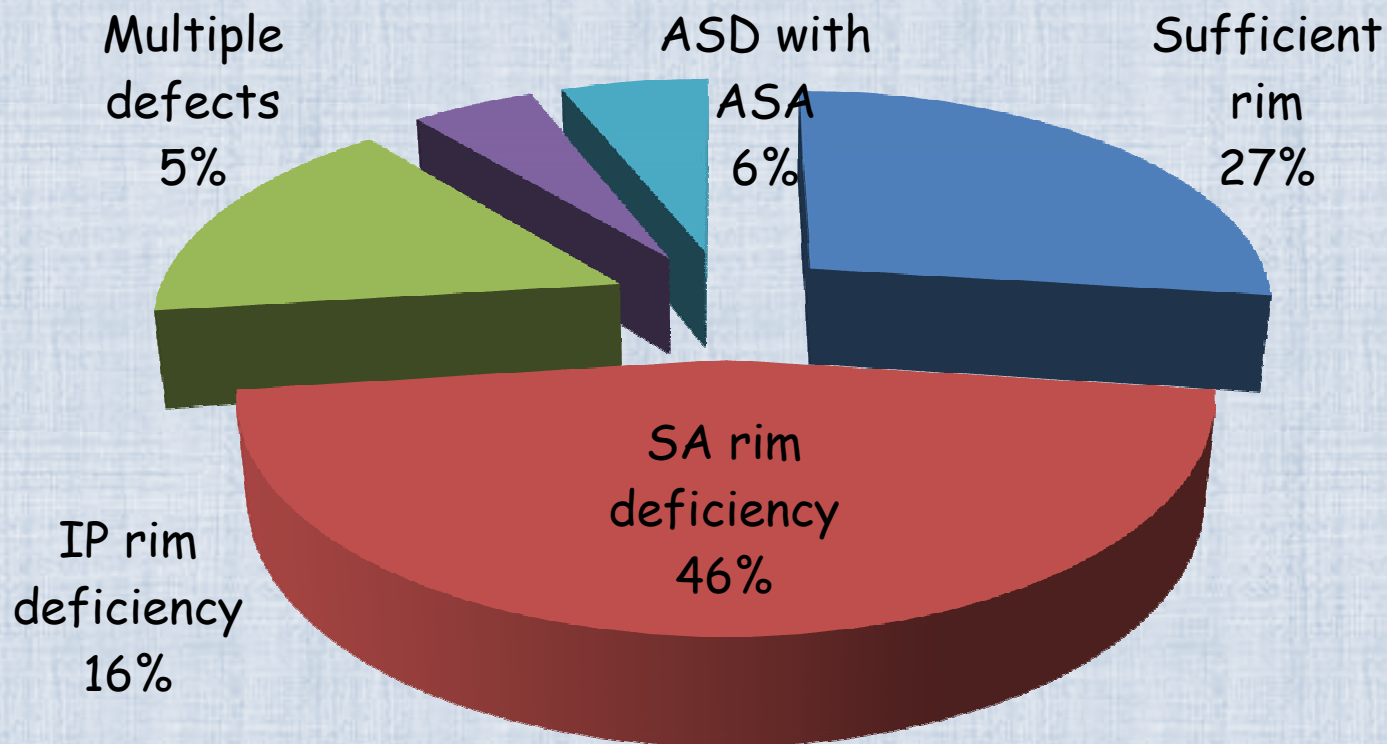
none



# Morphologic variations of ASD is common !

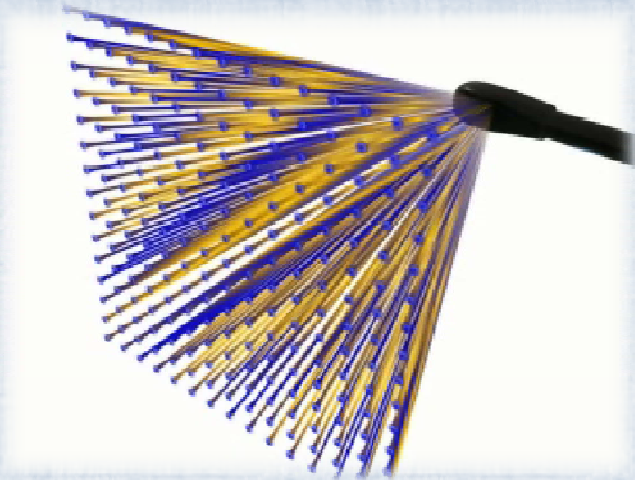
## The role of transesophageal echocardiography in transcatheter closure of secundum atrial septal defects by the Amplatzer septal occluder

Uros Mazic, MD, MSc,<sup>a</sup> Pavol Gavora, MD,<sup>b</sup> and Jozef Masura, MD, PhD<sup>b</sup> *Ljubljana, Slovenia, and Bratislava, Slovak Republic*  
(Am Heart J 2001;142:482-8.)



SA, Superoanterior; IP, Inferoposterior; ASA, Atrial septal aneurysm

# Real-time 3D TEE

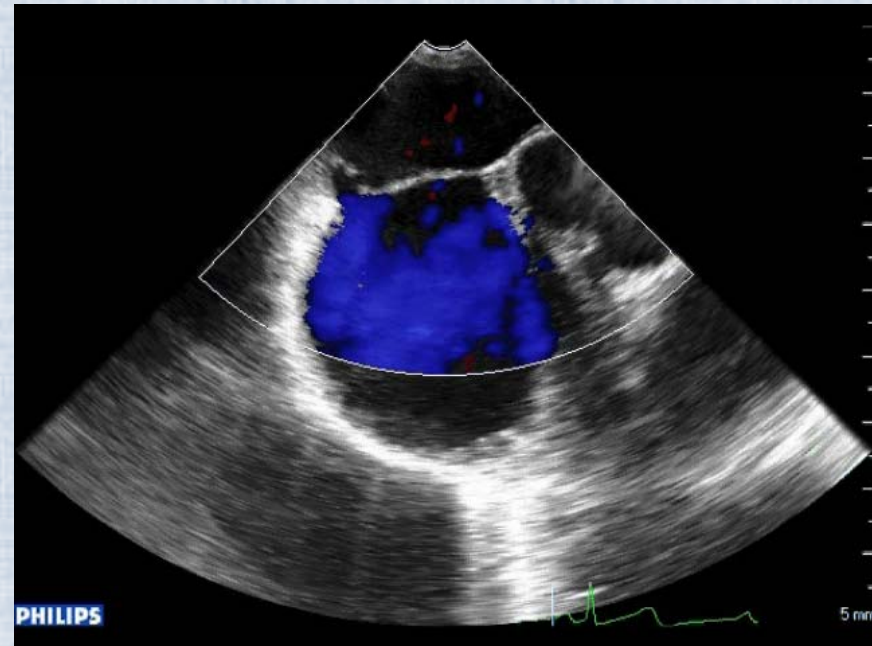


# Case 1, 38 y.o female (multiple defects)

0 degree



Color Doppler

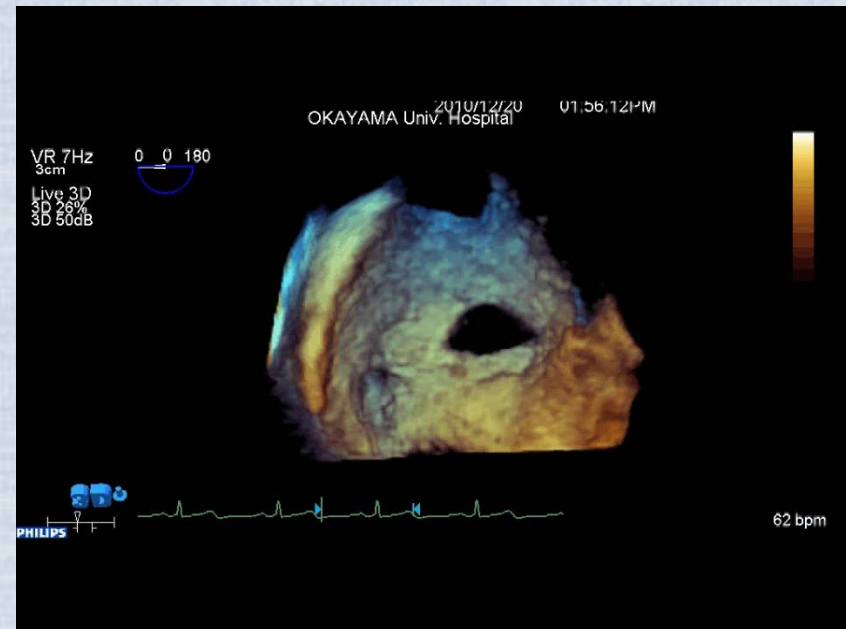
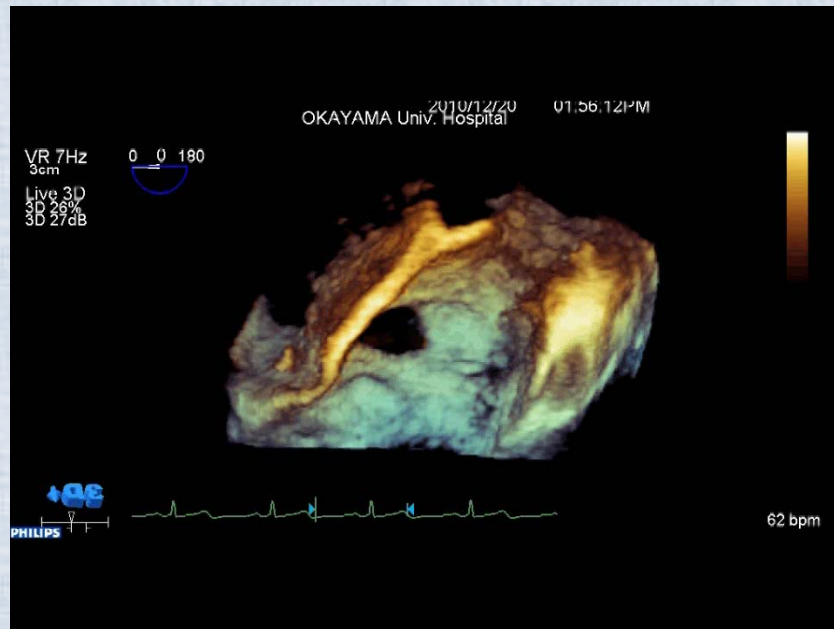


Maximal ASD diameter= 15mm & 5mm  
Distance between defects= 10mm  
Aortic rim deficiency

# 3D TEE

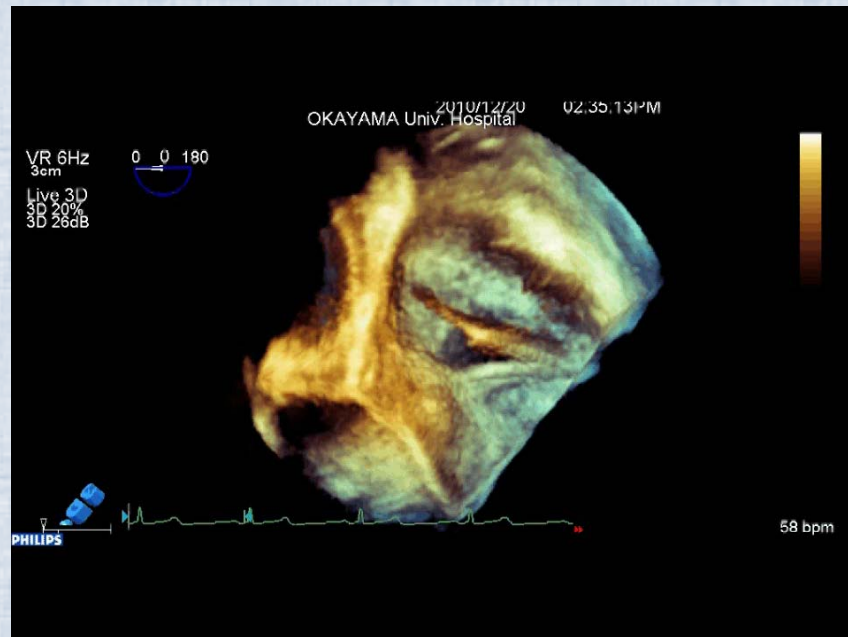
LA enface view

RA enface view

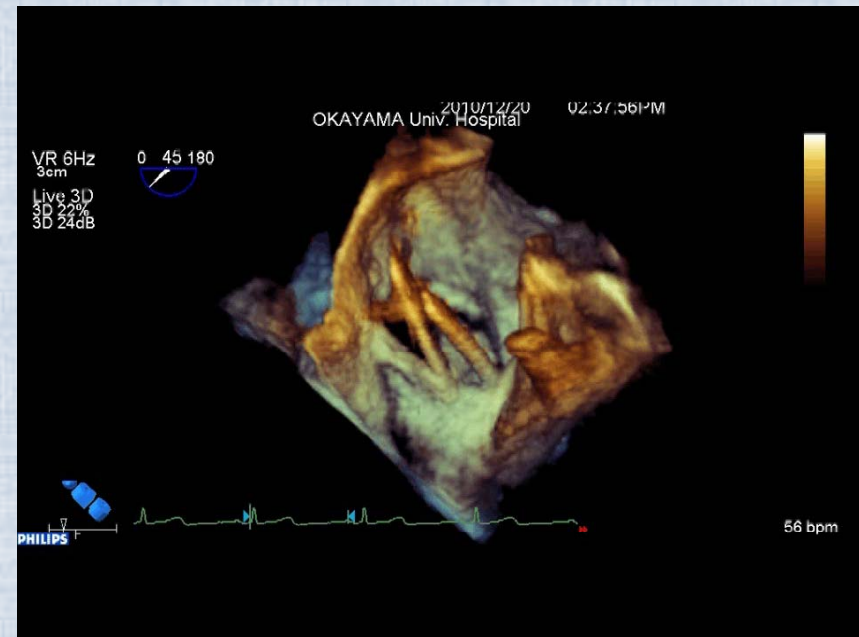


# Catheter passing through ASDs

Larger defect



Both defects

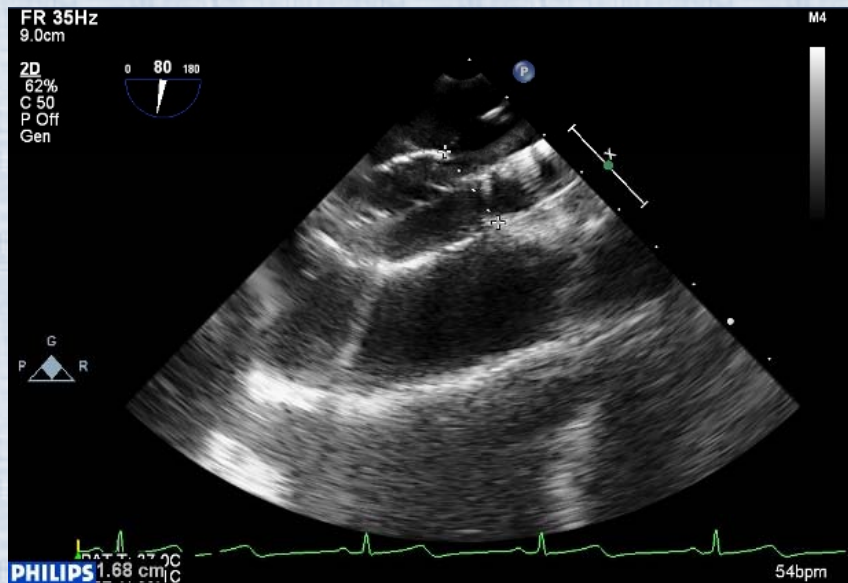


(LA enface view)

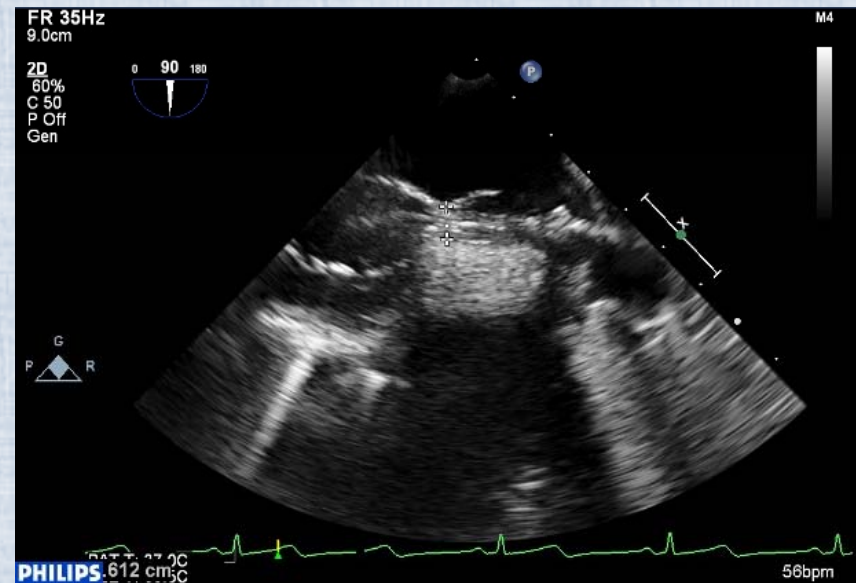
# Balloon sizing

Larger ASD

Smaller ASD



Balloon sizing diameter=17mm



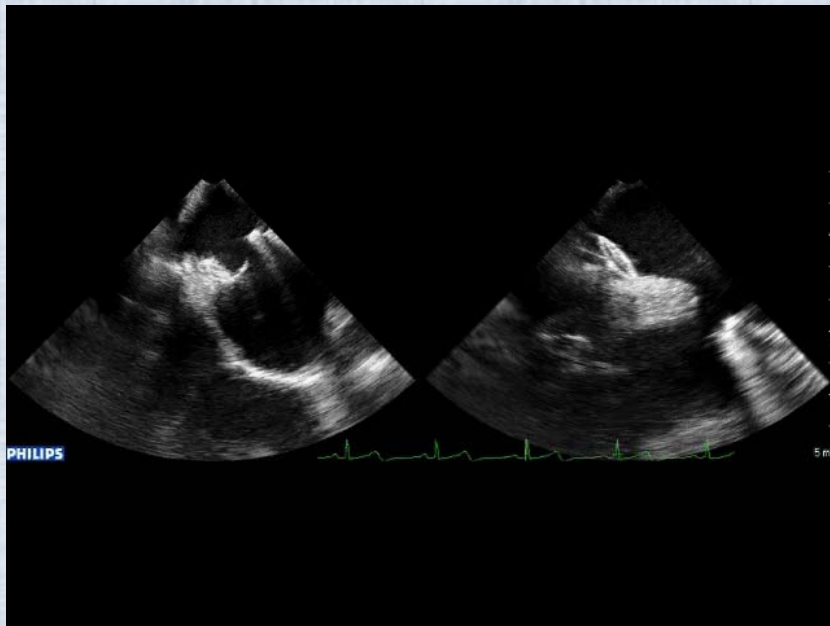
Balloon sizing diameter=6mm



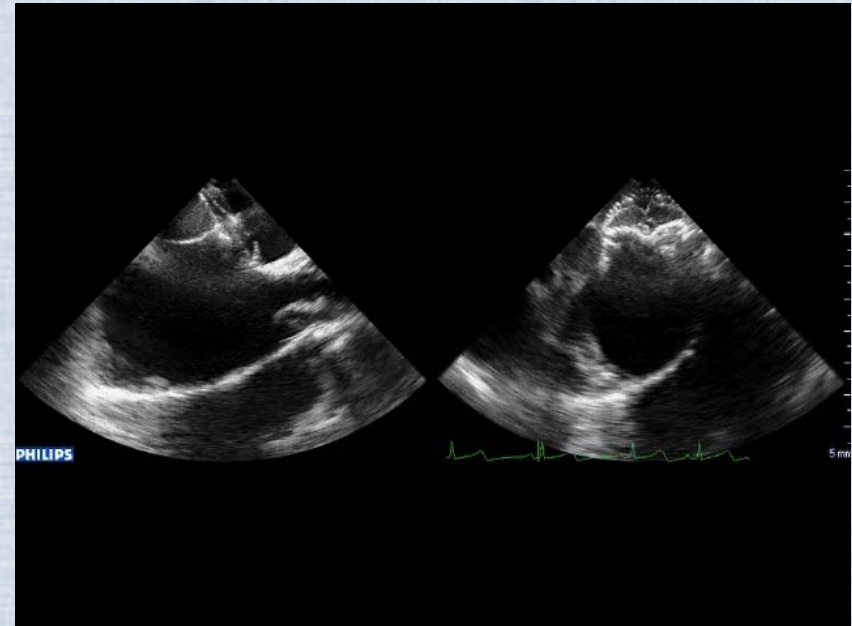
# Deployment (X-plane view)

Smaller ASD

Larger ASD



ASO 6mm



ASO 18mm

2010/12/20 03:24:24 PM  
OKAYAMA Univ. Hospital

VR 6Hz  
4cm  
Live 3D  
3D 34%  
3D 40dB

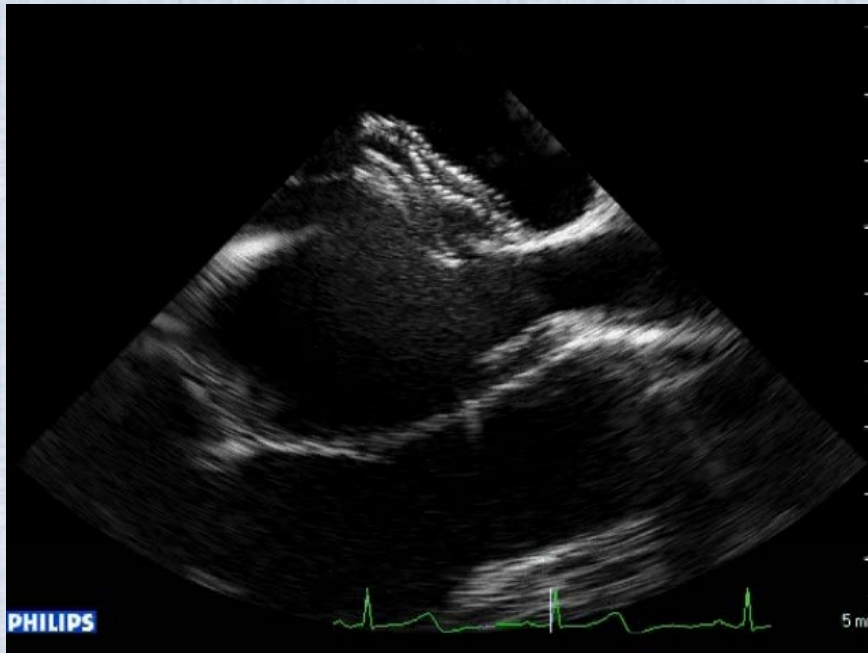


56 bpm

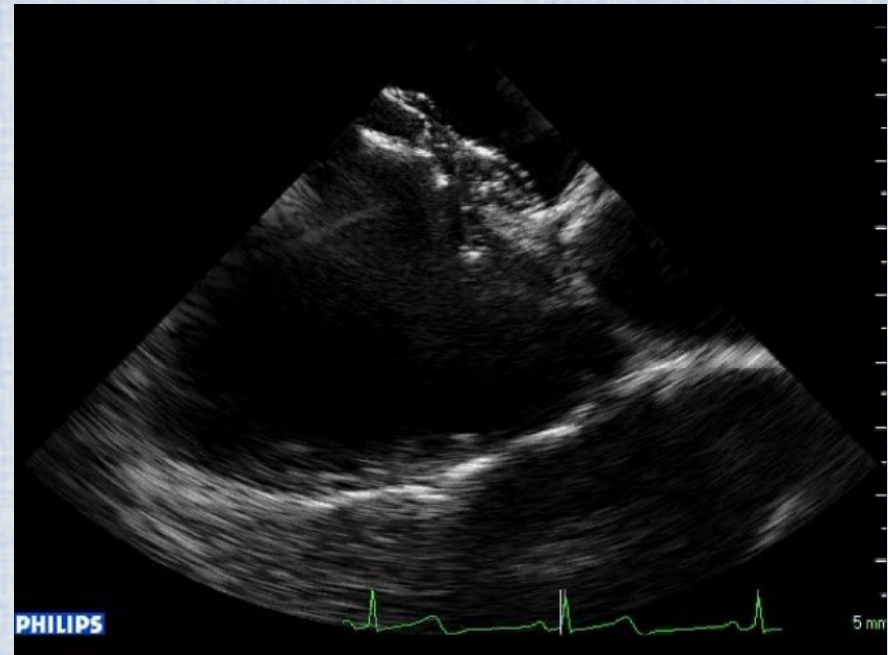


# Release devices

Smaller ASD

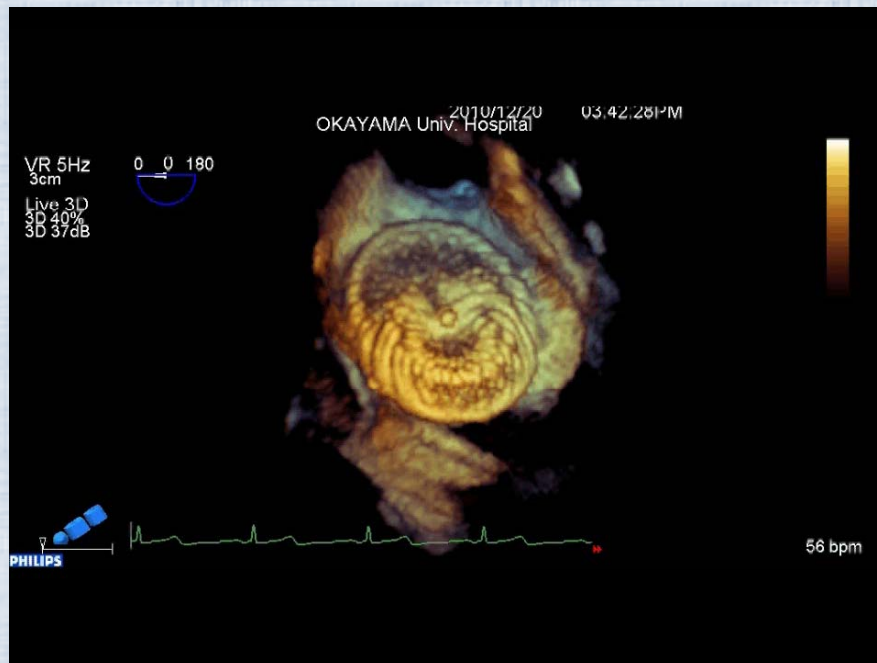


Larger ASD

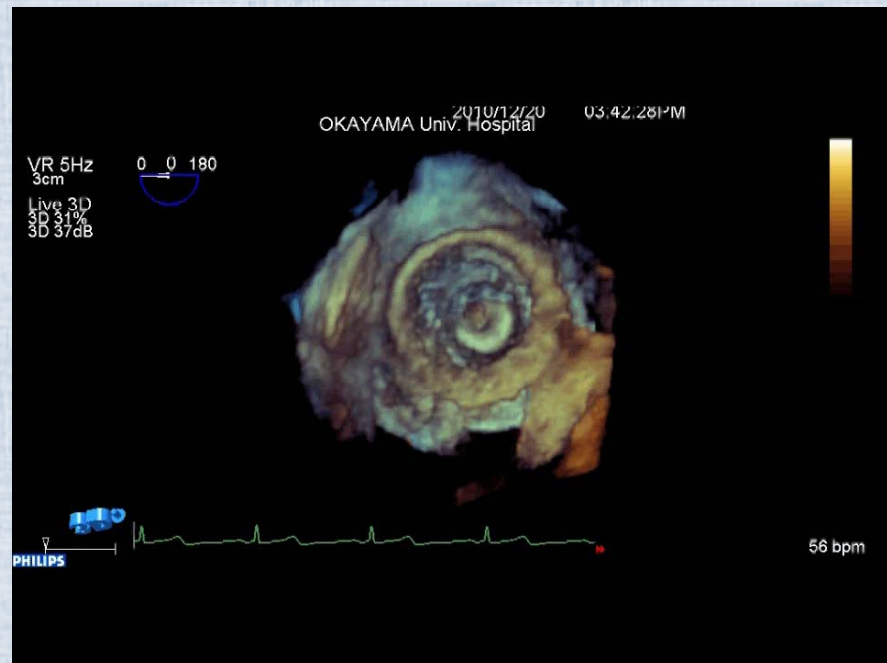


# After releasing devices

LA enface view



RA enface view



Case 2, 39 y.o female  
(Intra-right atrial structure)

0 degree



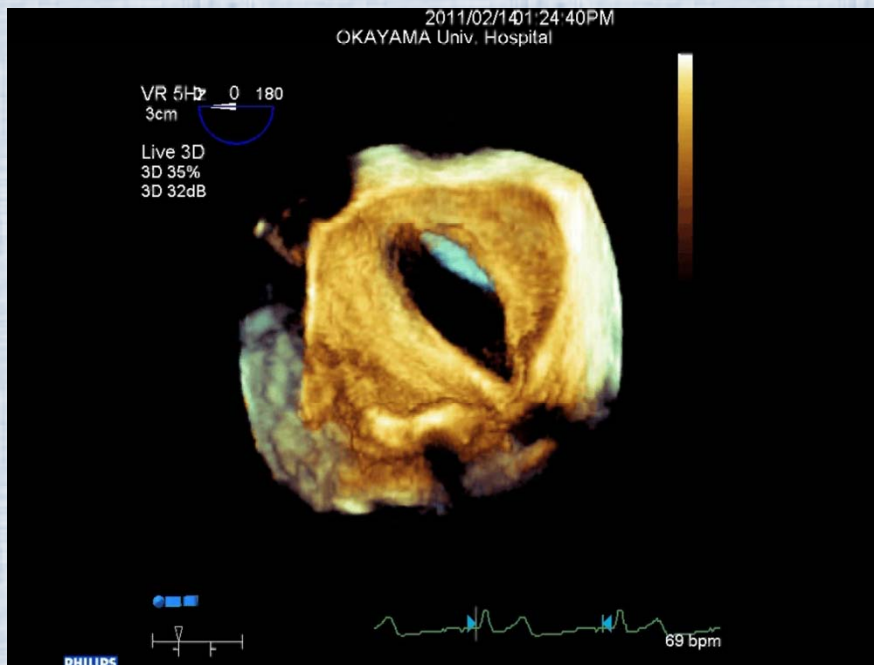
90 degrees



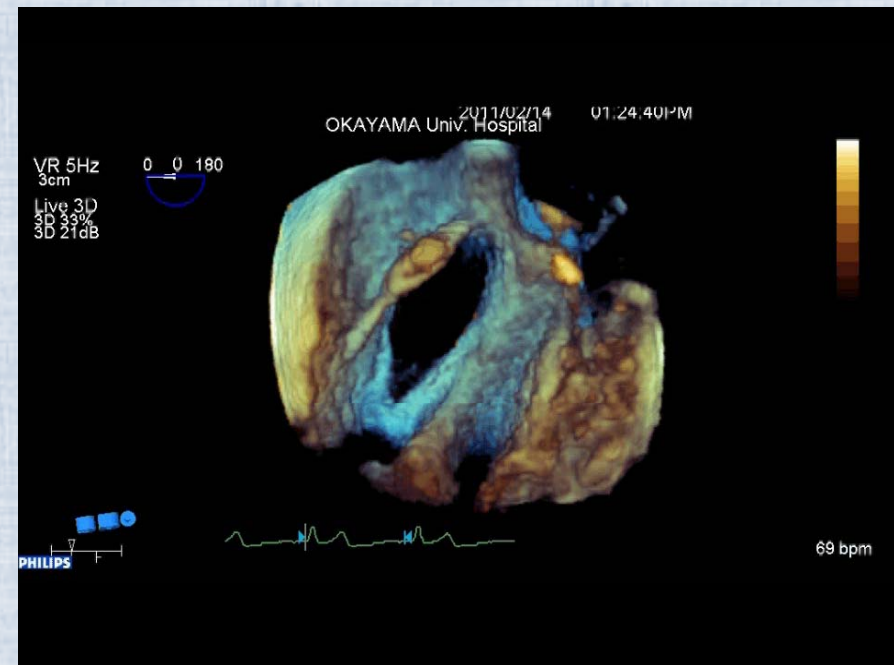
Maximal ASD diameter (2D) = 28mm

# RT3D TEE

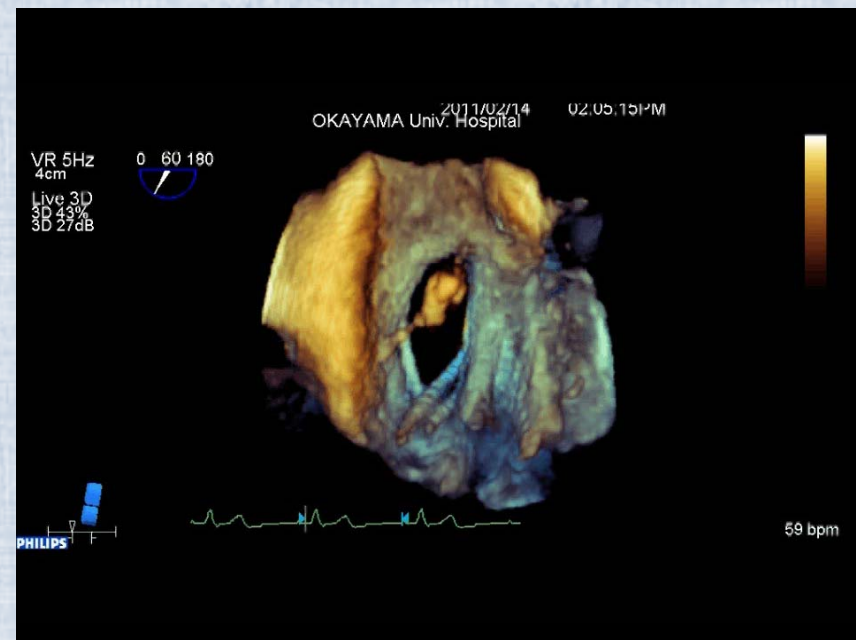
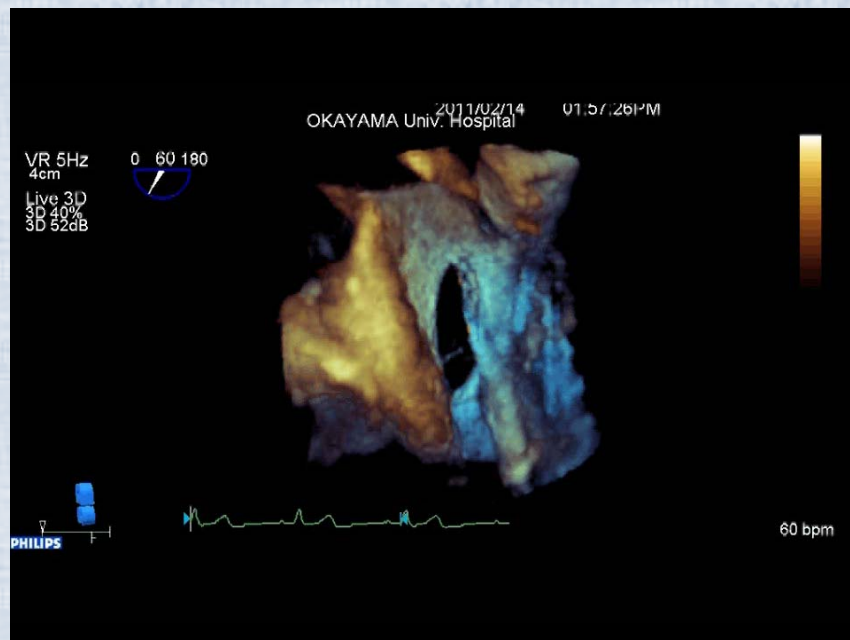
LA enface view



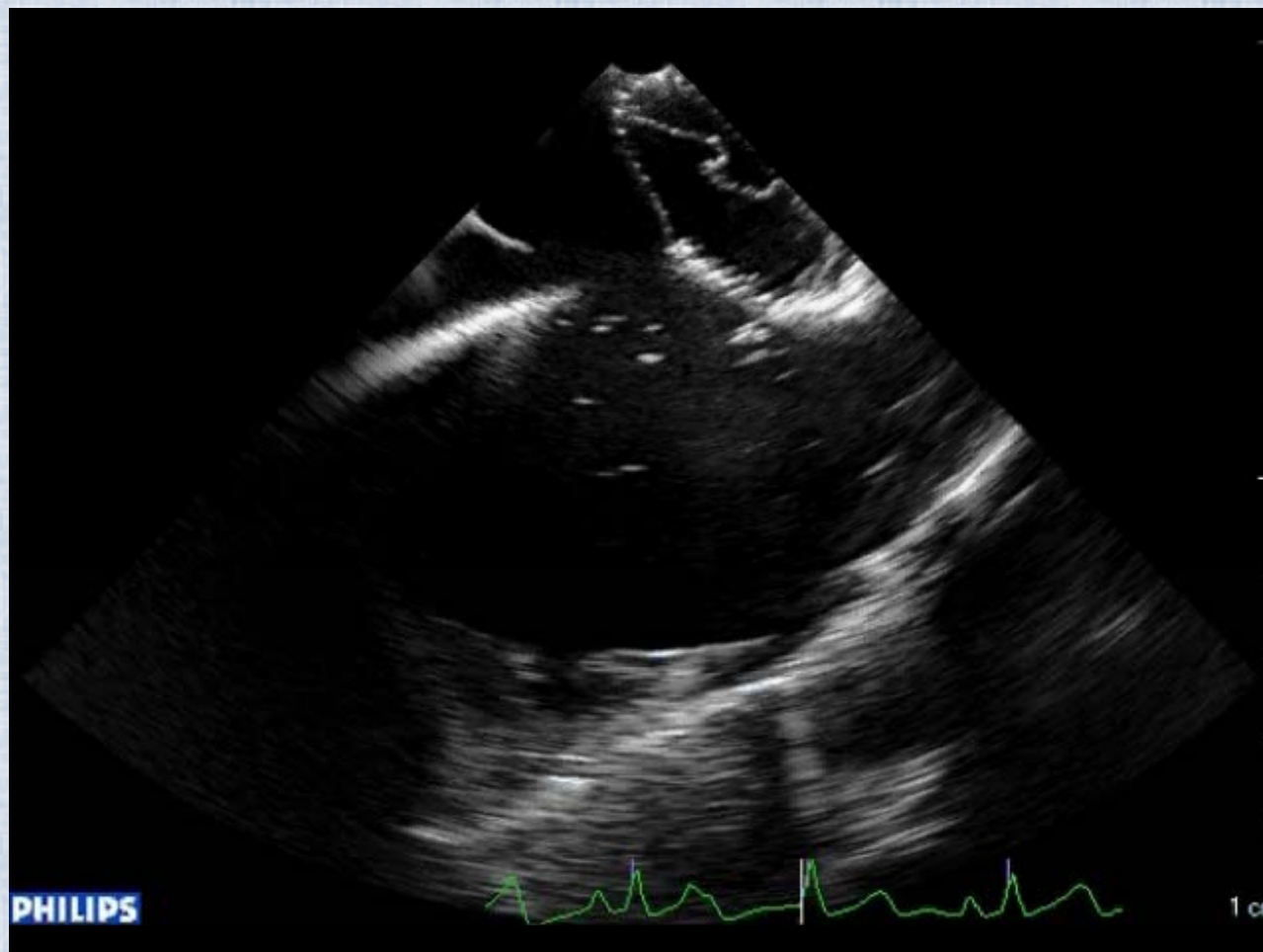
RA enface view



# Catheter crossing through the ASD



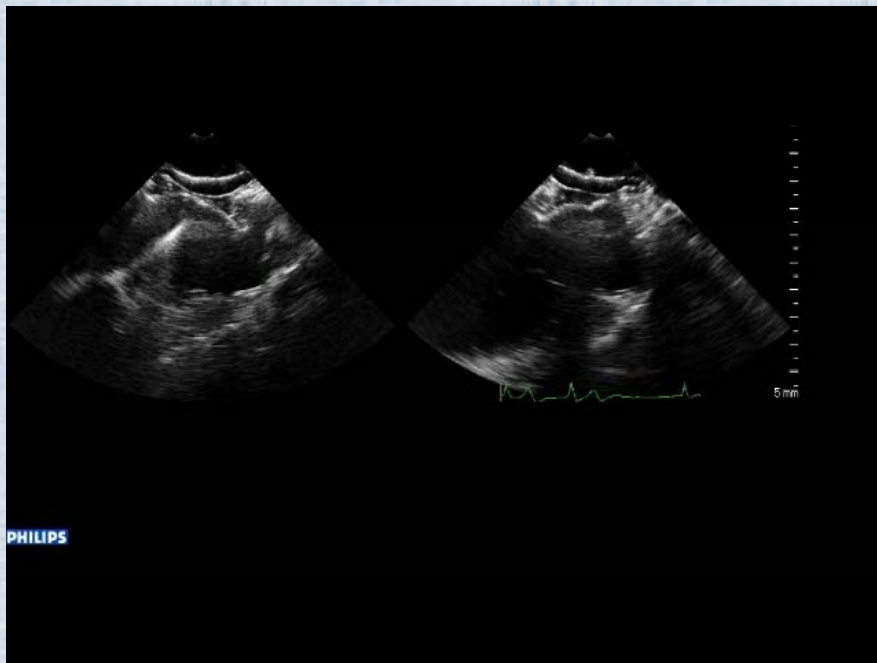
# 32-mm ASO



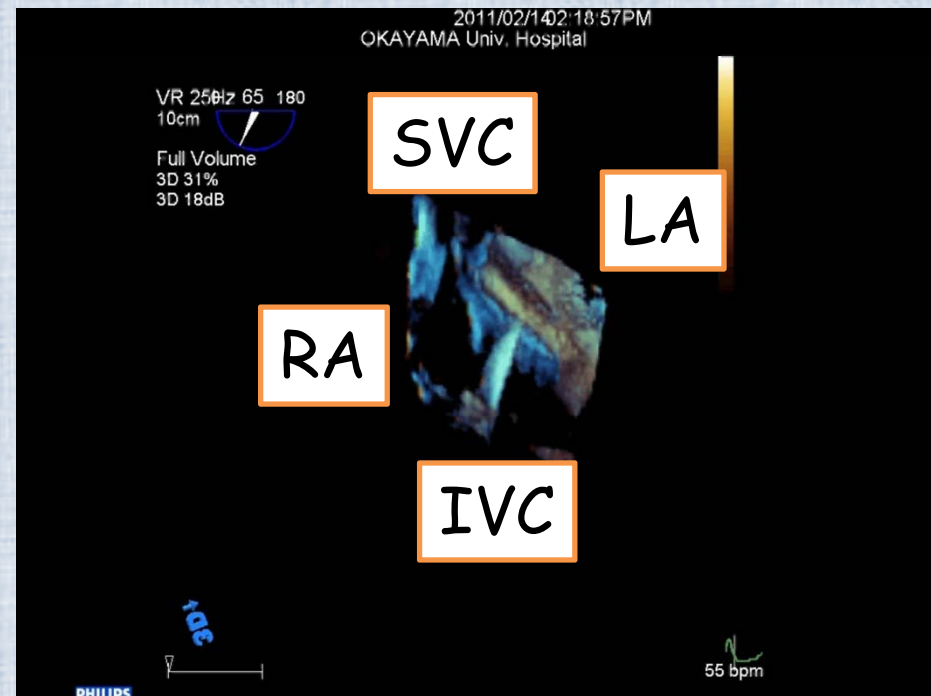


# After deployment

Wiggle (X-plane mode)

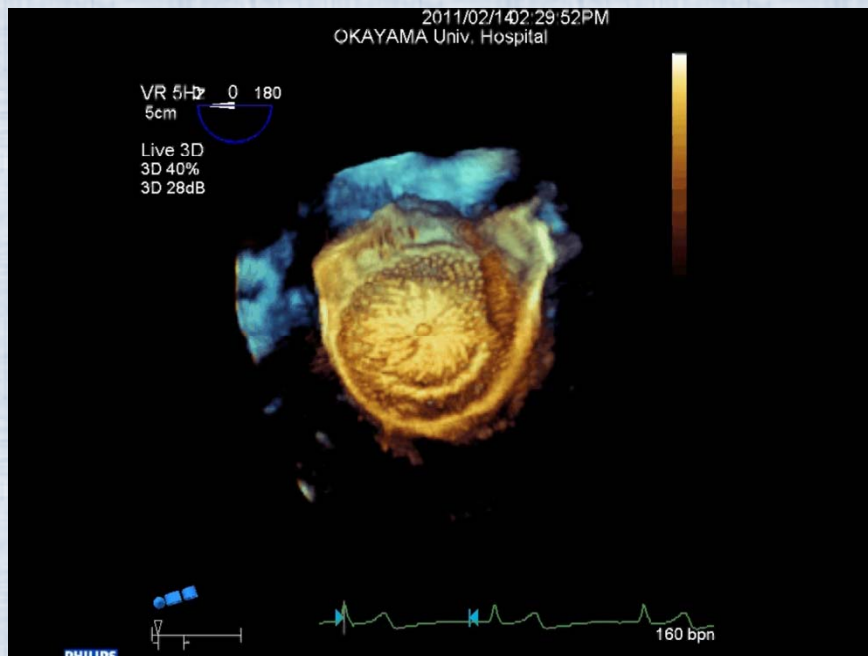


RT 3DTEE (side view)

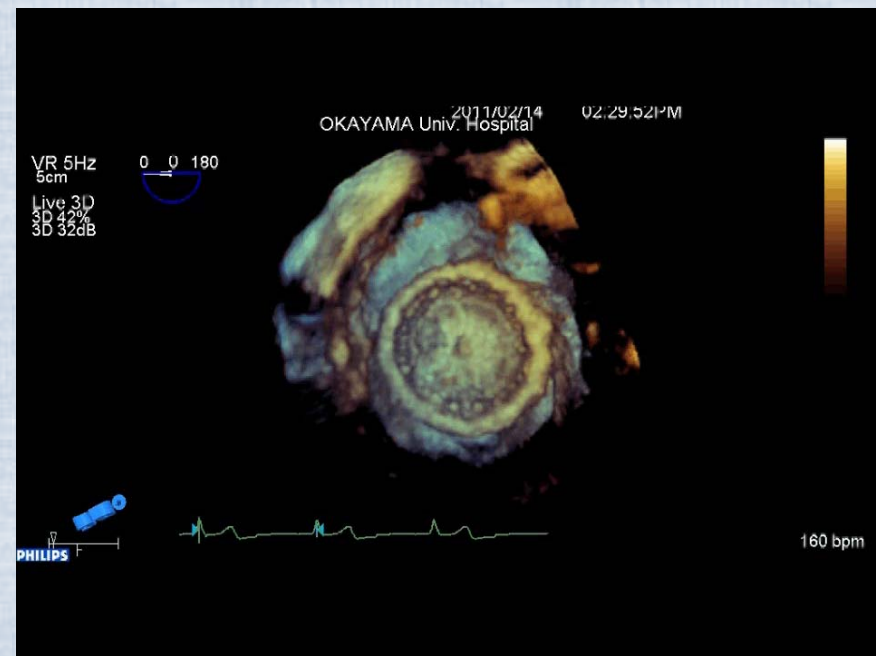


# After the procedure

LA enface view

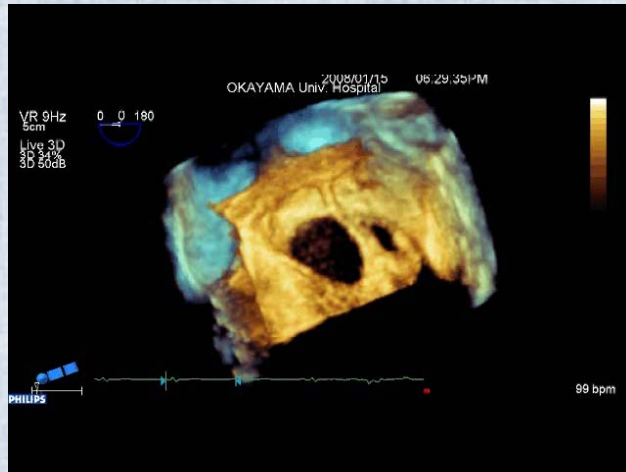


RA enface view



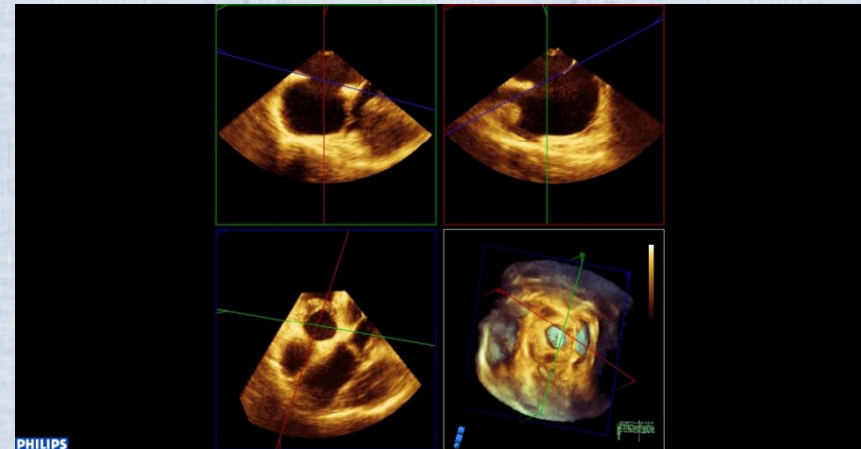
# RT 3D TEE image

## 3D zoom



- assessing the shape and the location of defects

## 3D full-volume



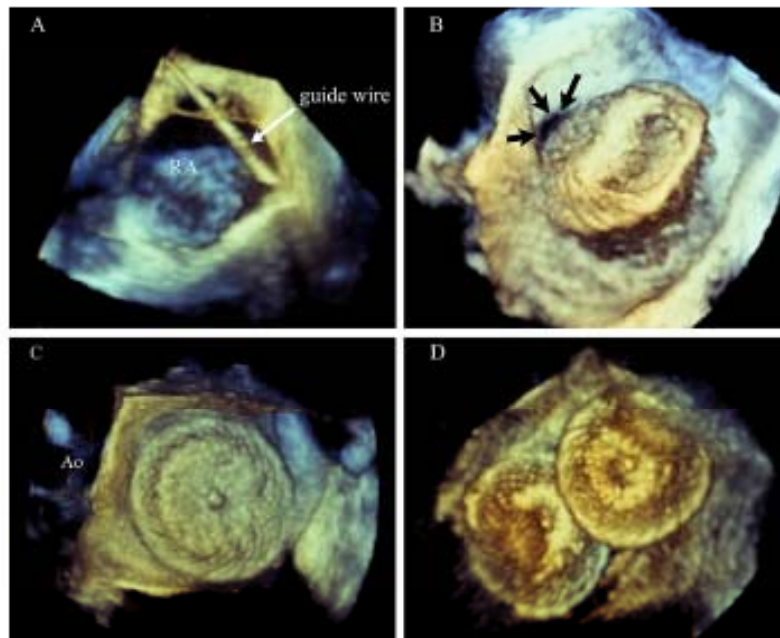
- measuring maximal ASD diameters
- assessing surrounding rims



## Application of Real-Time Three-Dimensional Transesophageal Echocardiography Using a Matrix Array Probe for Transcatheter Closure of Atrial Septal Defect

Manabu Taniguchi, MD, Teiji Akagi, MD, Nobuhisa Watanabe, RDCS, Yoshio Okamoto, MD, Koji Nakagawa, MD, Yasufumi Kijima, MD, Norihisa Toh, MD, Shinichi Ohtsuki, MD, Kengo Kusano, MD, and Shunji Sano, MD, *Okayama, Japan*

(*J Am Soc Echocardiogr* 2009; 22: 1114-1120)

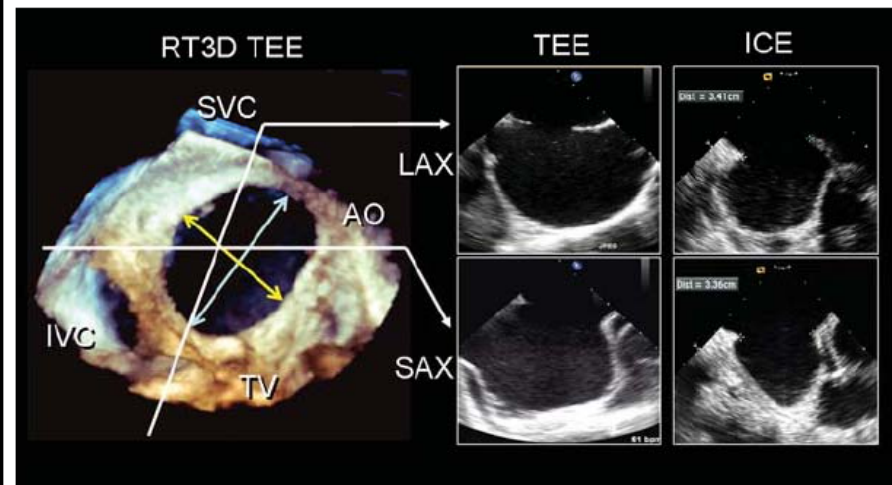


## Feasibility of real-time three-dimensional transoesophageal echocardiography for guidance of percutaneous atrial septal defect closure

Joseph A. Lodato<sup>1\*</sup>, Qi Ling Cao<sup>2</sup>, Lynn Weinert<sup>1</sup>, Lissa Sugeng<sup>1</sup>, John Lopez<sup>1</sup>, Roberto M. Lang<sup>1</sup>, and Ziyad M. Hijazi<sup>2</sup>

<sup>1</sup>University of Chicago Medical Center, 5841 South Maryland Ave. MC 5084, Chicago, IL 60637, USA; and <sup>2</sup>Rush University Medical Center, Chicago, IL, USA

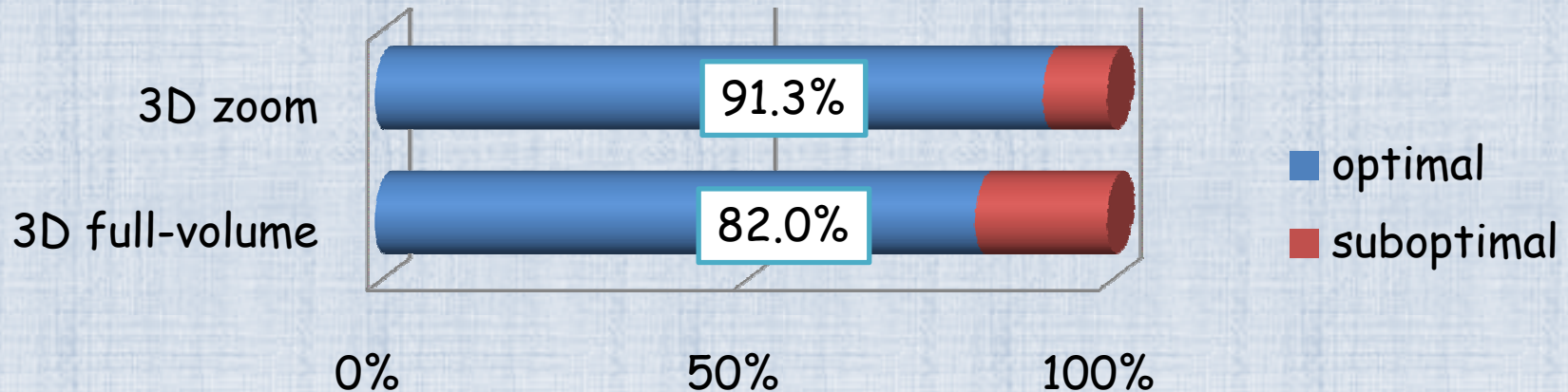
(*Eur J Echocardiogr* 2009; 10: 543-548)



# Image quality

(n=207)

**% of patients with or without optimal 3D image**

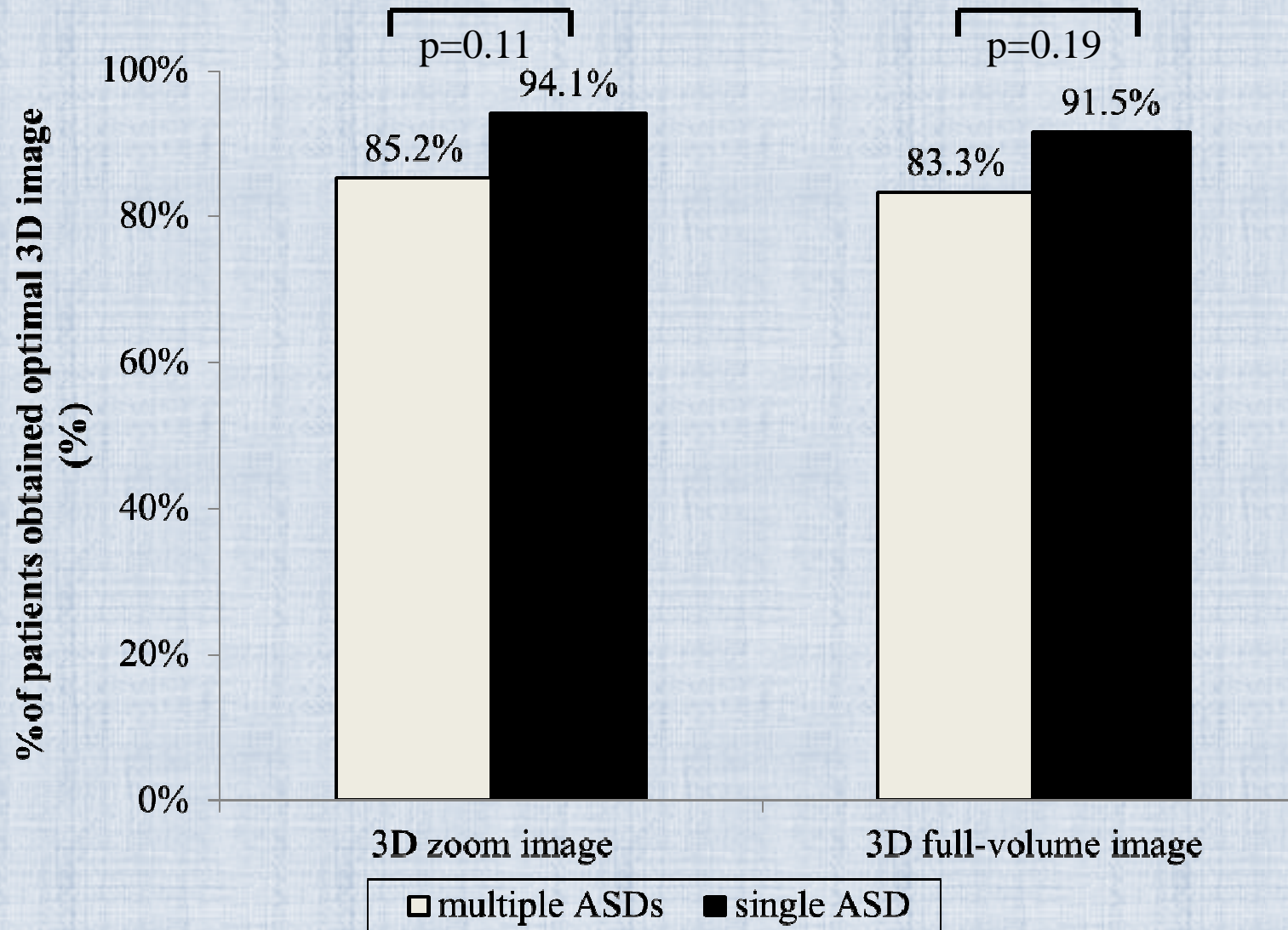


**Logistic regression analysis of less likely to be obtained good-quality full-volume data for the measurements**

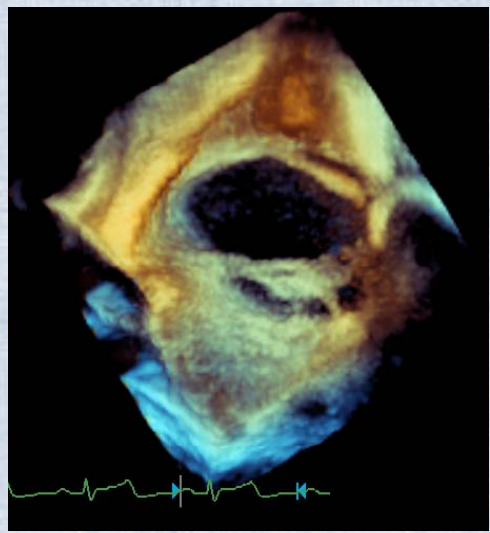
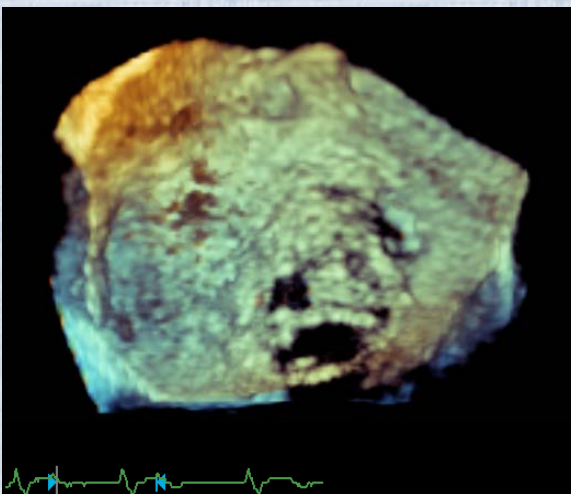
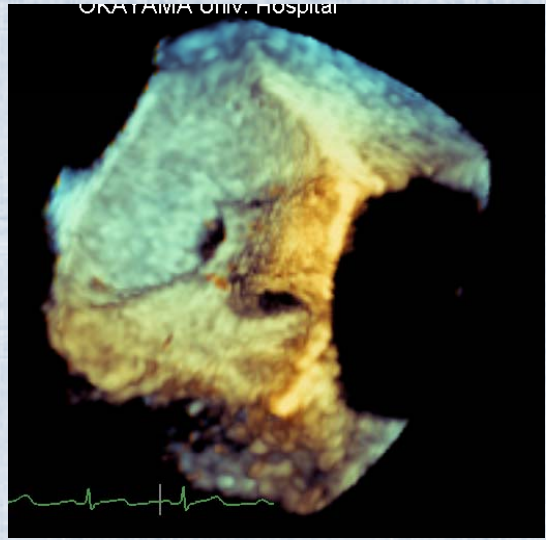
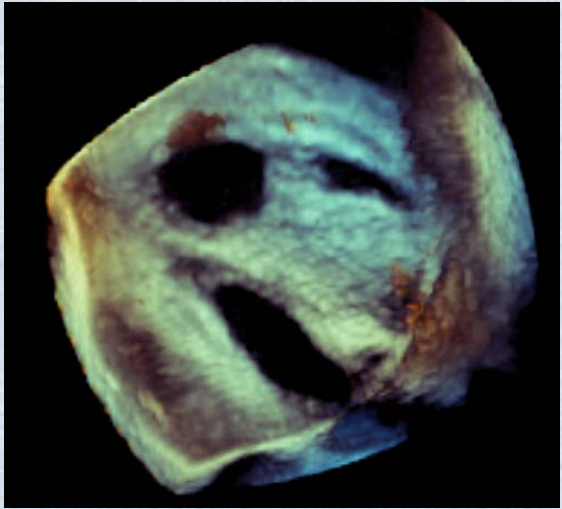
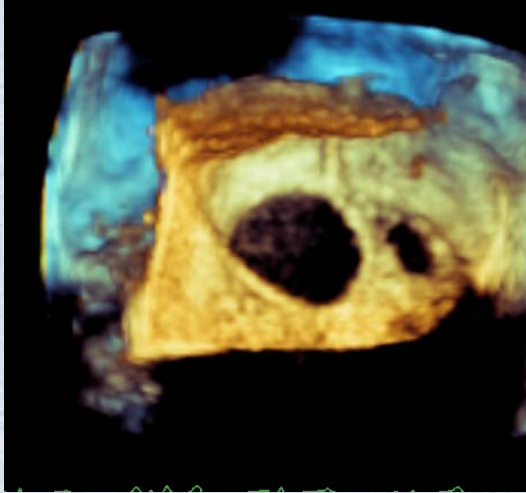
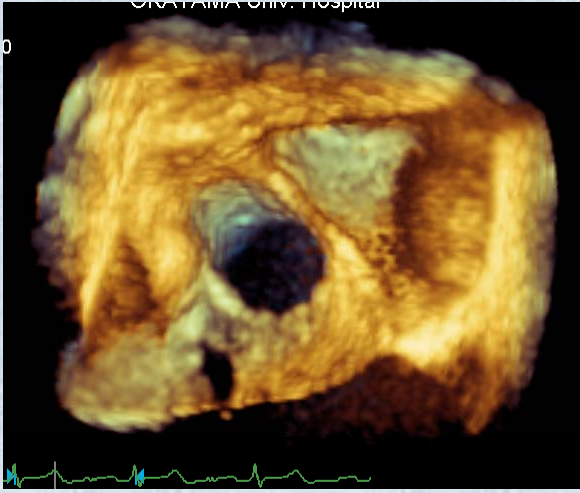
| Variable         | OR   | 95%CI     | P value |
|------------------|------|-----------|---------|
| age              | 1.06 | 1.03-1.09 | <0.001  |
| Deficient IP rim | 0.22 | 0.07-0.64 | 0.005   |

**Other variables:** multiple defects, maximal ASD size, body weight, BSA, Qp/Qs

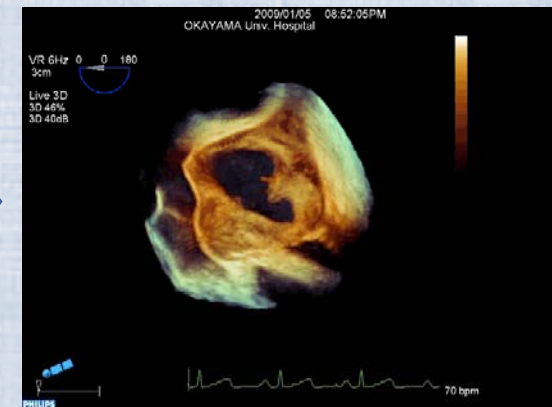
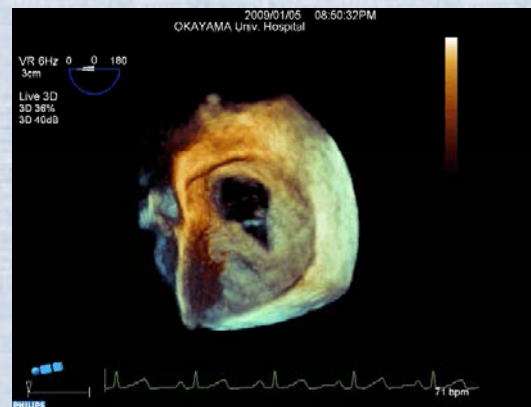
# Feasibility of 3DTEE in patients with multiple ASDs



# Multiple defects



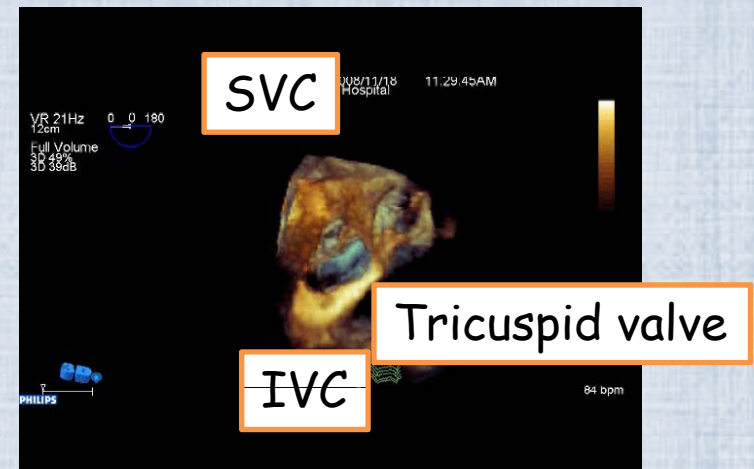
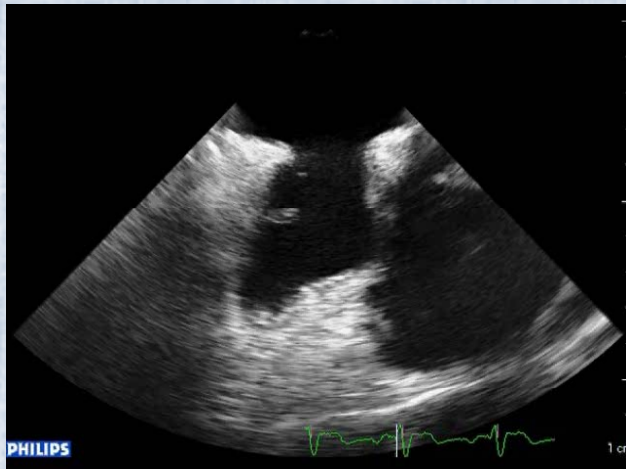
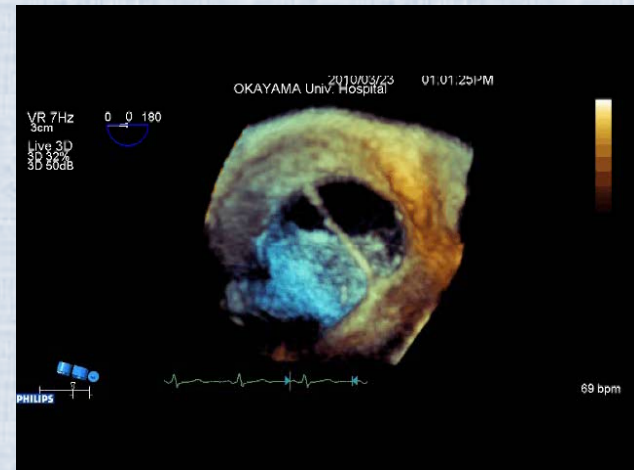
# Torn Atrial Septum during Transcatheter Closure of ASD



*(Kijima Y, Taniguchi M et al. J Am Soc Echocardiogr 2010; 23: 1222.e5-1222.e8.)*



# Intra-RA structure



# Conclusion

- In patients with optimal 3D zoom images, compared to 2D TEE images, 3D enface images contributed greatly to understanding ASD.
- RT3D TEE is feasible and effective imaging modality during transcatheter closure of difficult ASD, especially in patients with complex shaped ASD.

