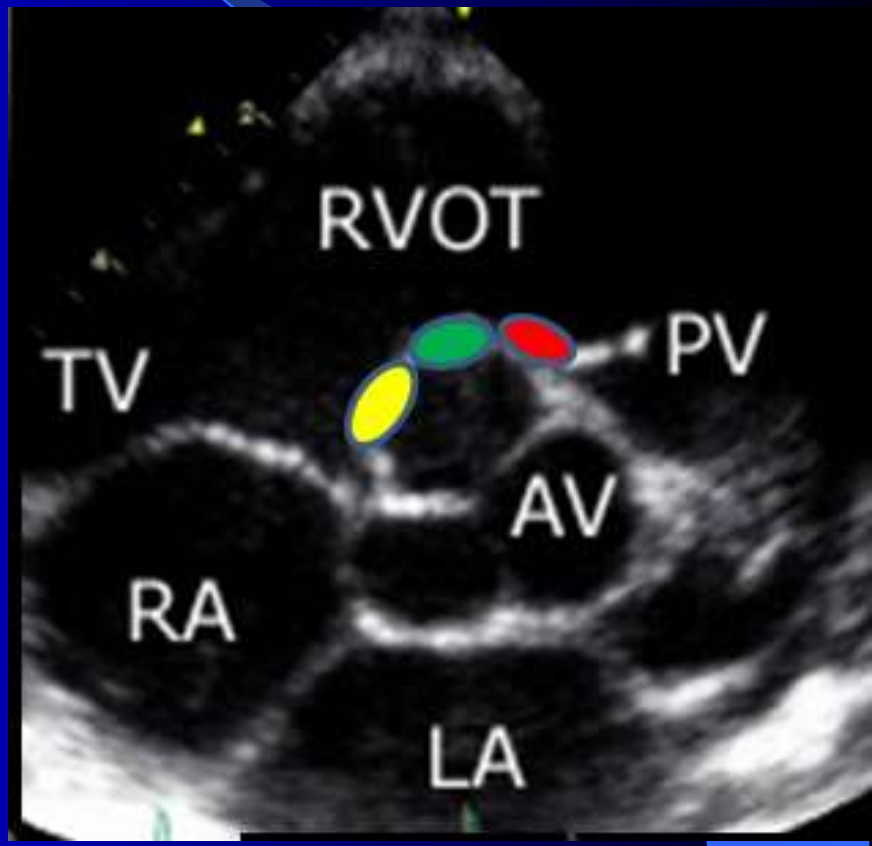
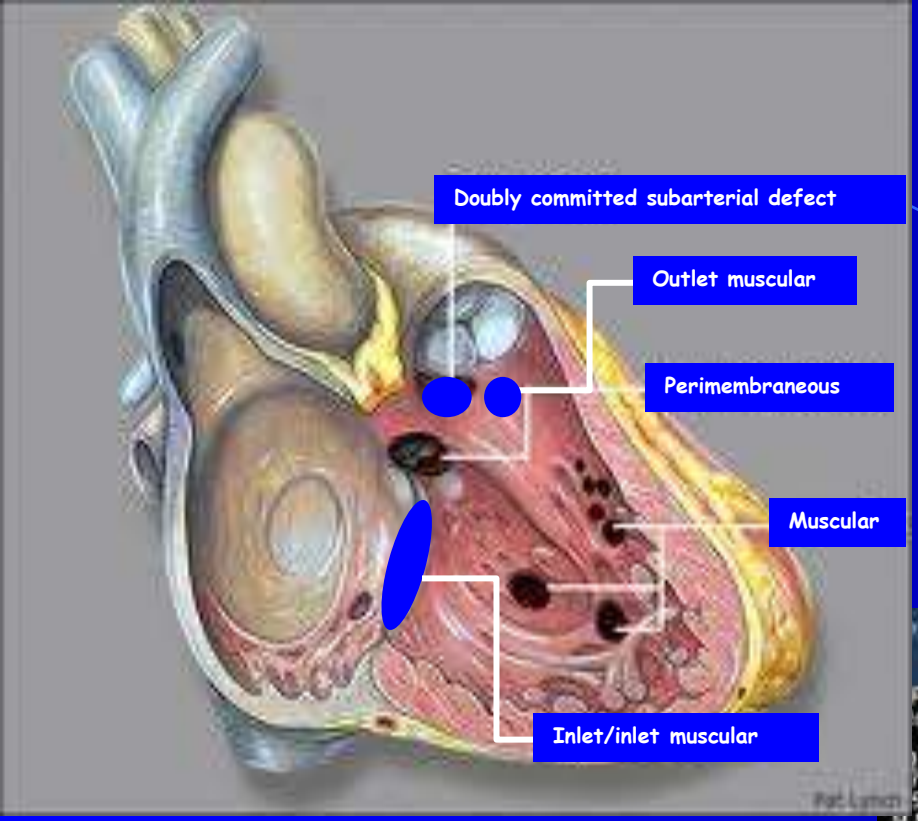
TRANSCATHETER CLOSURE FOR DOUBLY COMMITTED VSD

DO NGUYENTIN MD.
MEDICAL UNIVERSITY OF HCMC
CHILDREN HOSPITAL 1

INFUNDIBULAR VSD

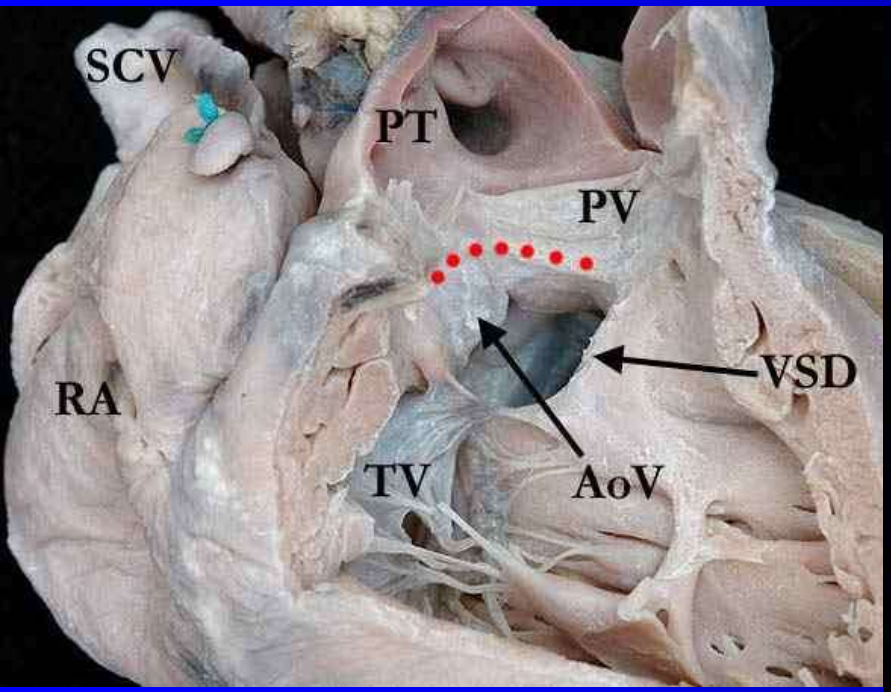
1. SUB-AORTIC VSD
2. INTRA-CONAL VSD
3. DOUBLY COMMITTED VSD
4. SUB-PULMONIC VSD

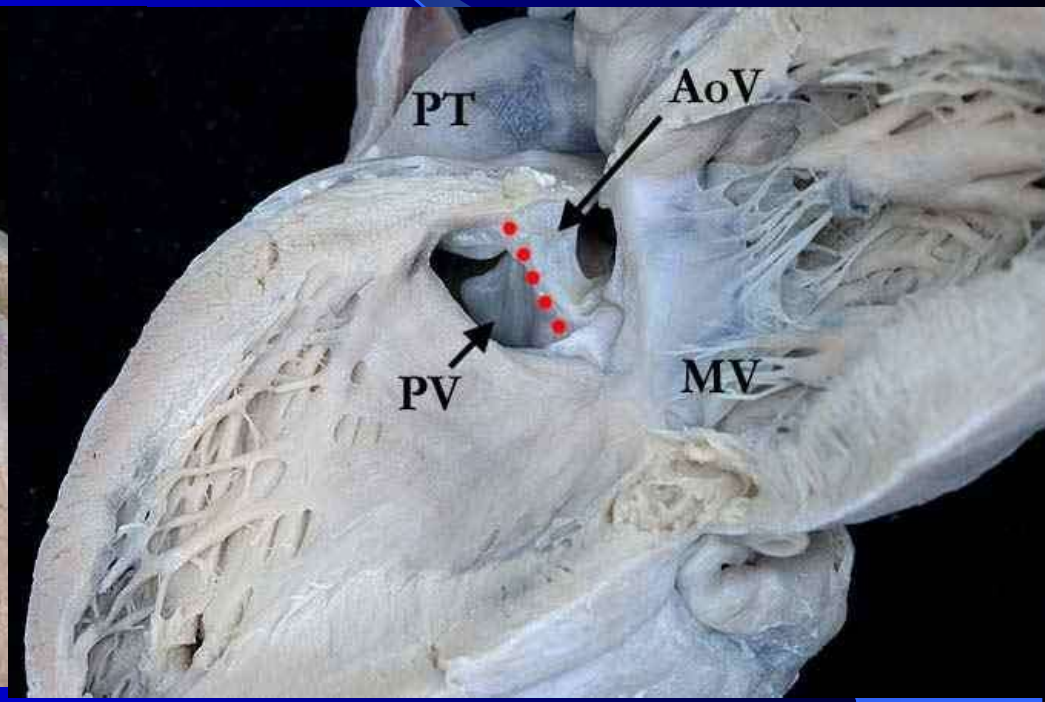


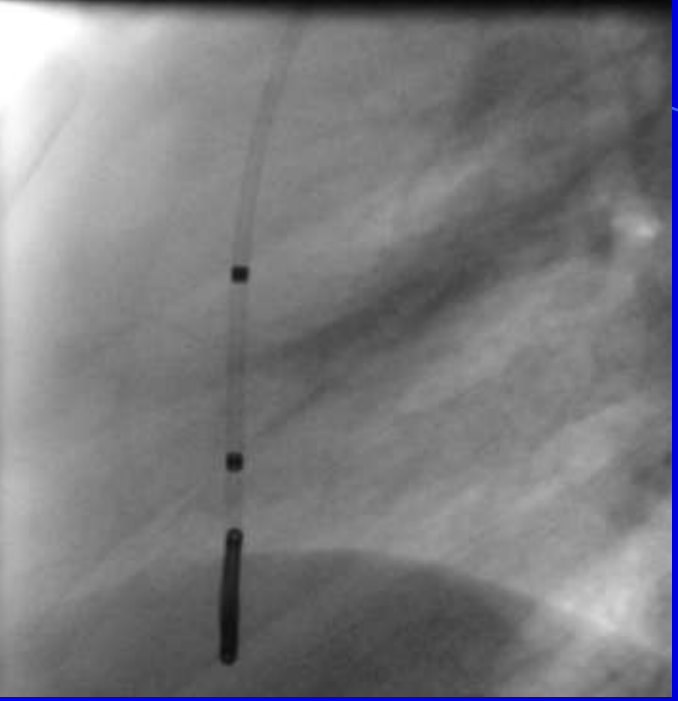

Doubly committed subarterial defect
Outlet muscular
Perimembraneous
Muscular
Inlet/inlet muscular

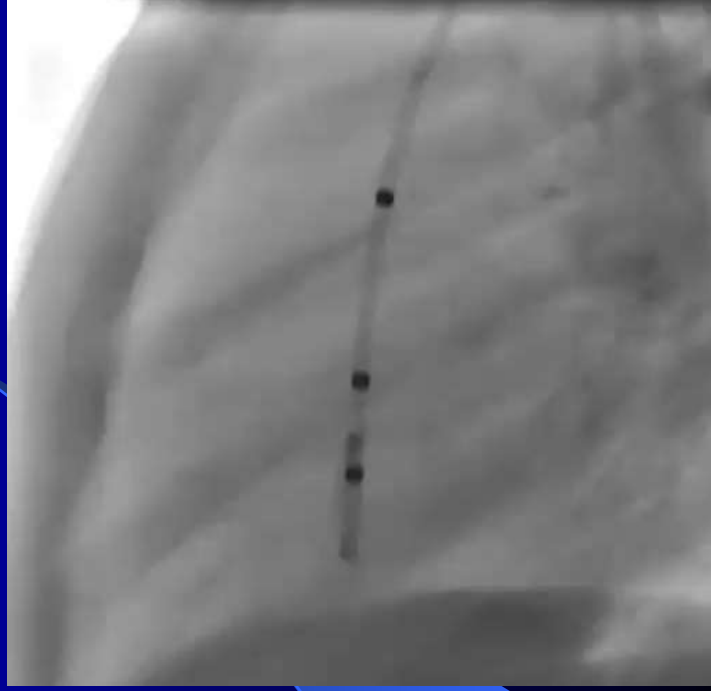

PHILIPS
TIS0 0 MI 1.0
X5-1/Pad S5
F 10Hz
2.5MHz
WF Hoch
Mittel
84 /min

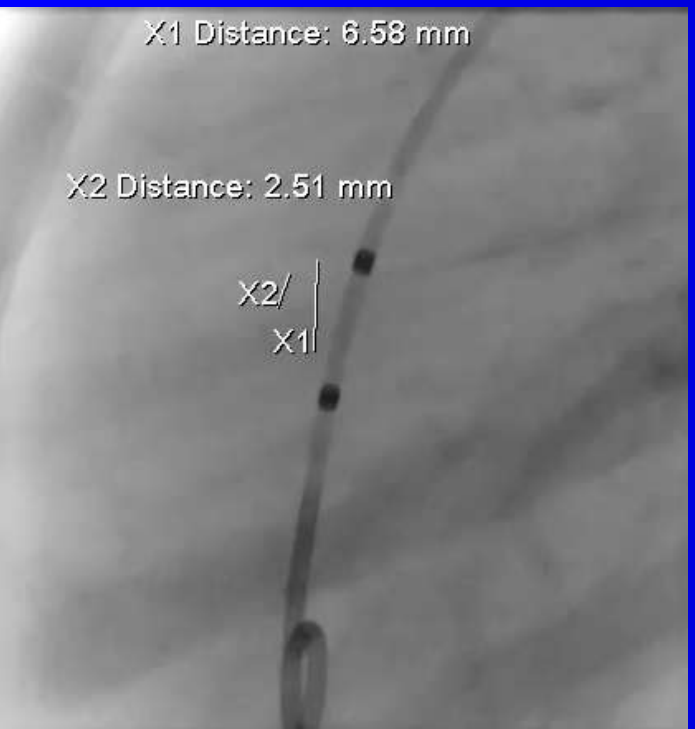
Doubly Committed Subarterial Ventricular Septal Defect










X1 Distance: 6.58 mm
X2 Distance: 2.51 mm
X2
X1


X1
Distance: 7.10 mm

WHY I CLOSE INFUNDIBULAR VSD?

Prevalence of VSD Types

Name	Year	No.VSD	Perimemb. %	**Subpulm. %**	Musc. %	Inlet %	
Soto B	1943	507	69.6	**6.9**	18.2	6.8	Mexico
Van der Hauwaert	1983	220	75.9	**5.9**			Europe
A.G. Eroglu	2003	1096	65.6	**3.3**	33.3	0.6	Turkey
Glen, S.	2004	1127	76		24		UK
Ando M	1977	146	52	**30.9**	15.7	1.4	Japan
Hong CY	1983	646	59.4	**28.2**	0.8	10.7	Korea
Lue HC	1986	332	75	**22.6**	0.6	0.9	Taiwan
Tatsuno K	1989	551	66.1	**31.6**	0.5	1.8	Japan
Layangool	2003	1.977	74.8	**17.5**	3.9	2.2	Thailand

Courtesy Dr. Layangool T.

Natural history of subarterial infundibular VSD

395 pts.

1.Aortic valve deformity: 43,5%

- **Aortic valve prolapse (AVP) without AR: 19,5%**
- **Aortic valve prolapse with AR: 24%**

2.No aortic valve deformity: 47,3%

- **Pulmonary hypertension (PHT): 59,4%**
- **AVP and AR develop most frequently at 5 to 8 years**
- **AVP present in all pts. without PHT at age of > 30 years**

Am Heart J 1984; 108(5): 1312-1317
Momma K et al

NATURAL HISTORY OF INFUNDIBULAR VSD

214 pts.

73% of 139 asymptomatic pts. develop AVP

80% of pts. with AVP develop AR

AVP and AR:

- 1 year: 8%
- 5 years: 30%
- 10 years: 64%
- 15 years: 83%

Am J; Cardiol 2001; 87(11): 1266-1270
Lun K et al

Doubly Committed VSDs

Etiology of aortic valve prolapse

1. Lack of support of aortic sinus by infundibular septum
2. Structural defect in the base of the aortic sinus itself
3. Hemodynamic influence during both systole and diastole

Doubly Committed Subarterial Ventricular Septal Defect

This entity consists of 2 different pathologies:

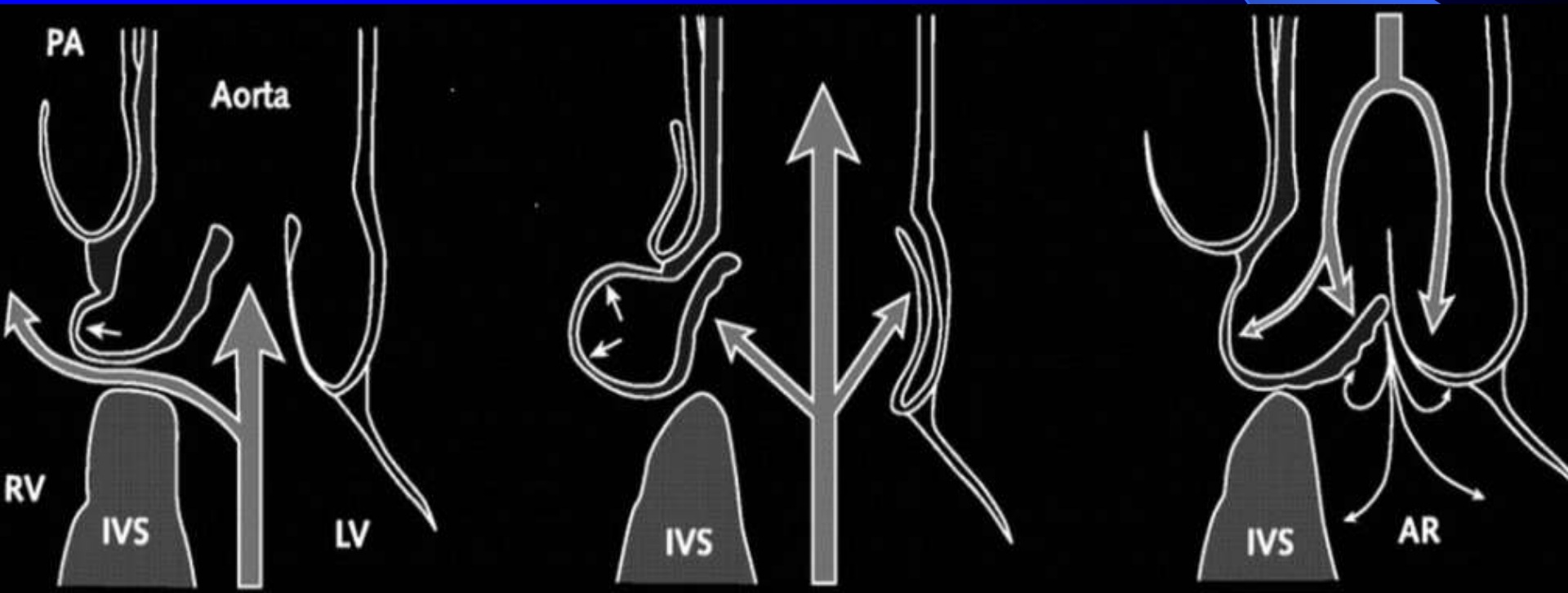
1.L-R-Shunt

2.Aortic valve deformity

Management: Curative Treatment and Prophylaxis

Presence of Ao Valve prolapse

- Severity of prolapse
- Presence and severity of AR




X1
Distance: 7.10 mm

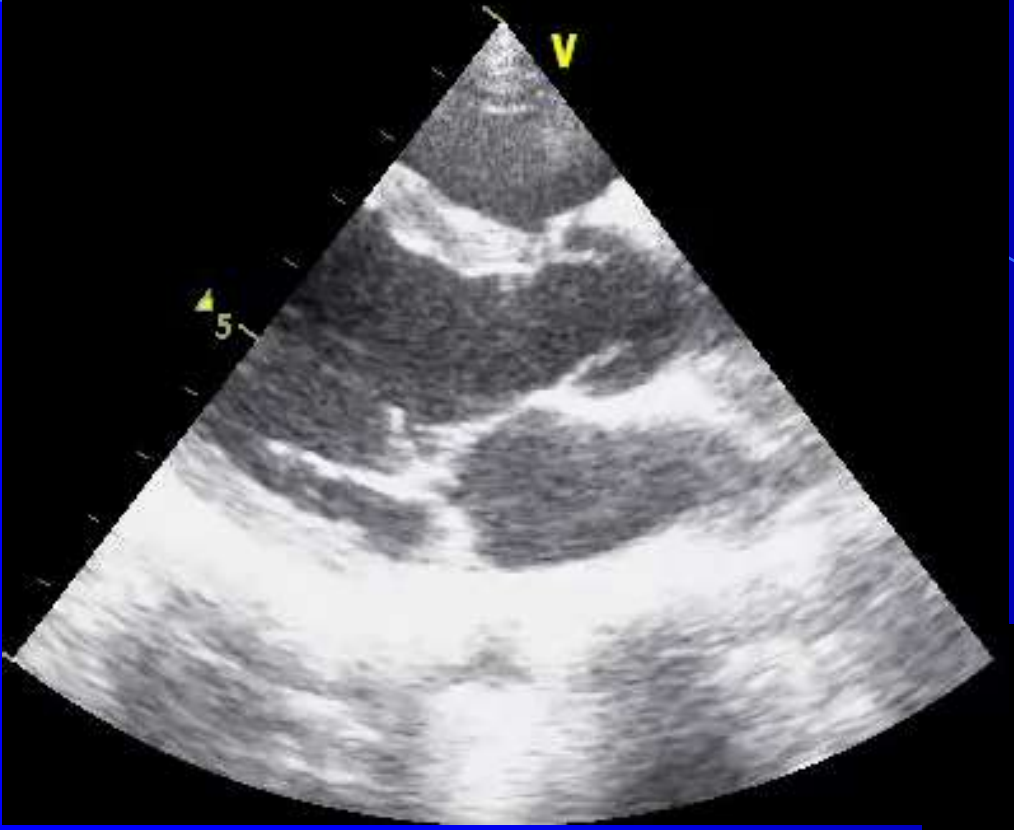
SPECIAL CONSIDERATIONS IN CLOSURE INFUNDIBULAR VSDs

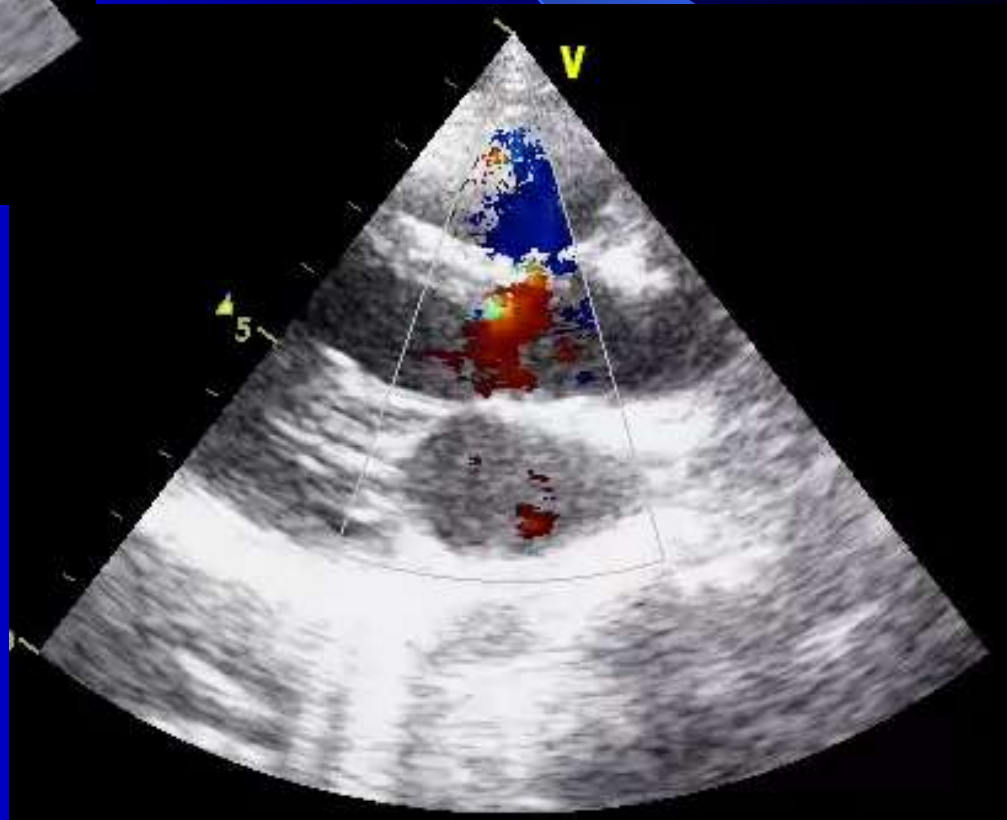
MORPHOLOGY OF INFUNDIBULAR VSD

1. **NO MSA**
2. **NO AORTIC RIM**
3. **THE SEVERITY OF AVP AND AR**

SEVERE AORTIC VALVE PROLAPSE

1. **MALALIGNMENT BETWEEN SETUM AND RCC**
2. **THE TRUE HOLE MAY BE BIGER THAN ON ECHO**
3. **THE PROLAPSED CUSP IS WEAK AND NO SUPPORT FROM CONAL SEPTUM : NOT STRONG ENOUGH FOR KEEPING THE DEVICE.**


V
5


V
5

SPECIAL CONSIDERATIONS

1. Aortic valve?
2. Pulmonary valve?
3. Stability of the device (without support mechanism)?
4. RVOT?
5. Arrhythmias?

PATIENT SELECTION

1. BODY WEIGHT > 10 KG
2. NO SEVERE AORTIC VALVE PROLAPSE
3. NO MODERATE TO SEVERE AR
4. TRUE DEFECT < 7 mm
5. NO OTHER CARDIAC ABNORMALITIES

HOW I CLOSE INFUNDIBULAR VSD?

TECHNIQUES

1. LATERAL VIEW FOR ANGIOGRAM
2. VSD CROSS WITH CUT PIGTAIL
3. DOUBLE CHECK FOR THE DIAMETER OF THE HOLE AFTER CROSSING LONG SHEATH
4. CHECKING AR DURING DEPLOYING THE DEVICE


LE THIEN THANH
ID: 350993/08_VSD
* 20/02/2003
Study 1
14/01/2013
12:46:37
H
Benh Vien Nhi Dong 1
AXIOM-Artis
HFS
A
Card <20kg
Card <20kg
SINGLE PLANE\SINGLE B
CRA 0
LAO 88
W: 190
C: 126

TRANSCATHETER CLOSURE OF SUBPULMONIC VSD

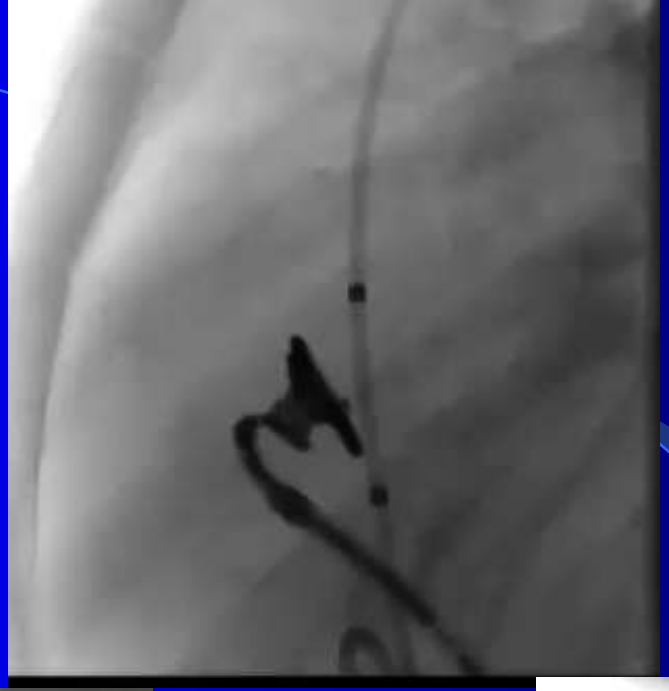
TECHNIQUES

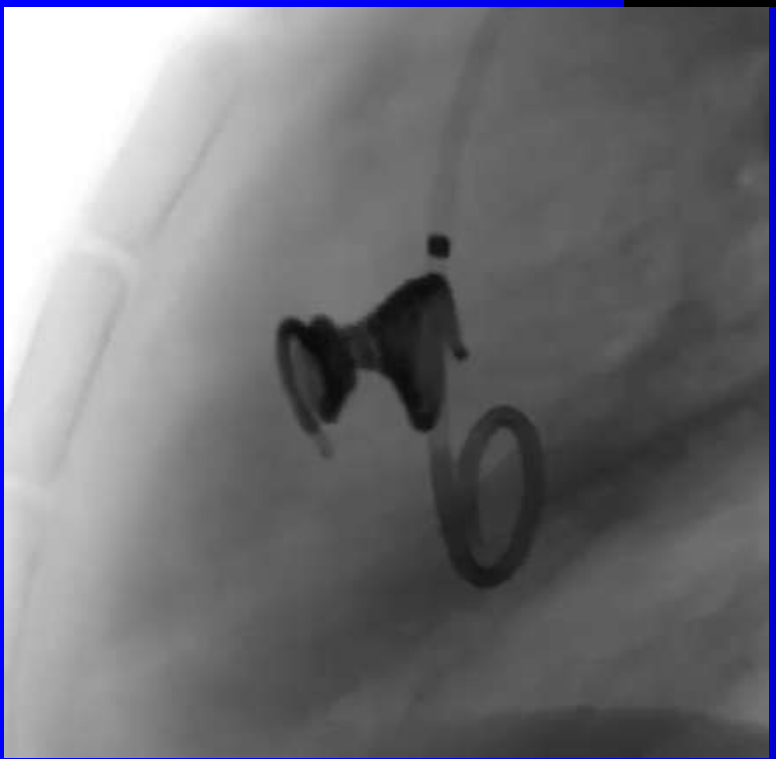
DEVICE SELECTION:

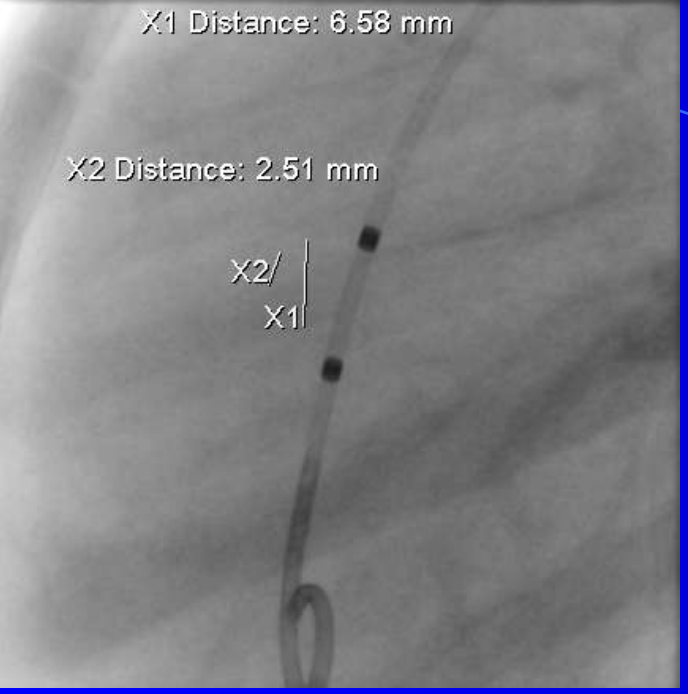
1. PFM COIL

- RIGHT SIDE: DIAMETER OF VSD IN RV PLUS 2
- LEFT SIDE: PLUS AT LEAST 4 ACCORDING TO PROLAPSE

1. ADO II
   - LENGTH: 4 mm
   - WAIST DIAMETER: SMALLEST DIAMETER + 1 OR 2
2. OTHER : NO EXPERIENCE.
3. ADO I: NOT SUITABLE





X1 Distance: 6.58 mm
X2 Distance: 2.51 mm
X2
X1

WHAT RESULTS FROM INFUNDIBULAR VSD CLOSURE BY DEVICE?

Catheter Cardiovasc Interv. 2011 Dec 1; 78(7):1032-40
Chungsomprasong P et al

Division of Cardiology, Department of Pediatric, Siriraj Hospital, Mahidol University, Bangkok, Thailand

33 pts. (11 perim. VSD, 22 DCVSD)
Age: 1 - 29 y. (9.8)
Body weight: 10 – 83 kg (34.5)
VSD diameter by TEE: 2.5 – 8 mm (4.7)

Pre-existing AR:
Trivial/mild: 8/33 (24.3%)
Moderate: 1/33 (3%)

Results:

Small residual shunt: 6/33 (18.2%)
Moderate/large: 0/33 (0%)

AR at 6 months:
Trivial/mild: 11/33 (24.3%)
Moderate: 0/33

International Survey for Coil Closure of Double Committed Subarterial VSD

44 pts. (24 male, 17 female)

Age: 2 - 38 y. (12.6)
Body weight: 10 – 74 kg (31.6)
VSD diameter by TEE: 2.5 – 8 mm (4.1)

Pre-existing AR:
None: 16/41 (39%)
Trivial/mild: 22/41 (53.6%)
Moderate: 3/41 (7.3%)

Technical success: 41/44 (93%)
Technical failure: 3/44 (7%)

1. No stable coil formation
2. Too little coil loops on LV side ➔ too large residual shunt

International Survey for Coil Closure of Double Committed Subarterial VSD

Clinical Results:

Small residual shunt: 6/41 (14.6%)
Moderate/large: 1/41 (2.4%) ➔ Surgical removal

AR (FU 6 – 63 months):
None: 23/40 (57,5%)
Trivial/mild: 16/40 (40%)
Moderate: 1/40 (2.5%)

Pre-existing AR:
None: 16/41 (39%)
Trivial/mild: 22/41 (53.6%)
Moderate: 3/41 (7.3%)

Development of AR after Coil Closure

Progressive: None
Unchanged: 40%
Regressive: 60%

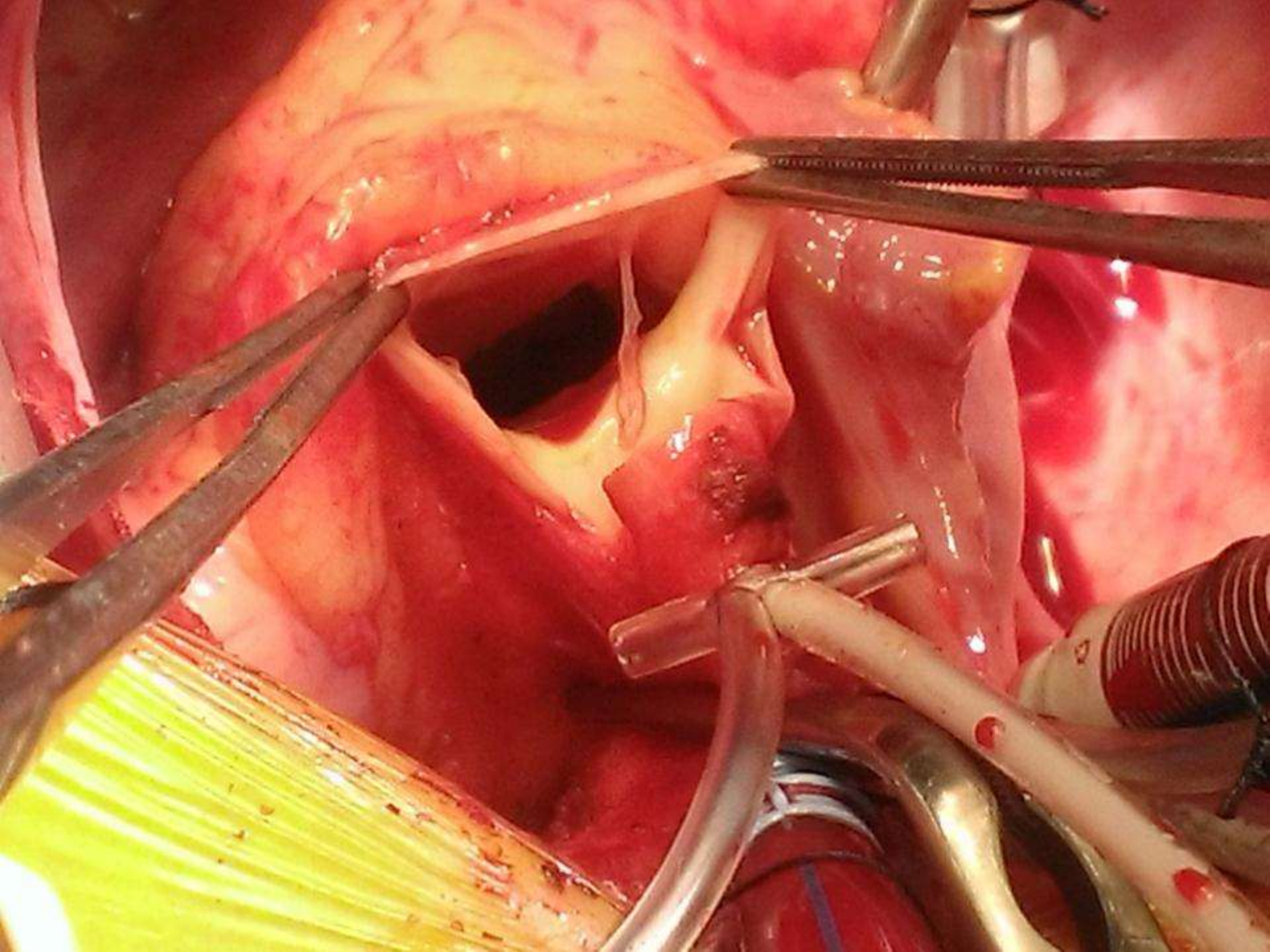
TRANSCATHETER CLOSURE OF SUBPULMONIC VSD

OUR EXPERIENCE

86 CASES INFUDIBULAR VSD CLOSURE

- **AGE: 2 YEARS- 15 YEARS**
- **BODY WEIGHT: 10- 55 kg**
- **VSD DIAMETER: 3.2 – 6.5 mm**

1. **SUCCESFUL: 81 CASES**
2. **TECHNICAL FAILURE 2 CASES**
3. **HEMOLYSIS 2 CASE**
4. **NEW AR: 1 CASE**



TRANSCATHETER CLOSURE OF SUBPULMONIC VSD

OUR EXPERIENCE

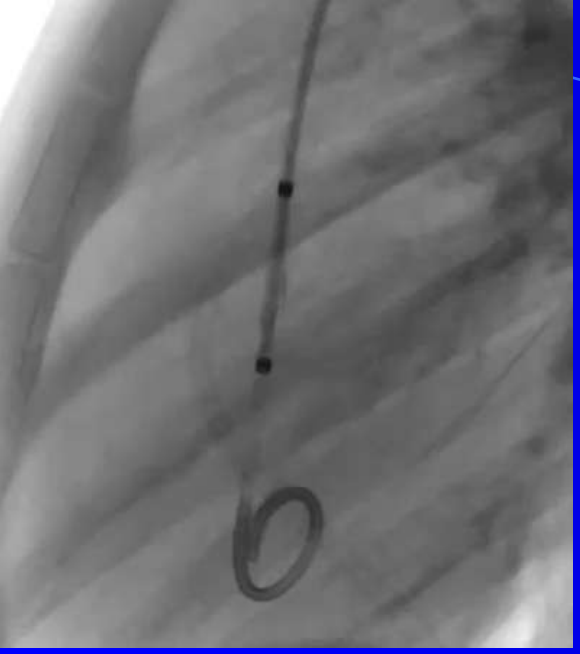
1. F/U 8 YEARS:
2. NO LATE AVB
3. NO AVP AND AR BECOME WORSEN

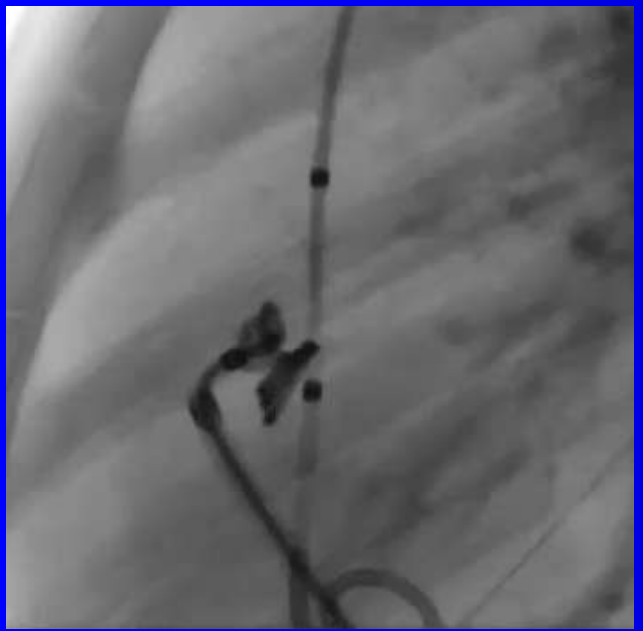
	BEFORE	ATER
AVP	56%	23%
AR	24%	14%

TRANSCATHETER CLOSURE OF SUBPULMONIC VSD

COMPLICATIONS AND FAILURE

1. HEMOLYSIS: RESIDUAL SHUNT
2. TECHNICAL FAILURE:
    1. UNDERESTIMATED THE SIZES OF DEFECTS
    2. THE DEVICE CONFIGURATION WAS CHANGED



CONCLUSIONS

1. DCVSD is common in Asia
2. Progressive AVP and AR is an important issue
3. Timing closure
4. Infundibular VSD is the most difficult type
5. Pfm coil and ADO II : acceptable devices
6. Long-term results should be strictly evaluated

THANKS FOR YOUR ATTENTION

SEE YOU IN HO CHI MINH CITY JAN 15 – 17th, 2014