TRANSCATHETER CLOSURE FOR DOUBLY COMMITTED VSD

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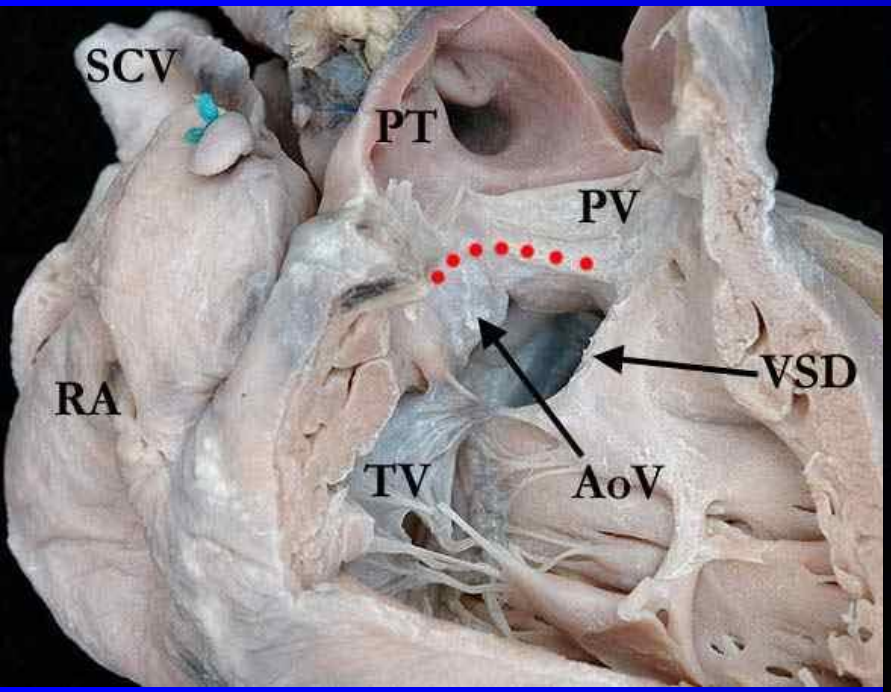
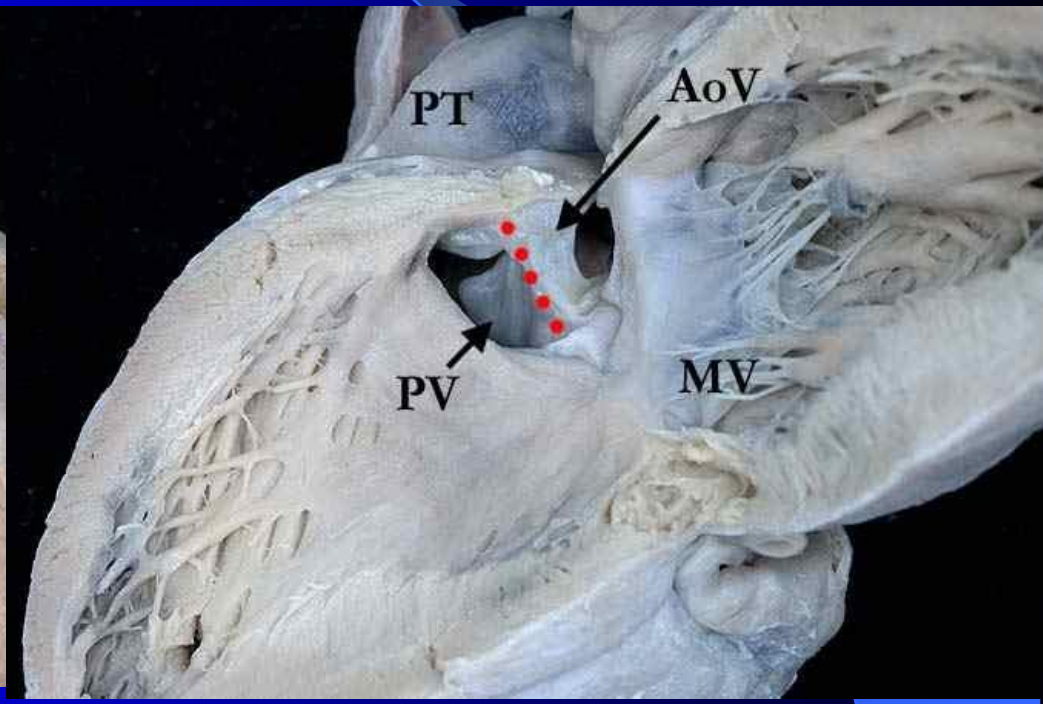
MEDICAL UNIVERSITY OF HCMC
CHILDREN HOSPITAL 1

TRANSCATHETER CLOSURE FOR INFUNDIBULAR VSD

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

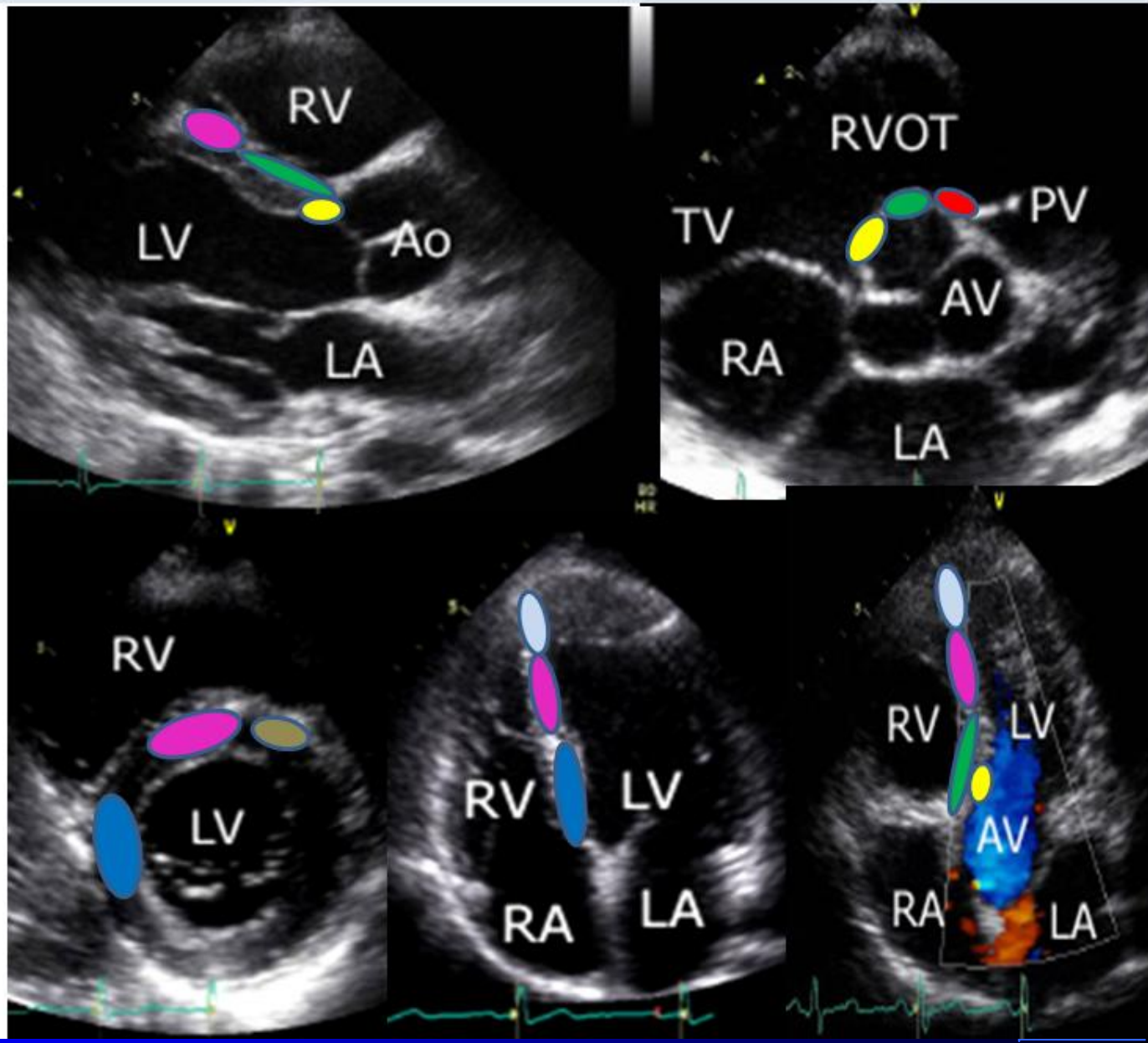
Doubly Committed Subarterial Ventricular Septal Defect





Echocardopgraphic delineation of various VSDs

- Subpulmonary
- Perimembraneous
- subaortic
- inlet
- mid-muscular
- marginal
- apical

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WF Hoch
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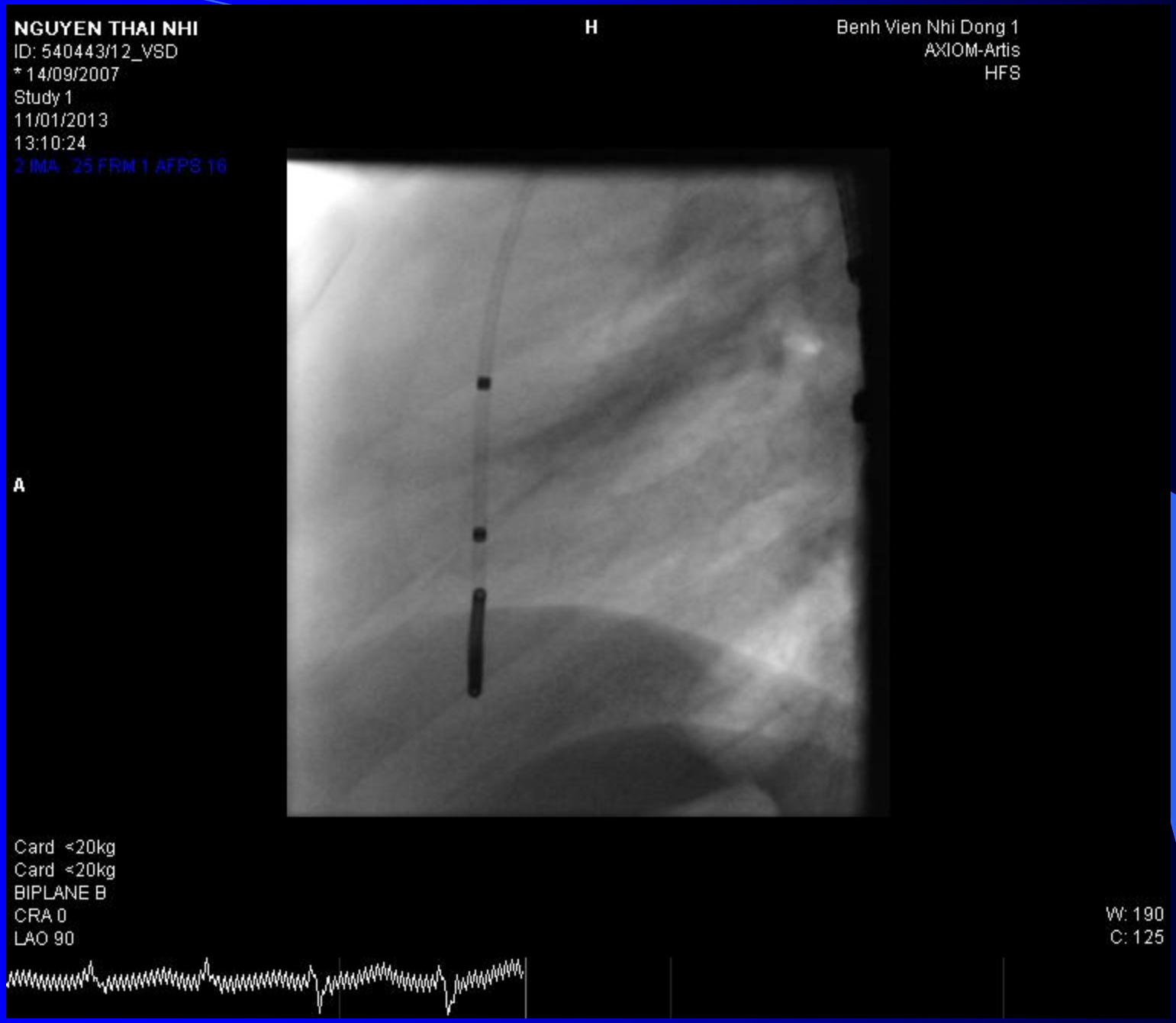
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AXIOM-Artis
HFS
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Card <20kg
Card <20kg
BIPLANE B
CRA 0
LAO 90
W: 190
C: 125

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.

WHY I CLOSE INFUNDIBULAR VSD?

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 aand nnulus 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:

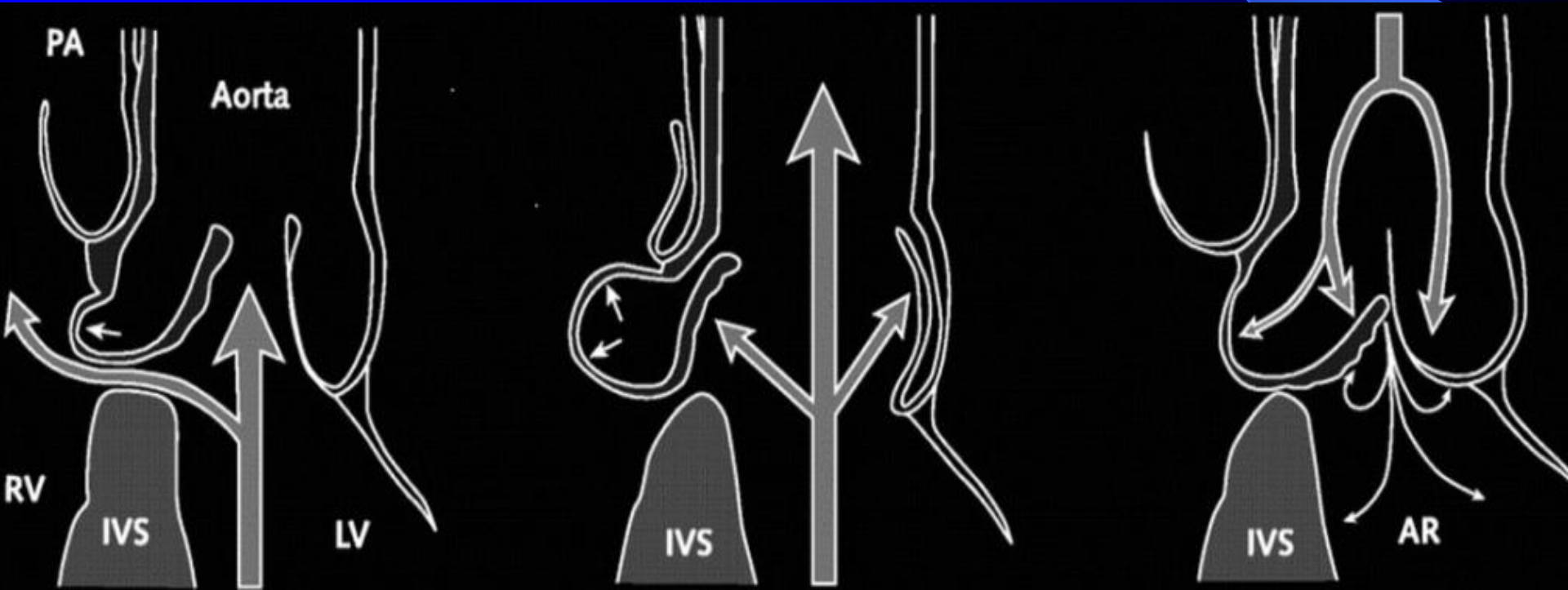
1.L-R-Shunt

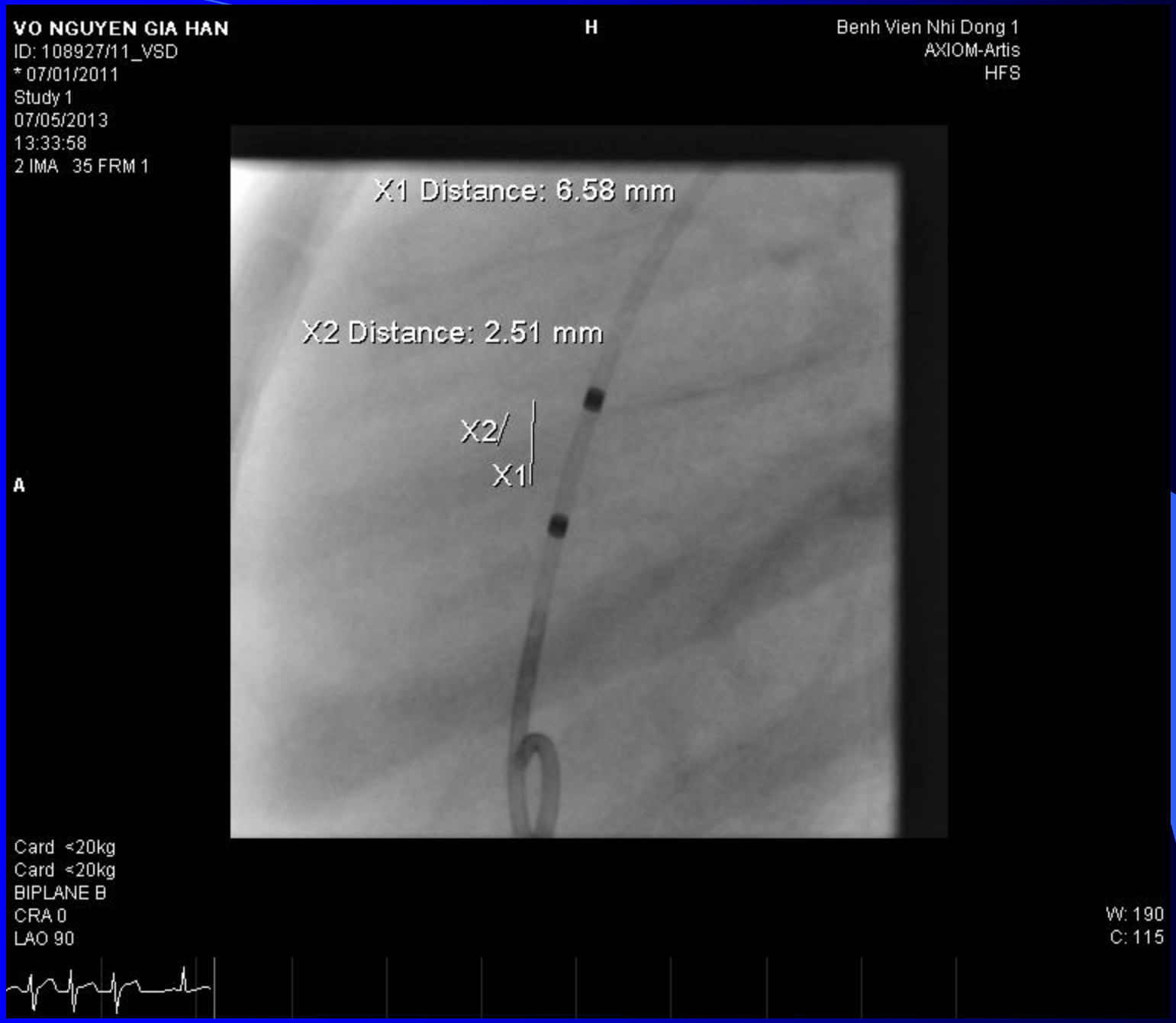
2.Aortic valve deformity

Management: Curative Treatment and Prophylaxis

Presence of Ao Valve prolapse

- Severity of prolapse
- Presence and severity of AR

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AXIOM-Artis
HFS
X1 Distance: 6.58 mm
X2 Distance: 2.51 mm
X2/
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Card <20kg
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BIPLANE B
CRA 0
LAO 90
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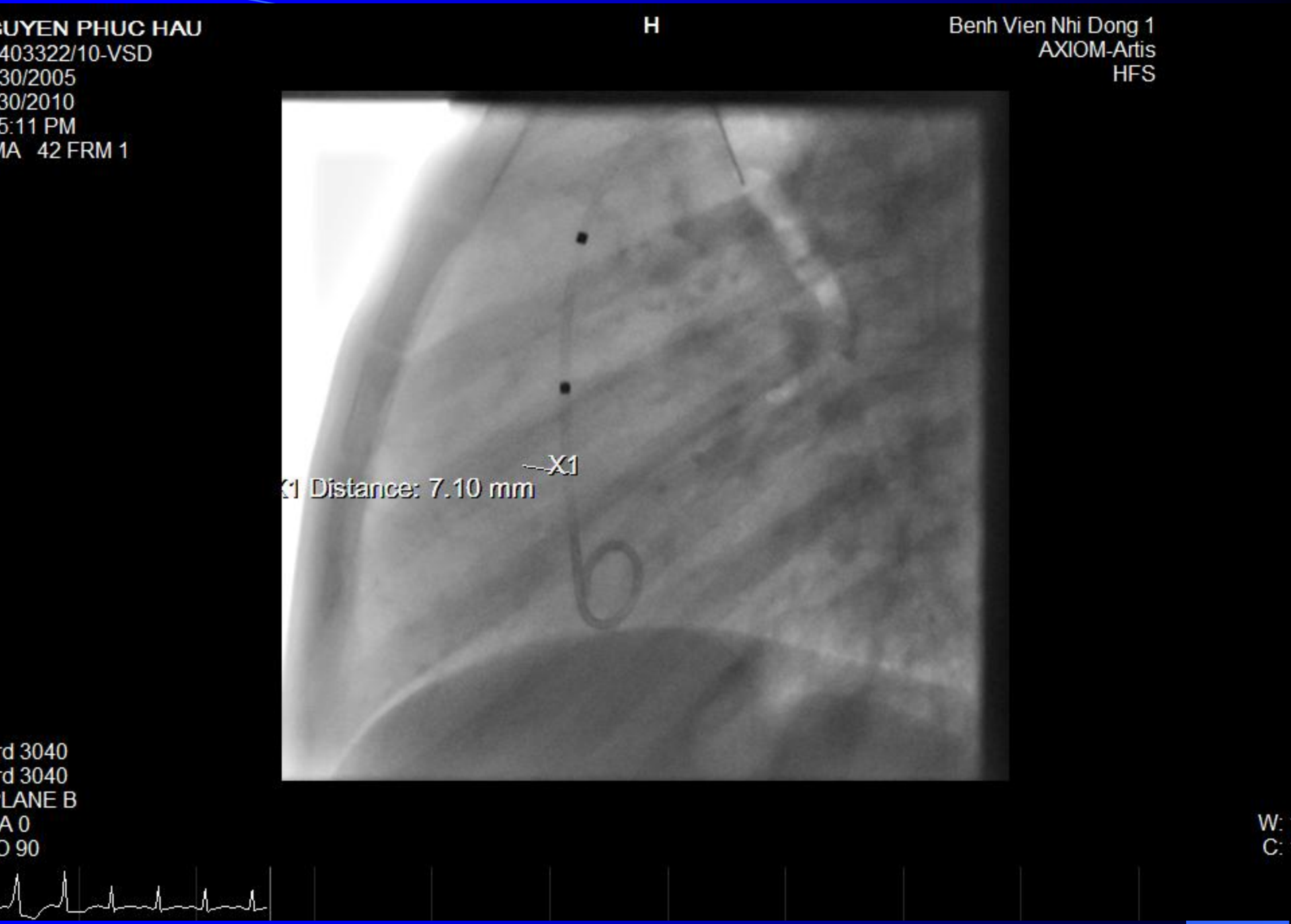
UYEN PHUC HAU
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Benh Vien Nhi Dong 1
AXIOM-Artis
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X1 Distance: 7.10 mm
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WHICH INFUNDIBULAR VSDs CAN BE CLOSED BY DEVICE?

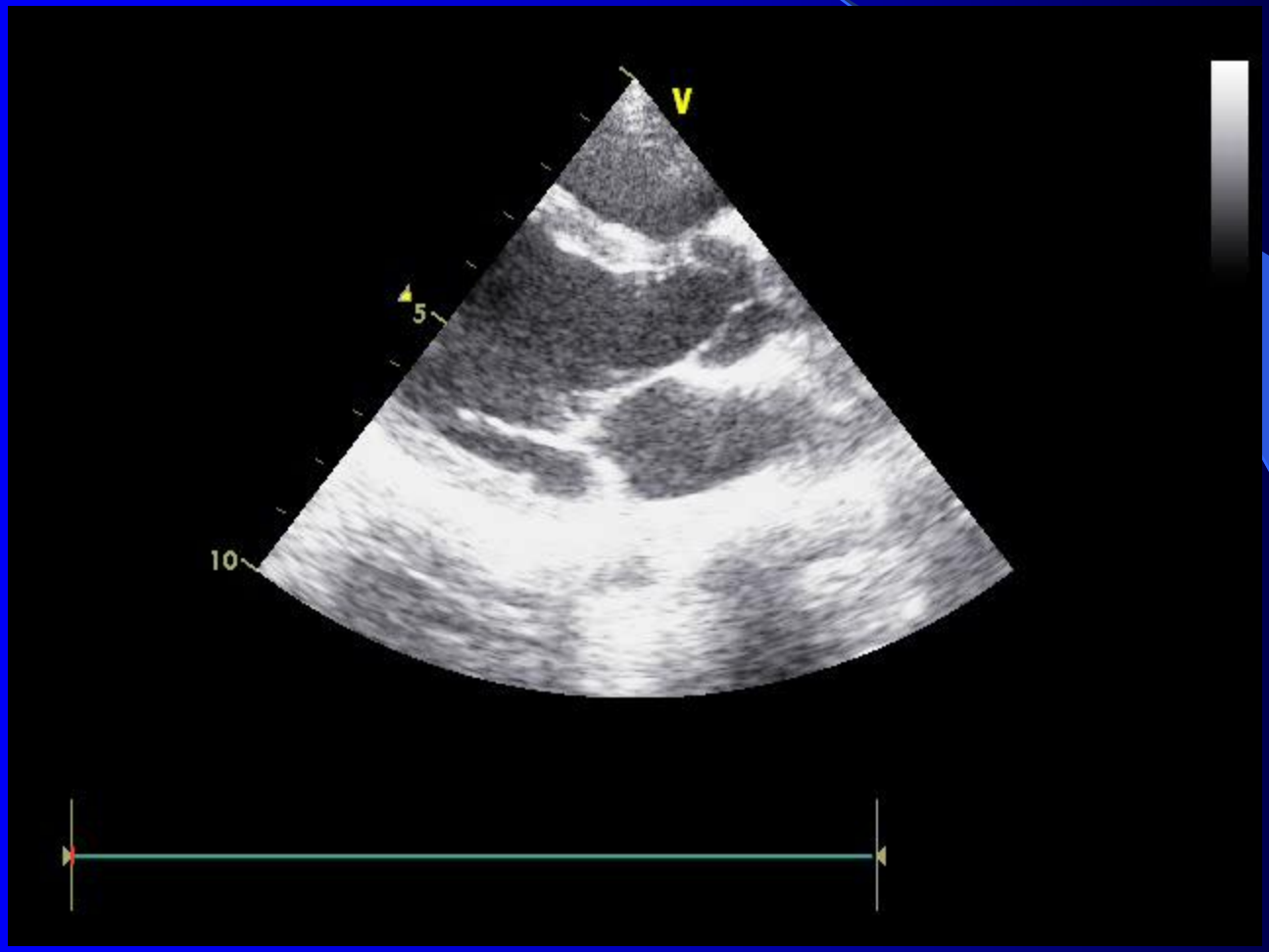
MORPHOLOGY OF INFUDIBULAR VSD

1. **NO MSA**
2. **LIMITTED OR NO AORTIC RIM**
3. **THE SEVERITY OF AORTIC VALVE PROLAPSE AND AR**
4. **EXTENSION OF DEFECT FROM PULMONIC TO AORTIC: SUBPULMONIC, INTRACONAL, SUBAORTIC, DOUBLY COMMITTED**

SEVERE AORTIC VALVE PROLAPSE

1. MALALIGNMENT BETWEEN SETUM AND RCC of AORTA
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.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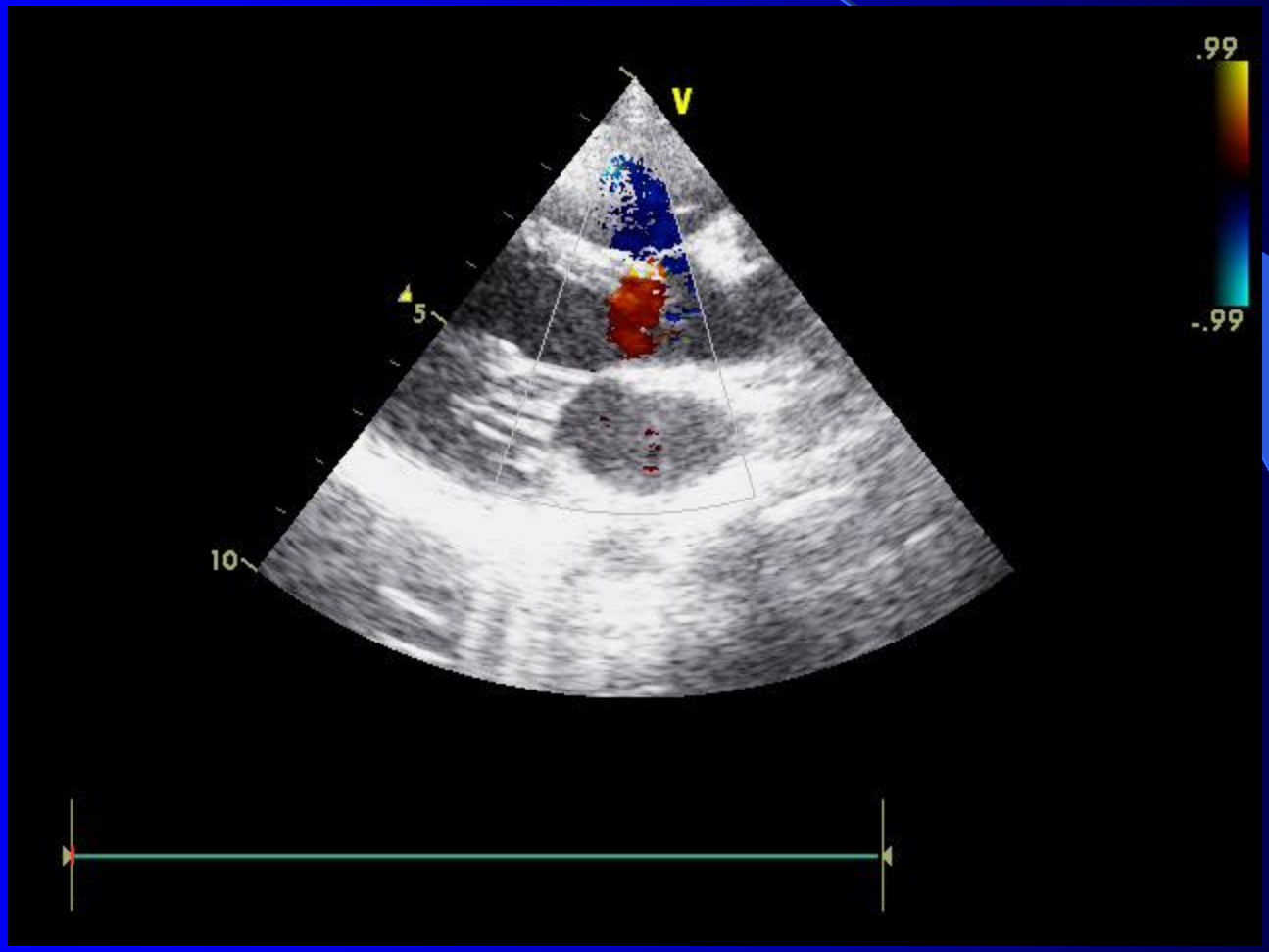
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Can we close the defect by device

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.MEASURE THE HOLE AFTER CROSSING LONG SHEATH

4.ALWAYS CHECKING AR DURING DEPLOYING THE DEVICE


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AXIOM-Artis
HFS
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Card <20kg
Card <20kg
SINGLE PLANE\SINGLE B
CRA 0
LAO 88
W: 190
C: 126

TRANSCATHETER CLOSURE OF SUBPULMONIC VSD

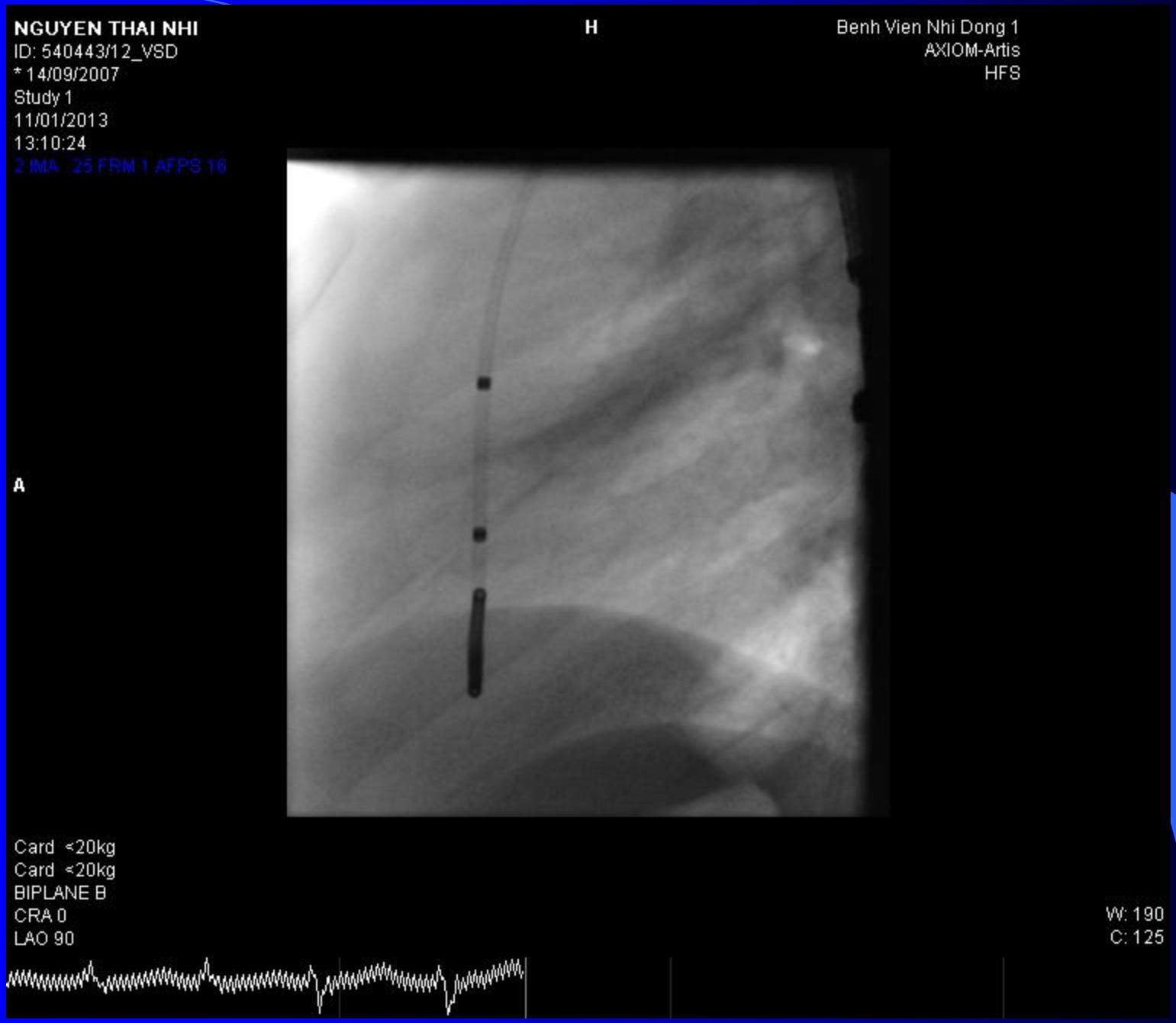
TECHNIQUES

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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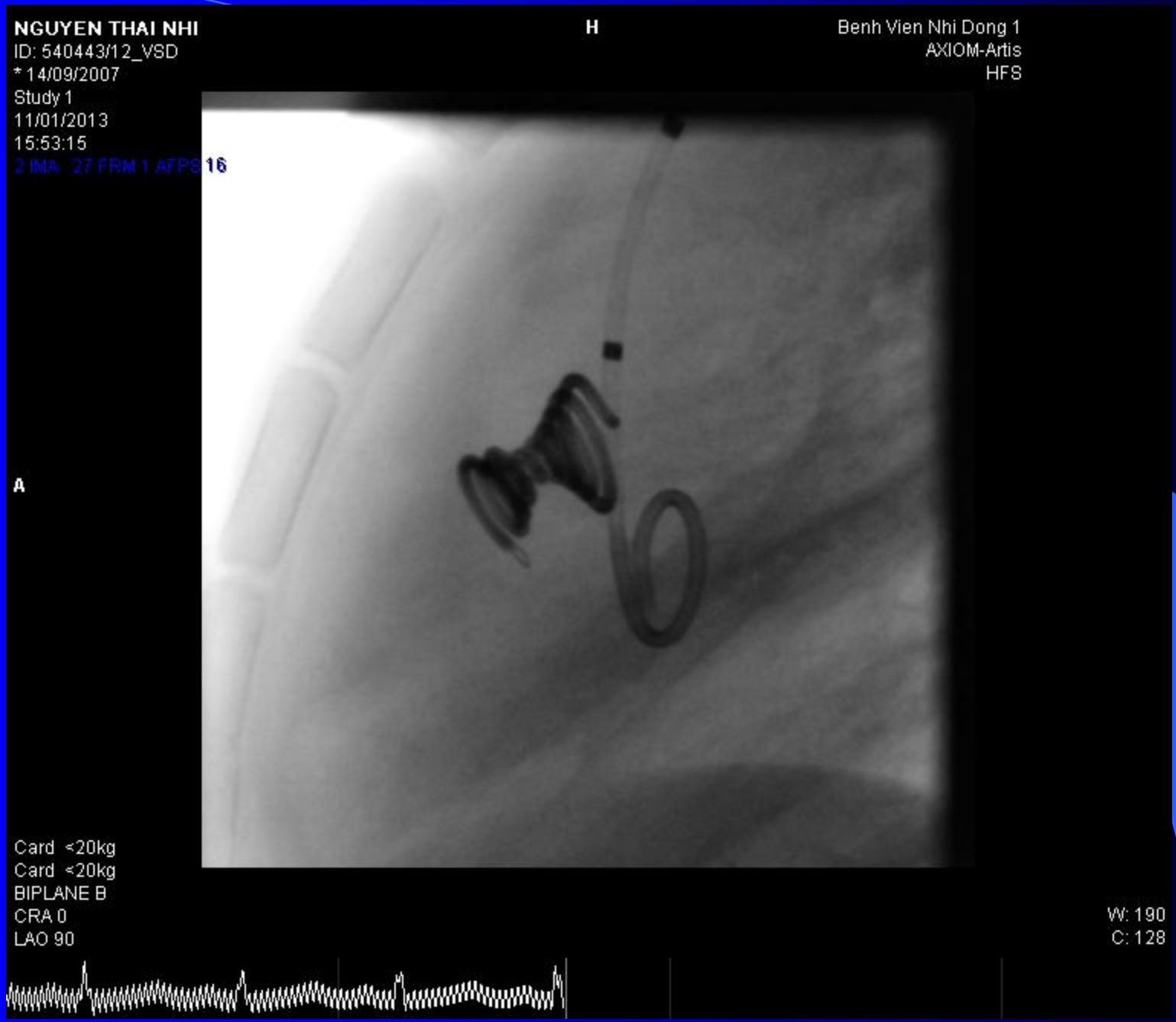
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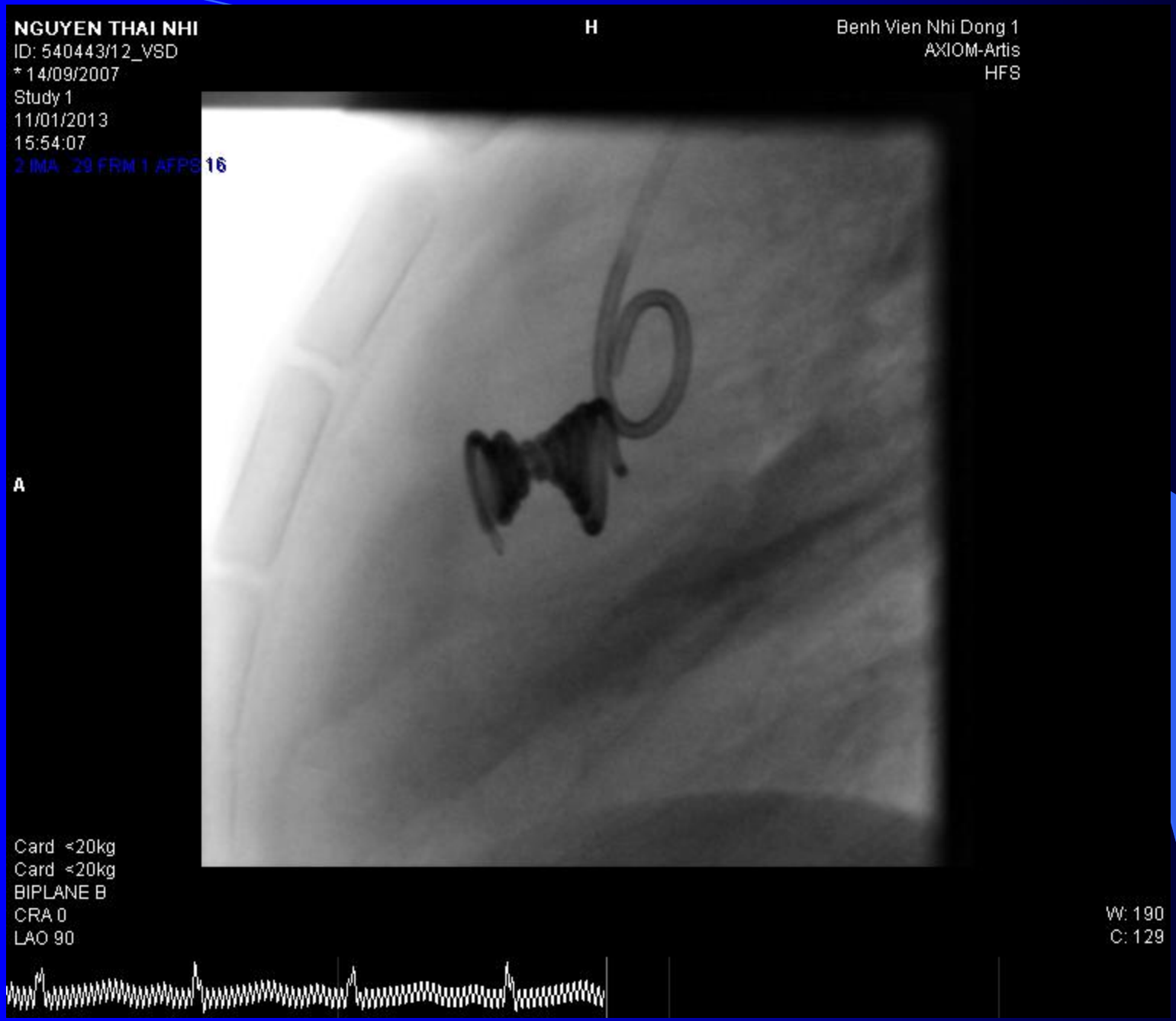
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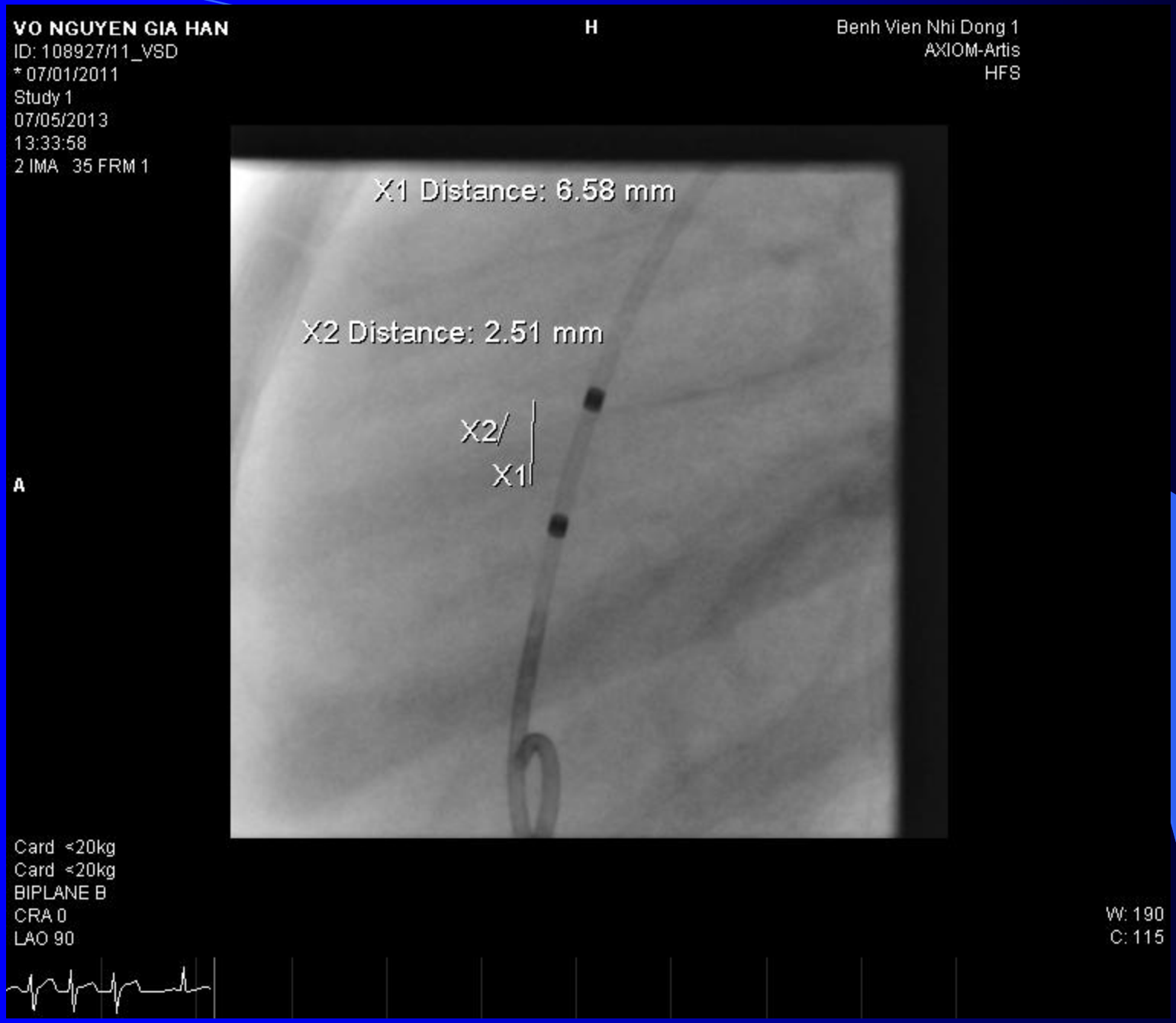
C: 129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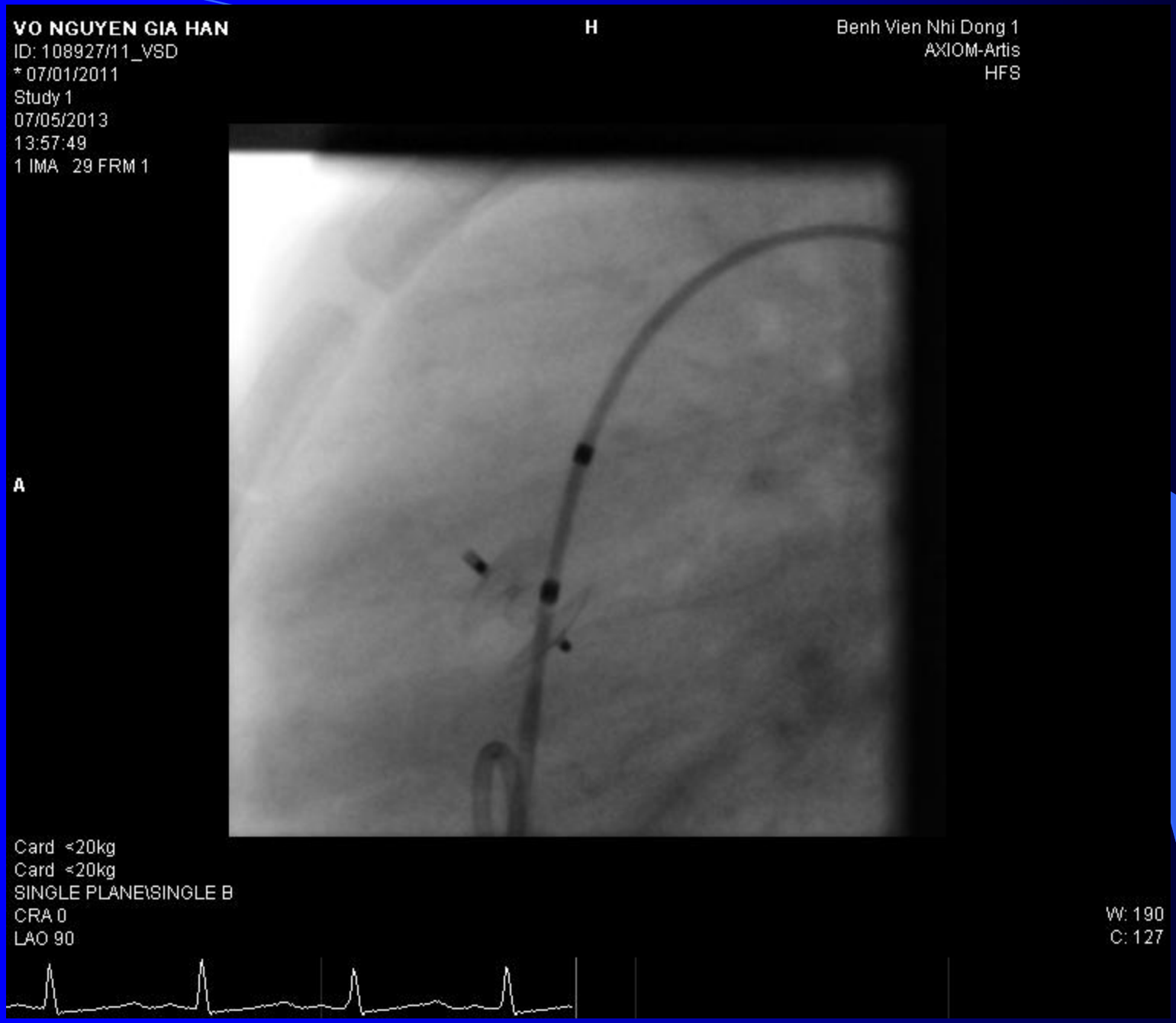
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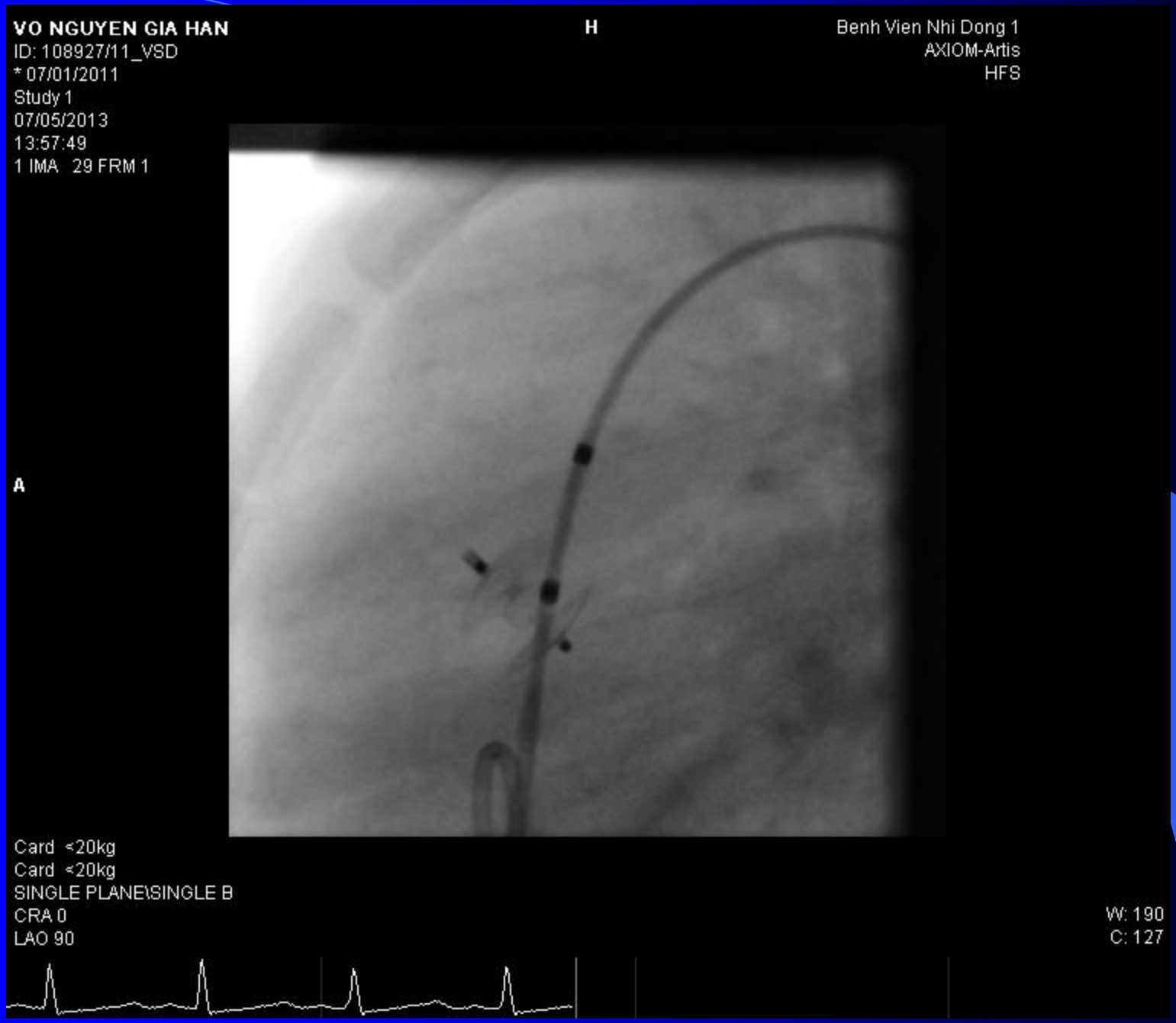
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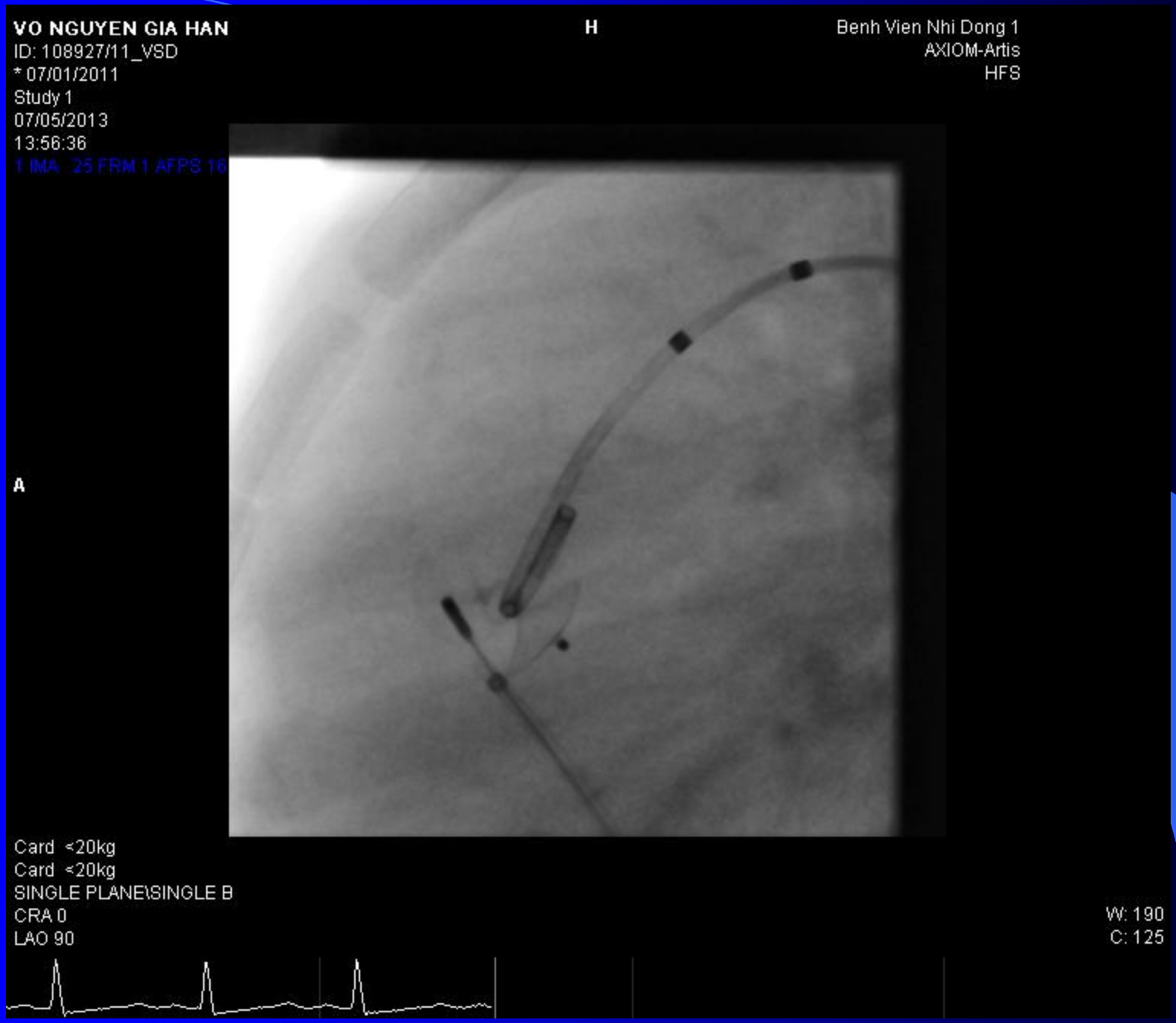
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WHAT RESULTS FROM INFUNDIBULAR VSD CLOSURE BY DEVICE?

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%)

No stable coil formation
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%

RESULTS

65 CASES INFUDIBULAR VSD CLOSURE

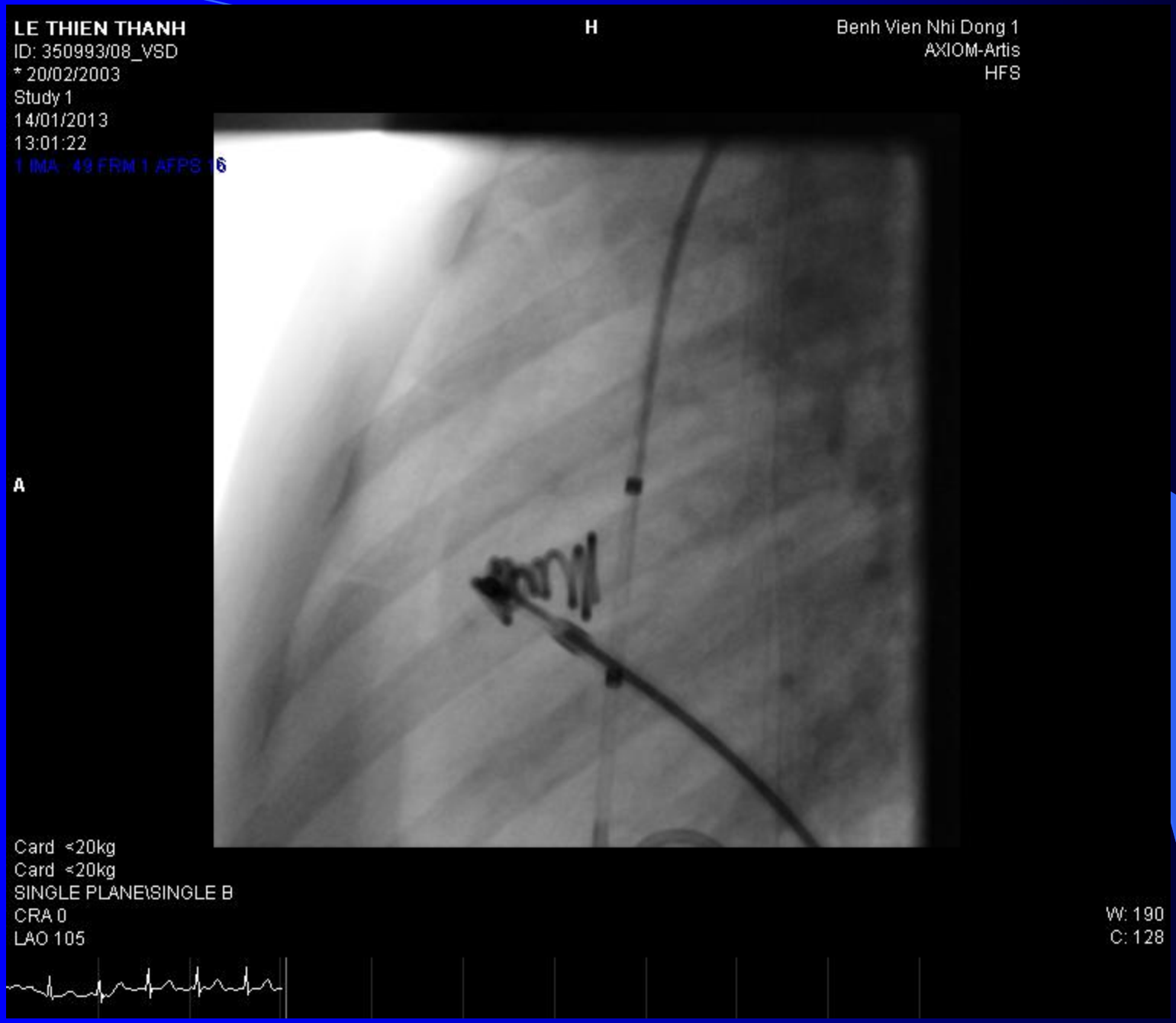
1. SUCCESFUL: 61 CASES
2. HEMOLYSIS 2 CASE
3. TECHNICAL FAILURE 2 CASES

COMPLICATIONS AND FAILURE

1. HEMOLYSIS: RESIDUAL SHUNT DUE TO
2. TECHNICAL FAILURE: THE DEVICES WERE NOT STABLE

DUE TO

1. UNDERESTIMATED THE SIZES OF DEFECTS
2. THE DEVICE CONFIGURATION WAS CHANGED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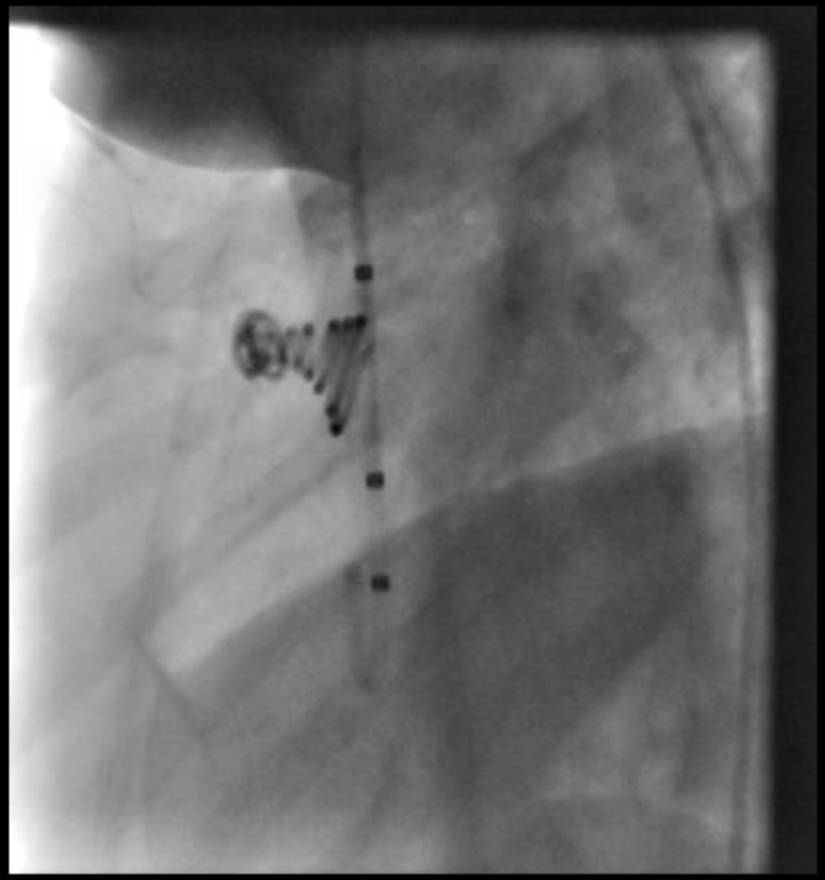

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CONCLUSIONS

1.DCVSD is common in Asia

2.Progressive AVP and AR are an important issue

3.Timing closure can reduce the severity of AR and prevent further progression.

4.Infundibular VSD is the most difficult type

5.Pfm coil and ADO II : acceptable devices

6.Preliminary results of coil occlusion show similar data compared to surgical closure. Long-term results should be strictly evaluated

HCMC Pediatric Cardiology & Congenital Heart Disease Society

The 4th Viet Nam Congress of Congenital and structural heart Diseases FISTULA from A to Z

January 8 - 10, 2014. Ho Chi Minh City, Viet Nam

2014

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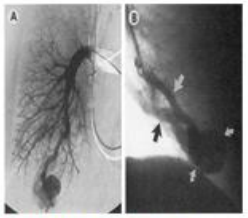
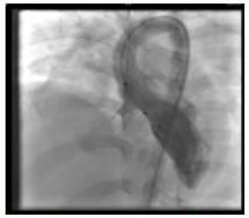
TOPIC 2014

Coronary Fistula



Pulmonray AV fistula

Porto - systemic fistula



Valsalva sinus Fistula

Paravalvular Leak

Renal A-V Fistula

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THANKS FOR YOUR ATTENTION

SEE YOU IN HO CHI MINH CITY JAN 8- 10, 2014